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AD HOC TECHNICAL EXPERT GROUP MEETING ON INDICATORS FOR THE STRATEGIC PLAN FOR BIODIVERSITY 2011-2020 Geneva, Switzerland, 14-17 September 2015

#### **REVIEW OF THE GLOBAL INDICATOR SUITE. KEY GLOBAL GAPS AND INDICATOR** OPTIONS FOR FUTURE ASSESSMENT OF THE STRATEGIC PLAN FOR **BIODIVERSITY 2011-2020**

#### *Revised note by the Executive Secretary*

1. The Executive Secretary is circulating herewith, for the information of participants in the meeting of the Ad hoc Technical Expert Group on Indicators for the Strategic Plan for Biodiversity 2011-2020, a technical background document reviewing the global indicator suite, key global gaps and indicator options for future assessment of the Strategic Plan for Biodiversity 2011-2020.

2. The report was prepared by the United Nations Environment Programme-World Conservation Monitoring Centre in consultation with the Secretariat of the Convention on Biological Diversity and the Biodiversity Indicators Partnership, and with financial support from the Federal Office for Environment, Government of Switzerland, to support the work of the Ad Hoc Technical Expert Group (AHTEG) on Indicators for the Strategic Plan for Biodiversity.

3. The report is presented in the form and language in which it was received by the Secretariat.



## Review of the global indicator suite, key global gaps and indicator options for future assessment of the Strategic Plan for Biodiversity 2011-2020

## June 2015

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This report was produced by UNEP-WCMC in consultation with the Secretariat of the Convention on Biological Diversity (CBD) and the Biodiversity Indicators Partnership (BIP), and with financial support from the Federal Office for Environment (FOEN), Government of Switzerland and the European Commission to support the Ad Hoc Technical Expert Group (AHTEG) on Indicators for the Strategic Plan for Biodiversity 2011-2020.

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## **Key Messages**

- The indicators brought together under the Biodiversity Indicators Partnership (BIP) provide a good framework from which to monitor progress towards the Strategic Plan for Biodiversity 2011-2020. There is at least one global indicator available for 17 of the 20 Aichi Biodiversity Targets at present.
- This review, through its analysis of indicator gaps and review of potential indicators to fill these gaps, has highlighted the following issues for consideration by the Ad Hoc Technical Expert Group (AHTEG) on Indicators for the Strategic Plan for Biodiversity 2011-2020:
  - It is important to ensure the continued production and enhancement of the indicators brought together under the BIP
     Whilst the indicators brought together under the BIP provide an extremely useful framework, very few of the indicators have sufficient long-term resources in place. Lack of resources are acting to restrict the spatial coverage or number of planned data points for a number of the indicators. There is also potential to further utilise some of the BIP indicators, through disaggregation etc., to monitor progress towards multiple Aichi Biodiversity Targets.
  - There should be a focus on identifying indicators for Aichi Biodiversity Targets 2, 3 and 15

In order to ensure there is at least one global indicator per Aichi Biodiversity Target, as requested in decision XI/3, emphasis should be placed on identifying indicators to fill gaps for Aichi Targets 2, 3, and 15. Through this review three potential indicators were identified for Aichi Target 2, seven indicators for Aichi Target 3 and one indicator for Aichi Target 15.

#### o Opportunities exist for enhancing the indicator suite more generally

Through this review, potential indicators were identified to fill gaps for Aichi Targets 2, 3 and 15 and for gaps identified at a finer resolution: Aichi Target Element Gaps and instances where indicators are available but alignment, temporal relevance or spatial coverage gaps exist. This review identified 52 potential new indicators, six inactive BIP indicators and 11 disaggregated BIP indicators. 21 of these indicators were categorised as ready for global use. As these indicators require no further development, there is the opportunity to incorporate these identified indicators into the BIP, enhancing the suite of indicators available for monitoring progress across the Strategic Plan for Biodiversity 2011-2020. Under this potential 'low cost' option the number of Aichi Target elements with no global indicators would drop from 29 to 20.

It is important to note that the potential indicators identified under this review are
options, not recommendations and should serve as a starting point for filling gaps in the
global indicator framework. Subject to AHTEG recommendations, emphasis should be
placed on conducting a thorough technical review of the priority gaps, involving expert
communities, to ensure that adopted indicators are highly aligned to Aichi Biodiversity
Targets and complement the existing global indicator suite.

## **Executive Summary**

#### Introduction

- In 2014, the 12<sup>th</sup> meeting of the Conference of the Parties (CoP) to the Convention on Biological Diversity (CBD) conducted a mid-term review of progress in implementation of the Strategic Plan for Biodiversity 2011-2020, including Global Biodiversity Outlook 4 (GBO-4). The review recognised that whilst there had been encouraging progress towards meeting some elements of the Aichi Targets, progress will not be sufficient to achieve the targets unless further urgent effective action is taken.
- Within the adopted decision XII/1, Parties requested the Executive Secretary to convene a meeting of the Ad Hoc Technical Expert Group (AHTEG) on Indicators for the Strategic Plan for Biodiversity 2011-2020.

#### **Purpose of this review**

- The Terms of Reference for the AHTEG on Indicators for the Strategic Plan 2011-2020 (decision XII/1), called on the AHTEG to 'identify a small set of measureable potential indicators that could be used to monitor progress at the global level towards the Aichi Biodiversity Targets with a focus on those that are currently not well addressed and those that may be relevant to the United Nations post-2015 development agenda and sustainable development goals'.
- This document has been developed to support the AHTEG by identifying gaps in the current suite of indicators brought together under the BIP, building upon the indicative list of indicators adopted in decision XI/3 and reviewing potential indicators to fill these gaps. This document is not a report on the state of the world's indicators.

## Current indicator suite and identification of key global gaps

- The Biodiversity Indicators Partnership (BIP) currently brings together 48 biodiversity indicators to monitor progress towards the Aichi Biodiversity Targets as outlined in the Strategic Plan for Biodiversity 2011-2020.
- In order to undertake a thorough gap analysis the 35 active indicators (those utilised in GBO-4 or the 2014 edition of the Aichi Passport) brought together under the BIP were mapped against the Aichi Biodiversity Targets and their respective Elements, and scored according to three criteria:
  - Alignment to the Aichi Biodiversity Target: How well does each indicator align with the text of the Aichi Target and its sub-Elements?
  - Temporal relevance to the Strategic Plan for Biodiversity: Are there enough pre 2010 data points and planned data points for the period 2010-2020 to enable accurate assessment of implementation of the Strategic Plan?
  - $\circ$  Spatial coverage: How global is the spatial coverage of the indicator?
- There are currently three Aichi Targets (2, 3 and 15) for which there are no global indicators available under the BIP.
- Specific challenges for the development of indicators for these Targets, include:
  - Aichi Biodiversity Target 2: The unspecific nature of 'biodiversity values', the challenge of measuring integration and the lack of universally accepted ecosystem accounting and reporting frameworks.

- Aichi Biodiversity Target 3: The majority of incentives occur at the national to regional scale. Global indicators for these Targets would therefore need to collate together information on various national/regional incentives, which would be a resource intensive activity.
- Aichi Biodiversity Target 15: Difficulty in measuring improvements in ecosystem resilience and the geographic variability in what is considered a 'degraded' ecosystem.
- The gap analysis was also conducted at the Aichi Target Element level.
- In terms of the coverage of each Element by the current BIP indicators, half (54%) do not have unique indicators. Target 13 has the highest proportion of Element gaps with only one of its five Elements having an indicator.
- Of the 35 Aichi Target Elements with a BIP indicator, 49% were judged to have high alignment, 60% scored high for temporal relevance and 80% scored good for spatial coverage.
- The three scoring criteria Aichi Target alignment, temporal relevance to the Strategic Plan and spatial coverage – were brought together to produce one score per Aichi Target to identify, in addition to the gaps, where targets may not be adequately represented/covered by the current indicators available.
- The combined scoring indicates that, in addition to focussing on identifying indicators for those Targets for which no global indicators exist (2, 3, and 15), emphasis should also be place on enhancing the global indicators available for Aichi Targets 1, 8, 13, 16, 17, 18, 19 and 20.

### **Options for filling indicator gaps**

- A review was conducted to identify potential indicators that may provide opportunities to fill each gap identified. Information sources for the review included:
  - The indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).
  - The non-BIP indicators incorporated in the Tittensor *et al.* (2014) indicator extrapolation analysis.
  - Indicators primarily rejected from the Tittensor *et al.* (2014) analysis due to the fact that they didn't meet the extrapolation criteria. These indicators were reviewed as they may meet these criteria in time or be useful for non-extrapolation assessments of progress towards the Aichi Targets.
  - Literature and online resources.
- The potential indicators identified were scored for alignment to the Aichi Biodiversity Targets and their associated Elements, spatial coverage and temporal relevance to the Strategic Plan, in order to maintain consistency with the scoring system applied to the indicators brought together under the BIP for the gap analysis.
- The readiness of the new potential indicators for use in monitoring progress towards the Aichi Targets was also identified, using the same categories applied to the indicative list of indicators adopted in decision XI/3, but with slight differences in the criteria for categorisation.
- The potential indicators are opportunities, not recommendations, and it has been assumed that the underlying data in the indicator has been used correctly and is not in breach of any data provider's agreement.
- The review may have missed suitable datasets and/or indicators and we welcome being made aware of any suitable work that may provide an opportunity to fill the gaps identified.

### Conclusions

- The indicators brought together under the BIP provide a good framework from which to monitor progress towards the Strategic Plan for Biodiversity 2011-2020. There is at least one global indicator available for 17 of the 20 Aichi Biodiversity Targets at present.
- This review, through its analysis of indicator gaps and review of potential indicators to fill these gaps, has highlighted the following issues for consideration by the Ad Hoc Technical Expert Group on Indicators for the Strategic Plan for Biodiversity 2011-2020:
  - 1. It is important to ensure the continued production and enhancement of the indicators brought together under the BIP
    - It is important to provide adequate resources for the continued production and enhancement of the indicators brought together under the BIP as very few of the indicators have sufficient long-term resourcing mechanisms in place. Lack of resources restricts the spatial coverage or future updates for a number of the indicators
    - A number of indicators under the BIP can be disaggregated to monitor trends towards multiple Aichi Biodiversity Targets and efforts should be made to ensure all indicators under the BIP are utilised to their full potential.
  - 2. There should be a focus on identifying indicators for Aichi Biodiversity Targets 2, 3 and 15
    - The review and analysis of the global indicators brought together under the BIP identified three Aichi Targets gaps for which there are currently no indicators available: 2, biodiversity values integrated; 3, incentives reformed and 15, ecosystem restoration and resilience. Emphasis could be placed on identifying indicators for these Targets in liaison with expert communities.
    - The potential indicators identified as starting points to fill these Aichi Target gaps were:

#### Target 2:

- > Integration of biodiversity in Poverty Reduction Strategy Papers
- Investment in Environmental Impact Assessments (EIAs) (ready for global use)
- > Number of research studies involving economic evaluation

#### Target 3:

- Financing reported for REDD+
- > Funding towards institutional capacity building in fisheries
- Sovernment financial transfers to fisheries (ready for global use)
- Instruments used for environmental policy
- Natural resource management
- OECD support to agriculture (produced and consumer support estimates)
- Tax expenditures for fossil fuels
- > World Trade Organisation 'green box' agricultural subsidies

#### Target 15:

Area of restoration projects in the Global Restoration Network Database

#### 3. Opportunities exist for enhancing the global indicator suite more generally

- At the Aichi Target Element level, there are no unique indicators under the BIP for more than half of the individual Elements as well as alignment, temporal relevance and spatial coverage gaps.
- The indicator suite could be enhanced more generally through the addition of 21 'Category A' indicators that require little to no further development into the BIP. The incorporation of these indicators, following thorough technical review, would reduce the number of Aichi Target Elements with no global indicators from 29 to 20.
- This potential 'quick win' option would require some resources to technically review the additional indicators, ensuring they complement existing indicators and do not present conflicting messages.

#### Acknowledgements

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## 1. Introduction

## 1.1. The Strategic Plan for Biodiversity 2011-2020

The Strategic Plan for Biodiversity 2011-2020, including its 20 'Aichi Biodiversity Targets', was adopted in decision X/2 at the tenth meeting of the Conference of the Parties to the Convention on Biodiversity (CBD COP 10), held in Nagoya, Japan in October 2010. This plan provides an overarching framework on biodiversity, not only for the biodiversity-related conventions, but also for the entire United Nations system and all other partners engaged in biodiversity management and policy development.

In 2011, the CBD Secretariat convened, as requested in decision X/7, an Ad Hoc Technical Expert Group (AHTEG) on Indicators for the Strategic Plan for Biodiversity 2011-2020. The terms of reference for the meeting included a number of actions, with those concerning the global indicator suite including the provision of advice on the further development and adjustment of indicators developed for the previous Strategic Plan (decisions VII/30 and VIII/15) and the suggestion of additional indicators to constitute a coherent framework for assessment of progress towards the Aichi Biodiversity Targets. The AHTEG on Indicators for the Strategic Plan for Biodiversity 2011-2020 produced an indicative list of indicators. The indicators were reviewed during COP 11 and adopted as an indicator framework for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3). The indicator framework consists of 12 headline indicators and 97 operational indicators. These operational indicators have been categorised as follows:

- A. Ready for use at the global level (22 indicators)
- B. Priority for development for use at the global level (36 indicators)
- C. For consideration at the sub-global level (39 indicators)

In addition to the adoption of the indicative list of indicators, decision X/3 called for the CBD Executive Secretary, in collaboration with the Biodiversity Indicators Partnership (BIP) and other relevant organisations, to achieve a number of actions relating to global indicator development for the Strategic Plan. This included the request to 'further develop global indicators identified in annex I ... with a view to ensuring that each Aichi Biodiversity Target can be monitored by at least one global indicator by 2014, taking into account indicators that are already in use by, or relevant to, other conventions, regional agreements and processes.'

## 1.2. The Biodiversity Indicators Partnership

The BIP is a global initiative established in 2007 in response to CBD decision VII/30, with substantial funding from the Global Environment Facility (GEF), to assist in monitoring progress towards the 2010 Biodiversity Targets. The BIP was subsequently endorsed by the CBD in decision VIII/15. From 2007 to 2010, the Partnership brought together over 40 organisations worldwide to develop, strengthen, implement and communicate a suite of complementary indicators, which were agreed by parties to the CBD at COP 8 (decision VIII/15) in 2006. The BIP made substantial progress in developing global biodiversity indicators for the framework. Of the headline indicators considered ready for testing and use in 2006, all were subsequently further developed in terms of data coverage and updating. Of the nine headline indicators that were identified as needing further development, Page | 11

four received substantial attention. In total, the Partnership brought together and reported on 29 specific metrics for 17 of the CBD headline indicators.

In order to support the revised and updated Strategic Plan for Biodiversity 2011-2020, including the Aichi Biodiversity Targets, the BIP underwent an extensive review process and identified the following four objectives for the continued Partnership:

- An enlarged and enhanced partnership to facilitate experience sharing and indicator implementation in support of the Strategic Plan for Biodiversity 2011-2020.
- A significant expansion in national capacity-strengthening for the development and use of biodiversity and ecosystem service indicators as part of NBSAP updating and implementation.
- Providing a communication hub website for developing and communicating compelling storylines from the combined suite of global indicators.
- A much closer integrated working relationship with the Secretariat of the CBD.

Despite limited resources for global indicator development, many of the indicators brought together under the BIP for the previous Strategic Plan were included in the indicative list of indicators for the Strategic Plan (decision XI/3) and have been further developed/updated to assess progress towards the Aichi Biodiversity Targets. The BIP has also been successful in incorporating 16 new indicators to enhance the indicator suite. Some of the new indicators originate from the disaggregation of existing indicators. For example, the IUCN Red List Index (Aichi Target 12) has been disaggregated/recalculated to produce the Red List Index (impacts of utilisation) (Aichi Target 4), the Red List Index (impacts of fisheries on marine species) (Aichi Target 6) and the Red List Index (pollinating species) (Aichi Target 14).

## 1.3. The 4<sup>th</sup> Edition of Global Biodiversity Outlook

The Global Biodiversity Outlook (GBO) is the flagship publication of the CBD, intended to summarise the latest data on the status and trends of biodiversity and draw conclusions relevant to further implementation of the Convention. The third edition of the GBO (GBO-3), published in 2010, made the first steps towards defining future projections of biodiversity loss on the planet (Pereira et al. 2010; Secretariat of the CBD 2010).

In order to refine and further develop the work carried out under GBO-3, the sixteenth meeting of the CBD Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) made recommendation XVI/2, that GBO-4 addresses the level of progress towards the Aichi Targets and how the achievement of the Aichi Targets would contribute to the 2050 vision of the Strategic Plan. The global indicators brought together under the BIP were utilised in two main ways to support this mid-term assessment of progress towards the implementation of the Strategic Plan for Biodiversity 2011-2020. Firstly, updates for 37 of the 48 listed BIP indicators were provided to the production team for the development of storylines within the status and trends sections of the Aichi Target chapters.

In addition, an indicator synthesis was produced which extrapolated global indicators to 2020. It was acknowledged that gaps exist in the suite of indicators brought together under the BIP and that the synthesis would include additional datasets/indicators, building on the CBD's indicative list, to try to address this issue. More than 100 possible additional data sets were identified. Those indicators, from the BIP and non-BIP sources, that were retained for the GBO-4 analysis for extrapolation to

2020 were selected using a set of criteria (Table **1.1**) that were designed to ensure the broadest possible range of the indicators were included, while still ensuring that they were sufficiently datarich for statistical extrapolation.

Table 1	<b>.1:</b> Criteria	used to i	dentifv il	ndicators f	<sup>f</sup> or use i	n the	GBO-4	extrapolation	to 2020	analvsis.

Criteria used to identify which BIP and non-BIP indicators were incorporated in the GBO-4 extrapolation to 2020 analysis					
i.	Relevance to the Aichi Target				
ii.	Scientific and institutional credibility, either through publication in the peer-reviewed				
	literature or through having an institutional basis				
iii.	An end data point after 2010, although this was relaxed where an Aichi Target had				
	few indicators or where an indicator was particularly relevant				
iv.	At least 5 data points				
<b>v.</b>	Broad geographic coverage				

Of the 150 potential indicators reviewed against the criteria (see Table 2.1), almost two thirds were subsequently excluded for failing to meet one or more criteria. The final selection resulted in 55 indicators suitable for extrapolation across 16 of the 20 Aichi Targets, 20 of these being from the BIP indicator suite (see Table 2.2). The resulting indicator extrapolations formed one of the main sources of information supporting the production of GBO-4; they were also published in the scientific journal, Science (Tittensor *et al.* 2014)<sup>1</sup>.

## 1.4. The 2015 Ad Hoc Technical Expert Group on Indicators for the Strategic Plan for Biodiversity 2011-2020

In 2014, the 12<sup>th</sup> meeting of the Conference of the Parties to the CBD conducted a mid-term review of progress towards the implementation of the Strategic Plan for Biodiversity 2011-2020, including GBO-4. The review recognised that, whilst there had been encouraging progress toward meeting some Elements of the Aichi Targets, progress would not be sufficient to achieve the targets unless further urgent effective action is taken.

Within the adopted decision XII/1, Parties requested the Executive Secretary to convene a meeting of the Ad Hoc Technical Expert Group on Indicators for the Strategic Plan for Biodiversity 2011-2020. The terms of reference for the meeting was provided in Annex 2 of the decision.

## 1.5. Purpose of this document

The Terms of Reference for the AHTEG on Indicators for the Strategic Plan 2011-2020 (decision XII/1), called on the AHTEG to 'identify a small set of measureable potential indicators that could be

<sup>&</sup>lt;sup>1</sup> Tittensor, D.P., Walpole, M., Hill, S.L.L., Boyce, D.G., Britten, G.L., Burgess, N.D., Butchart, S.H.M., Leadley, P.W., Regan, E.C., Alkemade, R., Baumung, R., Bellard, C., Bouwman, L., Bowles-Newark, N.J., Chenery, A.M., Cheung, W.W.L., Christensen, V., Cooper, H.D., Crowther, A.R., Dixon, M.J.R., Galli, A., Gaveau, V., Gregory, R.D., Gutierrez, N.L., Hirsch, T.L., Hoft, R., Januchowski-Hartley, S.R., Karmann, M., Krug, C.B., Leverington, F.J., Loh, J., Lojenga, R.K., Malsch, K., Marques, A., Morgan, D.H.W., Mumby, P.J., Newbold, T., Noonan-Mooney, K., Pagad, S.N., Parks, B.C., Pereira, H.M., Robertson, T., Rondinini, C., Santini, L., Scharlemann, J.P.W., Schindler, S., Sumaila, U.R., Teh, L.S.L., van Kolck, J., Visconti, P., Ye, Y., 2014. A mid-term analysis of progress toward international biodiversity targets. Science (80). 346, 241–244. doi:10.1126/science.1257484 Page | 13

used to monitor progress at the global level towards the Aichi Biodiversity Targets with a focus on those that are currently not well addressed and those that may be relevant to the United Nations post-2015 development agenda and sustainable development goals'. This document has been developed to support the AHTEG by identifying gaps in the current suite of indicators brought together under the BIP, building upon the indicative list of indicators adopted in decision XI/3 and reviewing potential indicators to fill these gaps.

## 2. Current indicator suite and identification of key global gaps

## 2.1. Current indicator suite brought together under the BIP

In addition to the indicators developed and utilised to monitor progress towards the previous Strategic Plan and the 2010 Biodiversity Target, the BIP has subsequently identified and incorporated (according to the criteria outlined in Table **2.1**) 16 additional indicators, resulting in a suite of 49 biodiversity indicators (Table **2.2**) to monitor progress towards the Aichi Biodiversity Targets as outlined in the Strategic Plan for Biodiversity 2011-2020.

**Table 2.1:** Criteria for the inclusion of new indicators and Partners into the BIP following the adoption of the Strategic Plan for Biodiversity 2011-2020. Taken from 'Guidance for new BIP Indicator Partners':

Essential	Desired
Indicator(s) relevant to one or more of the Aichi	Indicator can be disaggregated by country
Biodiversity Targets	Indicator data updated annually
Temporal trend data available or a developed	Data freely available via website, publication,
baseline	etc.
Plans in place to continue indicator production	Peer reviewed in scientific literature
and produce regular updates – not an isolated	
one-off study	
Indicator applicable at the global or regional	
scale	

http://www.bipindicators.net/LinkClick.aspx?fileticket=48KdsYjZFaw%3d&tabid=158&mid=1575

The majority of the indicators brought together under the BIP have been recently utilised to support assessments of progress towards the Strategic Plan for Biodiversity. 28 of the indicators were utilised for the production of the status and trends sections of the GBO-4 Aichi Target chapters. With 21 meeting the set criteria (Table **1.1**) for inclusion on the GBO-4 extrapolation to 2020 analysis. A larger subset of the indicators, 35, have been recently updated and were incorporated in the 2015 edition of the Aichi Passport. Twelve of the indicators brought together under the BIP are still under development or are not currently being taken forward by organisations/institutions at present (e.g. Water Quality Index for Biodiversity). These indicators, which have not been utilised in GBO-4 or the 2015 edition of Aichi Passport (highlighted in Table 2.2), are classified as 'inactive' for the purpose of this review and not included in the gap analysis undertaken below. For the same reason, the Global Wild Bird Index was also excluded. **Table 2.2:** The global indicators brought together under the BIP. Indicators in italics are categorised as inactive for the purpose of this review, because 1) they are still under development or 2) no organisation or institution is currently taking them forward, or 3) they have been superseded by others listed. Further information on the individual indicators can be found in the indicator factsheets provided in Annex 1, with the latest information on the inactive indicators being available from the BIP website: http://www.bipindicators.net/globalindicators.

Strategic	Aichi	Aichi Target		Recent use of the indicators			
Goal	Target	Quick Title*	Indicators brought together under the BIP	Aichi Passport 2014	GBO-4: Status and trends sections within Aichi Target chapters	GBO-4: Extrapolations to 2020 and Synthesis	
A	1	Awareness of biodiversity	Biodiversity Barometer	Yes	Yes	Yes	
	4	Use of Natural	Ecological footprint	Yes	Yes	Yes	
		Resources	Red List Index (impacts of utilisation)	Yes	No	Yes	
			Status of Species in trade	No	No	No	
			Wild Commodities Index	No	No	No	
В	5	Loss of habitats	Extent of forests and forest types	Yes	Νο	No	
		Area of forest under sustainable management: degradation and deforestation	No	No	No		
			Extent of marine habitats	No	No	No	
			Forest fragmentation	No	No	No	
			River fragmentation and flow regulation	No	No	No	

Strategic	Aichi	Aichi Target	Indicators brought together under the DID	Recent use of the indicators			
Goal	Target	Quick Title*	Indicators brought together under the BIP	Aichi Passport 2014	GBO-4: Status and trends sections within Aichi Target chapters	GBO-4: Extrapolations to 2020 and Synthesis	
			Wild Bird Index for habitat specialists	Yes	Yes	Yes	
	6	Sustainable	Marine Trophic Index	Yes	Yes	No	
		fisheries	MSC certified fishery tonnage and improvements	Yes	Yes	Yes	
			Proportion of fish stocks in safe biological limits	Yes	Yes	Yes	
			Red List Index (impacts of fisheries)	Yes	Yes	Yes	
	7	Areas under	Wild Bird Index for farmland birds	Yes	Yes	Yes	
	sustainable	sustainable	Area of agricultural ecosystems under sustainable management	No	No	No	
			Area of forest under sustainable management: certification	Yes	Yes	Yes	
	8	Pollution	Water Quality Index for Biodiversity	No	No	No	
			Loss of reactive nitrogen to the environment	Yes	Yes	No	
			Nitrogen Deposition	Yes	Yes	No	
	9	Invasive Alien Species	Trends in the numbers of invasive alien species introduction events	Yes	Yes	Yes	

<b>C</b> 1	<b></b>	A			Recent use of the indic	ators
Goal	Aichi Target	Quick Title*	Indicators brought together under the BIP	Aichi Passport 2014	GBO-4: Status and trends sections within Aichi Target chapters	GBO-4: Extrapolations to 2020 and Synthesis
			Red List Index (impacts of invasive alien species)	Yes	Yes	Yes
			Trends in invasive alien species vertebrate eradications	Yes	Yes	No
			Adoption of national legislation to the prevention or control of invasive alien species	Yes	Yes	Yes
	10 Vulnerable Ecosystems	Climatic impacts on European bird populations	Yes	No	No	
		Ecosystems	Cumulative human impact on marine ecosystems	Yes	No	No
С	11	Protected	Coverage of protected areas	Yes	Yes	Yes
		areas	Protected area overlays with biodiversity	Yes	Yes	Yes
			Management effectiveness of protected areas	Yes	Yes	Yes
	12	Preventing	Living Planet Index	Yes	Yes	Yes
		extinctions	Red List Index	Yes	Yes	Yes
			Wildlife Picture Index	Yes	Yes	No
			Global Wild Bird Index	No	Yes	No

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Strategic	Aichi	Aichi Target	Indicators brought together under the DID	Recent use of the indicators			
Goal Targ		Quick Title*	indicators brought together under the Bip	Aichi Passport 2014	GBO-4: Status and trends sections within Aichi Target chapters	GBO-4: Extrapolations to 2020 and Synthesis	
	13	Genetic Diversity	Ex-situ crop collections	No	No	No	
			Genetic Diversity of terrestrial domesticated animals	Yes	Yes	Yes	
D	14	Essential	Red List Index (species used for food and medicine)	Yes	Yes	No	
		Services	Ocean Health Index	Yes	Yes	No	
			Red List Index (pollinating species)	Yes	Yes	Yes	
			Health and well-being of communities directly dependant on ecosystem goods and services	No	No	No	
			Nutrition indicators for biodiversity	No	No	No	
	16	Nagoya Protocol on Access and Benefit- Sharing	Ratification status of the Nagoya protocol	Yes	Yes	No	
E	17	National Biodiversity Strategies and	Status of NBSAPS	Yes	Νο	Νο	

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Strategic	Aichi	Aichi Target	Indicators brought together under the PID	Recent use of the indicators			
Goal	al Target Quick Title*		indicators brought together under the bip	Aichi Passport 2014	GBO-4: Status and trends sections within Aichi Target chapters	GBO-4: Extrapolations to 2020 and Synthesis	
		Action Plans					
	18	Traditional	Index of Linguistic Diversity	Yes	Yes	No	
		Knowledge	Linguistic Diversity	Yes	No	No	
			VITEK	No	No	No	
	19	Biodiversity Knowledge	Number of Global Biodiversity Information Facility records over time	Yes	Yes	Yes	
	20	Resource Mobilization	Official Development Assistance Provided in support of the Convention	Yes	Yes	Yes	

\*Please note that the wordings of the Aichi Biodiversity Targets have been shortened for reasons of readability. The official wording can be found in <u>decision X/2</u>.

# 2.2. Mapping and scoring the BIP indicators against the Aichi Biodiversity Targets

In order to undertake a thorough gap analysis the indicators brought together under the BIP were mapped against the Aichi Target Elements and scored according to three criteria (Table 2.3):

- Alignment to Aichi Target Element how well does an indicator align to the text of the Aichi Biodiversity Target sub-Elements? Each indicator was assigned as having high, medium or low alignment to a Target Element. It is important to note that assignment of the alignment scores was a subjective process and relied on personal interpretation of the Aichi Targets.
- Temporal relevance to the Strategic Plan are there enough pre 2010 data points and planned data points for the period 2010-2020 to enable accurate assessment of implementation of the Strategic Plan? Each of the indicators were scored in order to determine their temporal relevance to the Strategic Plan for Biodiversity 2011-2020. Scoring was based upon the number of data points available during the Strategic Plan period. Estimates of the number of data points available from 2011 2020 were based on periodicity of data points to date and in some cases in consultation with indicator partners.
- Spatial coverage what is the spatial scale of the indicator? The scores given to each of the indicators were assigned according to the criteria adopted in Tittensor *et al.* (2014).

Table **2.4** shows how the BIP Indicators were mapped and their scores under each of the three criteria.

Score	Alignment to Aichi Target Element	Temporal Relevance	Spatial Coverage
High/Good	As defined by Tittensor et al. (2014).	According to current trends 5 ≥ data points are projected between 2011-2020. This gives greater sensitivity to change than indicator's that scored medium.	'Good', as defined by Tittensor et al. (2014): 5 + continents (more than 20 countries total
Medium/ Moderate	As defined by Tittensor et al. (2014).	According to current trends 3- 4 data points are projected between 2011-2020. This is sufficient information to analyse a trend.	'Moderate', as defined by Tittensor et al. (2014): 3-4 continents (more than 10 countries total); 5 + continents (less than 20 countries total)
Low/Poor	As defined by Tittensor et al. (2014).	According to current trends 2 ≤ data points are projected between 2011-2020. This is insufficient information to analyse a trend.	<ul> <li>'Poor', as defined by Tittensor et al. (2014) : <ol> <li>1-2 continents (no matter how many countries);</li> </ol> </li> <li>3-4 continents (less than 10 countries total</li> </ul>

Table 2.3: The scoring system applied through this review to s	support indicator gap analyses.
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**Table 2.4:** The global indicators brought together under the BIP and their Aichi Biodiversity Target Element alignment, temporal relevance and spatial coverage scores. Further information on the individual indicators can be found in the indicator factsheets provided in Annex 1 and from the BIP website: <u>http://www.bipindicators.net/globalindicators</u>. For an explanation of the score criteria see Table **2.3** and for the Target Element text see Table **2.5**.

Strategic Goal	Aichi Target Element	Indicators brought together under the BIP	Alignment to Aichi Target Element	Temporal relevance to the Strategic Plan	Spatial coverage
А	1.1	Biodiversity Barometer	High	High	Poor
	4.2	Ecological footprint	High	High	Good
		Red List Index (impacts of utilisation)	High	Medium	Good
В	5.1	Extent of forests and forest types	High	Low	Good
	5.3	Wild Bird Index for habitat specialists	Low	High	Poor
	6.1	MSC certified fishery tonnage and improvements	High	High	Good
	6.3	Red List Index (impacts of fisheries)	Medium	Medium	Good
	6.4	Proportion of fish stocks in safe biological limits	High	High	Good
		Marine Trophic Index	High	High	Good
	7.1	Wild Bird Index for farmland birds	Medium	High	Poor
	7.3	Area of forest under sustainable management: certification	High	Good	Good
	8.2	Loss of reactive nitrogen to the environment	Low	Low	Poor
		Nitrogen Deposition	Low	Low	Good

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Strategic Goal	Aichi Target Element	Indicators brought together under the BIP	Alignment to Aichi Target Element	Temporal relevance to the Strategic Plan	Spatial coverage
	9.1	Trends in the numbers of invasive alien species introduction events	Medium	High	Moderate
	9.3	Red List Index (impacts of invasive alien species)	Medium	Medium	Good
	9.3	Trends in invasive alien species vertebrate eradications	High	High	Good
	9.4	Adoption of national legislation to the prevention or control of invasive alien species	High	High	Good
	10.2	Climatic impacts on European bird populations	Low	Low	Poor
		Cumulative human impact on marine ecosystems	High	Low	Good
С	11.1	Coverage of protected areas	High	High	Good
	11.2	Protected area overlays with biodiversity	High	Medium	Good
	11.3	Management effectiveness of protected areas	Medium	High	Good
	12.2	Living Planet Index	Low	High	Good
		Red List Index	High	Medium	Good
		Wildlife Picture Index	Low	High	Moderate
D	14.1	Ocean Health Index	Low	High	Good
		Red List Index (species used for food and medicine)	Low	Medium	Good

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Strategic Goal	Aichi Target Element	Indicators brought together under the BIP	Alignment to Aichi Target Element	Temporal relevance to the Strategic Plan	Spatial coverage
		Red List Index (pollinating species)	Low	Medium	Good
	16.1	Ratification status of the Nagoya protocol	High	High	Good
E	17.1	Status of NBSAPS	High	High	Good
	18.3	Index of Linguistic Diversity	Low	Medium	Good
		Linguistic Diversity	Low	Low	Good
	19.1	Number of Global Biodiversity Information Facility records over time	Low	High	Good
	20.1	Official Development Assistance Provided in support of the Convention	High	High	Good

In Figure **2.1**, the global indicators brought together under the BIP have been mapped against the Strategic Goals and Aichi Biodiversity Targets. There are currently three Aichi Targets (2, 3 and 15) for which there are no global indicators under the BIP, two of the three relating to Targets under Strategic Goal (SG) A ("Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society"). The Strategic Plan for Biodiversity 2011-2020 set out an ambitious framework, with a number of the Aichi Biodiversity Targets dealing with biodiversity related subjects not covered in the pre-2010 Strategic Plan. Therefore there were no existing indicators brought together under the BIP that could be taken forward for monitoring these Aichi Targets. Although more indicators have been incorporated into the suite of global indicators following the adoption of the Strategic Plan for Biodiversity (decision X/2), limited resources have hindered efforts in searching for and developing new indicators for these Aichi Targets. Specific challenges for the development of indicators for these Targets, include:

Aichi Biodiversity Target 2: The unspecific nature of 'biodiversity values', the challenge of measuring integration and the lack of universally accepted ecosystem accounting and reporting frameworks.

Aichi Biodiversity Target 3: The majority of incentives occur at the national to regional scale. Global indicators for these Targets would therefore need to collate together information on various national/regional incentives, which would be a resource intensive activity.

Aichi Biodiversity Target 15: Due to the difficulty of measuring improvements in ecosystem resilience and the geographic variability in what is considered a 'degraded' ecosystem.

In relation to the scoring of the indicators, whilst a number of Aichi Biodiversity Targets (8, 14, 18 and 19) do have indicators, the indicators available are poorly aligned with the Target description – meaning that, for example, whilst Aichi Target 14 appears to be well represented, having four indicators, none of them were considered to capture all the key Elements of the Target. Similarly, whilst Strategic Goal E has five indicators, three of these (all of which relate to Aichi Targets 18 and 19) are poorly aligned to their respective Aichi Biodiversity Targets.

In relation to spatial coverage, Aichi Target 1 is the least well represented, with its single indicator, the Biodiversity Barometer, scoring low as it only provides information for nine countries. Regarding the temporal relevance of the indicators for monitoring implementation during the period of the Strategic Plan, Targets 8 and 10 are poorly represented by the current indicator suite, as all four indicators for these Targets scored low in this regard due to infrequency of planned data collection.

## 2.3. Mapping and scoring the BIP indicators against individual Elements of the Aichi Biodiversity Targets

In order to undertake a thorough gap analysis for the indicators brought together under the BIP, the analysis at the Aichi Target level (section 2.2) was repeated at the Aichi Target Element level. The Aichi Target Elements, based on those used in the 4<sup>th</sup> edition of the Global Biodiversity Outlook, are detailed in Table **2.5**.



#### Figure 2.1: The number, alignment, spatial coverage and temporal relevance of the indicators brought together under the BIP in relation to the Aichi Targets and Strategic Goals (SG).

**Table 2.5:** The breakdown of each Aichi target into its respective Elements. The Elements are based on those used in GBO-4, with the exception of Target 11 for which some Elements were combined to support instances were global indicators mapped onto multiple Elements.

Aichi	Aichi Target Element				
Target	#	Text			
	1.1	People are aware of the values of biodiversity			
1	1.2	People are aware of the steps they can take to conserve and sustainably use biodiversity			
	2.1	Biodiversity values integrated into national and local development and poverty reduction			
2		strategies			
	2.2	Biodiversity values integrated into national and local planning processes			
	2.3	Biodiversity values incorporated into national accounting, as appropriate			
	2.4	Biodiversity values incorporated into reporting systems			
	3.1	Incentives, including subsidies, harmful to biodiversity, eliminated, phased out or reformed in order to minimize or avoid negative impacts			
	3.2	Positive incentives for conservation and sustainable use of biodiversity developed and applied			
	4.1	Governments, business and stakeholders at all levels have taken steps to achieve, or			
		have implemented, plans for sustainable production and consumption			
	4.2	and have kept the impacts of use of natural resources well within safe ecological limits			
	5.1	The rate of loss of forests is at least halved and where feasible brought close to zero			
	5.2	The loss of all habitats is at least halved and where feasible brought close to zero			
	5.3	Degradation and fragmentation are significantly reduced			
	6.1	All fish and invertebrate stocks and aquatic plants are managed and harvested			
-6		sustainably, legally and applying ecosystem based approaches			
	6.2	Recovery plans and measures are in place for all depleted species			
	6.3	Fisheries have no significant adverse impacts on threatened species and vulnerable			
		ecosystems			
	6.4	The impacts of fisheries on stocks, species and ecosystems are within safe ecological			
		limits, i.e. overfishing avoided			
-52	7.1	Areas under agriculture are managed sustainably, ensuring conservation of biodiversity			
	7.2	Areas under aquaculture are managed sustainably, ensuring conservation of biodiversity			
	7.3	Areas under forestry are managed sustainably, ensuring conservation of biodiversity			
	8.1	Pollutants (of all types) have been brought to levels that are not detrimental to			
118		ecosystem function and biodiversity			
	8.2	Pollution from excess nutrients has been brought to levels that are not detrimental to			
		ecosystem function and biodiversity			
23 V	9.1	Invasive alien species identified and prioritized			
29	9.2	Pathways identified and prioritized			
	9.3	Priority species controlled or eradicated			
	9.4	Introduction and establishment of IAS prevented			
a stally	10.1	Multiple anthropogenic pressures on coral reefs are minimized, so as to maintain their			
10		integrity and functioning 1			
	10.2	Multiple anthropogenic pressures on other vulnerable ecosystems impacted by climate			
		change or ocean acidification are minimized, so as to maintain their integrity and			
		functioning			
Pattin	11.1	At least 17 per cent of terrestrial and inland water areas and 10 per cent of coastal and			
		marine areas are conserved			
	11.2	Areas of particular importance for biodiversity and ecosystem services conserved and			

Aichi	Aichi Target Element				
Target	#	Text			
		conserved areas are ecologically representative			
	11.3	Conserved areas are effectively and equitably managed			
	11.4	Conserved areas are well connected and integrated into the wider landscape and			
		seascape			
	12.1	Extinction of known threatened species has been prevented			
12	12.2	The conservation status of those species most in decline has been improved and sustained			
110 C	13.1	The genetic diversity of cultivated plants is maintained			
3	13.2	The genetic diversity of farmed and domesticated animals is maintained			
	13.3	The genetic diversity of wild relatives is maintained			
	13.4	The genetic diversity of socio-economically as well as culturally valuable species is maintained			
	13.5	Strategies have been developed and implemented for minimizing genetic erosion and safeguarding genetic diversity			
14	14.1	Ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded			
	14.2	taking into account the needs of women, indigenous and local communities, and the poor and vulnerable			
	15.1	Ecosystem resilience and the contribution of biodiversity to carbon stocks have been			
<b>1</b> 5		enhanced through conservation and restoration			
	15.2	At least 15 per cent of degraded ecosystems are restored, contributing to climate change			
		mitigation and adaptation, and to combating desertification			
	16.1	The Nagoya Protocol is in force			
16	16.2	The Nagoya Protocol is operational, consistent with national legislation			
025	17.1	Submission of NBSAPs to Secretariat by (end of) 2015			
-17	17.2	NBSAPs adopted as effective policy instrument			
	17.3	NBSAPs are being implemented			
18	18.1	Traditional knowledge, innovations and practices of indigenous and local communities are respected			
	18.2	Traditional knowledge, innovations and practices are fully integrated and reflected in implementation of the Convention			
	18.3	with the full and effective participation of indigenous and local communities			
there want	19.1	Knowledge, the science base and technologies relating to biodiversity, its values,			
19		functioning, status and trends, and the consequences of its loss, are improved			
	19.2	Biodiversity knowledge, the science base and technologies are widely shared and transferred and applied			
20	20.1	Mobilization of financial resources implementing the Strategic Plan for Biodiversity 2011–2020 from all sources has increased substantially from 2010 levels			



Figure 2.2: The coverage of each Element of the Aichi Biodiversity Targets by the indicators brought together under the BIP in relation to their alignment.



Figure 2.3: The coverage of each Element of the Aichi Biodiversity Targets by the indicators brought together under the BIP in relation to their temporal relevance.



Figure 2.4: The coverage of each Element of the Aichi Biodiversity Targets by the indicators brought together under the BIP in relation to their spatial coverage.

In terms of the coverage of each Element by the indicators brought together under the BIP, under half (46%) have indicators (Figure 2.2). Target 13 has the highest percentage of gaps with only one of its five Elements having an indicator. As Target 20 has only one Element, this analysis does not show a gap. However, the Element text discusses mobilising resources 'from all sources' and the current indicator drawn from OECD DAC (Organisation for Economic Co-operation and Development Assistance Committee) data only looks at bilateral overseas development assistance from DAC members. There is therefore a gap in the sense that other sources such as multilateral flows, flows from non-DAC members, domestic flows and private sector flows are not covered.

If only those indicators that have high or medium alignment with the Element are retained then the percentage of Elements with indicators drops to 37%, whilst if only those with good alignment are retained the percentage drops to 30% (Figure 2.2).

If only those indicators that have high or medium temporal relevance to the Element are retained then the percentage with indicators drops to 41%, whilst retaining only those with good alignment the percentage drops further to 35% (Figure 2.3). Similarly if only those indicators which have high or medium spatial coverage are retained, the percentage drops to 41%, whilst if retaining only those with good alignment the percentage drops further to 39% (Figure 2.4).

The above is reflected in the scoring of the three categories (alignment, temporal relevance and spatial coverage) across all of the Elements. Specifically, it is clear that a lack of indicator alignment with the Elements is the largest challenge, followed by the temporal relevance of the indicators to the Strategic Plan period and, finally, their spatial coverage (Figure 2.5).



Figure 2.5: The scoring of the three categories (alignment, temporal relevance and spatial coverage) across all of the BIP indicators.

#### 2.4. Aichi Target scores

Although there may be global indicators for an Aichi Target Element, in some cases these indicators may have low alignment, temporal relevance to the Strategic Plan or spatial coverage. The three scoring criteria – Aichi Target Element alignment, temporal relevance to the Strategic Plan and spatial coverage – have been brought together to produce one score per Aichi Target (Figure **2.2.6**) to identify, in addition to the gaps, where targets may not be adequately represented/covered by the current indicators available.

The combined score for each indicator was calculated by bringing together the individual scores for the three criteria: Aichi Target alignment, temporal relevance to the Strategic Plan and spatial coverage. Each indicator was given a score from 1 - 3 for each criteria, with 1 being low/poor, 2 being medium/moderate and 3 being high/good. Not all criteria were given the same level of importance and combined scores were generated per indicator based on weightings as detailed in Table **2.6**.

Criteria	Weighting	Justification
Alignment to Aichi Target Element	Indicator score multiplied by factor of 2	This is considered to be the most important criteria for scoring the indicators. Good alignment is central to being able to adequately assess if progress towards the Aichi Targets is being made.
Temporal relevance to the Strategic Plan	Indicator score multiplied by factor of 1.5	Considered to be the second most important criteria. In order to adequately assess if implementation of the Strategic Plan is successful, data points are needed prior to and throughout the duration of the Strategic Plan period. The more data points, the greater the ability to generate accurate storylines of progress.
Spatial coverage	No weighting given. Score used as assigned	Whilst it is favourable that the indicators are global in coverage, this is not deemed the more important than the other criteria.

 Table 2.6: Weightings for each criteria in calculating the score for each indicator.

Once the individual indicators were scored, a statistical procedure which seeks to reduce the variance within classes and maximise the variance between classes (Natural Jenks) was used to assign each Aichi Target a score (High, Medium and Low) relative to the scores of the other targets (Figure **2.2.6**). Scoring the targets in this way according to all three criteria (their alignment, temporal relevance and spatial coverage) gives a complete picture as to the gaps and weakness of the current suite of indicators brought together under the BIP. The combined scoring indicates that, in addition to focussing on identifying indicators for those Targets for which no global indicators exist (2, 3, and 15), emphasis should also be placed on enhancing the global indicators available for Aichi Targets 1, 8, 13, 16, 17, 18, 19 and 20.

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#### *Figure 2.2.6:* The score for the global indicators available for each Aichi target in relation to their alignment, temporal relevance and spatial coverage.

### 2.5. Key indicator gaps

Throughout this document we have identified two forms of gaps: the first relating to instances where a Target/Element has no indicator, and the second relating to situations where there are indicators present but either their alignment to the Aichi Target, temporal relevance for monitoring progress during the period of the Strategic Plan or spatial coverage is low. In this section we briefly summarise each of these gaps (with more detail provided in the relevant sections above) and in the next section outlining options to fill them. The details of the specific gaps are outlined in Table 2.7.

#### 2.5.1. Absence of suitable indicators

There are currently no global indicators available under the BIP for three (15%) of the 20 Aichi Biodiversity Targets. When broken down to the Element level, there are gaps for 29 (54%) of the 54 Aichi Target Elements (Table **2.7**).

## 2.5.2. Gaps in alignment, temporal relevance or spatial coverage of current indicators to the Aichi Targets

The alignment, temporal relevance or spatial coverage 'gaps' identified in this review represent instances where all the indicators available for an individual Aichi Target Element score low. There are five instances where all indicators available for an Aichi Target Element score low for their alignment. With regards to temporal relevance, three Aichi Target Element gaps have been identified. Three Aichi Target Elements have spatial coverage gaps. Aichi Target 5.3 is particularly poorly represented, with the indicator available, the Wild Bird Index, scoring low for both alignment and spatial coverage. Both an alignment gap and temporal relevance gap has been identified for Aichi Target Element 8.2.

 Table 2.7: Gaps (indicated by bullet points) in the global indicators brought together under the BIP.

AICHI	AICHI AICHI TARGET ELEMENT GAPS IN THE GLOBAL INDICATORS BROUGHT TOGET				ROUGHT TOGETHER	UNDER THE BIP	
TARGET			No global Less than one indica		ator with either high or medium score		
			available	Aichi Target Alignment	Spatial coverage	Temporal relevance to the Strategic Plan	
	1.1	People are aware of the values of biodiversity			•		
	1.2	People are aware of the steps they can take to conserve and sustainably use biodiversity	•				
	2.1	Biodiversity values integrated into national and local development and poverty reduction strategies	•				
	2.2	Biodiversity values integrated into national and local planning processes	•				
	2.3	Biodiversity values incorporated into national accounting, as appropriate	•				
	2.4	Biodiversity values incorporated into reporting systems	٠				
	3.1	Incentives, including subsidies, harmful to biodiversity, eliminated, phased out or reformed in order to minimize or avoid negative impacts	•				
	3.2	Positive incentives for conservation and sustainable use of biodiversity developed and applied	•				
	4.1	Governments, business and stakeholders at all levels have taken steps to achieve, or have implemented, plans for sustainable production and consumption	•				
	4.2	and have kept the impacts of use of natural resources well within safe ecological limits					
	5.1	The rate of loss of forests is at least halved and where feasible brought close to zero				•	

AICHI		AICHI TARGET ELEMENT	GAPS IN THE GLOBAL INDICATORS BROUGHT TOGETHER UNDER THE BIP				
IARGEI				Less than one indicator with either high or medium score			
				Aichi Target Alignment	Spatial coverage	Temporal relevance to the Strategic Plan	
	5.2	The loss of all habitats is at least halved and where feasible brought close to zero	•				
	5.3	Degradation and fragmentation are significantly reduced		•	•		
<b>~</b>	6.1	All fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches					
	6.2	Recovery plans and measures are in place for all depleted species	•				
	6.3	Fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems					
	6.4	The impacts of fisheries on stocks, species and ecosystems are within safe ecological limits, i.e. overfishing avoided					
27	7.1	Areas under agriculture are managed sustainably, ensuring conservation of biodiversity			•		
	7.2	Areas under aquaculture are managed sustainably, ensuring conservation of biodiversity	•				
	7.3	Areas under forestry are managed sustainably, ensuring conservation of biodiversity					
all a	8.1	Pollutants (of all types) have been brought to levels that are not detrimental to ecosystem function and biodiversity	•				
	8.2	Pollution from excess nutrients has been brought to levels that are not detrimental to ecosystem function and biodiversity		•		•	
233	9.1	Invasive alien species identified and prioritized					
29	9.2	Pathways identified and prioritized	•				
AICHI	AICHI TARGET ELEMENT		GAPS IN THE GLOBAL INDICATORS BROUGHT TOGETHER UNDER THE BIP				
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TARGET			No global	Less than one indic	Less than one indicator with either high or medium score		
			indicator available	Aichi Target Alignment	Spatial coverage	Temporal relevance to the Strategic Plan	
	9.3	Priority species controlled or eradicated					
	9.4	Introduction and establishment of IAS prevented					
10	10.1	Multiple anthropogenic pressures on coral reefs are minimized, so as to maintain their integrity and functioning 1	•				
	10.2	Multiple anthropogenic pressures on other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning				•	
11	11.1	At least 17 per cent of terrestrial and inland water areas and 10 per cent of coastal and marine areas are conserved					
	11.2	Areas of particular importance for biodiversity and ecosystem services conserved and conserved areas are ecologically representative					
	11.3	Conserved areas are effectively and equitably managed	•				
	11.4	Conserved areas are well connected and integrated into the wider landscape and seascape	•				
12	12.1	Extinction of known threatened species has been prevented	•				
	12.2	The conservation status of those species most in decline has been improved and sustained					
	13.1	The genetic diversity of cultivated plants is maintained	•				
	13.2	The genetic diversity of farmed and domesticated animals is maintained					

AICHI	AICHI TARGET ELEMENT		GAPS IN THE GLOBAL INDICATORS BROUGHT TOGETHER UNDER THE BIP			
IARGEI				Less than one indicator with either high or medium score		
				Aichi Target Alignment	Spatial coverage	Temporal relevance to the Strategic Plan
	13.3	The genetic diversity of wild relatives is maintained	•			
	13.4	The genetic diversity of socio-economically as well as culturally valuable species is maintained	•			
	13.5	Strategies have been developed and implemented for minimizing genetic erosion and safeguarding genetic diversity	•			
14	14.1	Ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded		•		
	14.2	taking into account the needs of women, indigenous and local communities, and the poor and vulnerable	•			
<b>15</b>	15.1	Ecosystem resilience and the contribution of biodiversity to carbon stocks have been enhanced through conservation and restoration	•			
	15.2	At least 15 per cent of degraded ecosystems are restored, contributing to climate change mitigation and adaptation, and to combating desertification	•			
	16.1	The Nagoya Protocol is in force				
16	16.2	The Nagoya Protocol is operational, consistent with national legislation	•			
	17.1	Submission of NBSAPs to Secretariat by (end of) 2015				
17	17.2	NBSAPs adopted as effective policy instrument	•			
	17.3	NBSAPs are being implemented	•			

AICHI	AICHI TARGET ELEMENT		GAPS IN THE GLOBAL INDICATORS BROUGHT TOGETHER UNDER THE BIP			
TARGET				Less than one indicator with either high or medium score		
				Aichi Target Alignment	Spatial coverage	Temporal relevance to the Strategic Plan
18	18.1	Traditional knowledge, innovations and practices of indigenous and local communities are respected	•			
	18.2	Traditional knowledge, innovations and practices are fully integrated and reflected in implementation of the Convention	•			
	18.3	with the full and effective participation of indigenous and local communities		•		
110.011	19.1	Knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved		•		
	19.2	Biodiversity knowledge, the science base and technologies are widely shared and transferred and applied	•			
20	20.1	Mobilization of financial resources implementing the Strategic Plan for Biodiversity 2011–2020 from all sources has increased substantially from 2010 levels				

# 3. Options for filling indicator gaps

A review was conducted to identify potential indicators which may be suitable for filling each gap identified in Section 2.3. Information sources for the review included:

- The indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).
- The non-BIP indicators incorporated in the Tittensor *et al.* (2014) indicator extrapolation analysis.
- Indicators primarily rejected from the Tittensor *et al.* (2014) analysis due to the fact that they didn't meet the extrapolation criteria. These indicators were reviewed as they may meet these criteria in time or be useful for non-extrapolation assessments of progress towards the Aichi Targets.
- Literature and online resources.

New indicators identified were scored for alignment to the Aichi Biodiversity Targets and their associated Elements, spatial coverage and temporal relevance to the Strategic Plan, in order to maintain consistency with the scoring system applied to the indicators brought together under the BIP for the gap analysis. For scoring categories and criteria see Table **2.3**. The readiness of the new potential indicators for use in monitoring progress to towards the Aichi Targets was also identified, using the same categories applied to the indicative list of indicators adopted in decision XI/3, but with slight differences in the criteria for categorisation (Table **3.1**).

Table 3.1: The categories and criteria used for the indicative list of indicators adopted in decision XI/3 and applied to the
potential new indicators identified in this review.

Category	Criteria used for indicative list of indicators (decision XI/3)	Criteria used in this review
Α	Ready for use at the global level	Ready for global use
В	Priority for development for use at the global level	Some development needed for use at the global level
С	For consideration at the sub-global level	For consideration at the sub- global level

Due to time constraints, the indicator search was prioritised according to the categories outlined in Table **3.1**. Priority was given to trying to identify indicators that could be considered ready for global use (Category A). In the event that no or few Category A indicators could be identified, focus was then placed on identifying indicators for development at the global level (Category B). If no progress could be made in identifying global level indicators, then attention was focussed on identifying indicators for consideration at the sub-global level (Category C).

The potential indicators identified in this review are opportunities, not recommendations and should serve as a starting point for filling gaps in the global indicator framework. It has been assumed that the underlying data in the indicator has been used correctly and is not in breach of any data provider's agreement. The review may have missed suitable datasets and/or indicators and we welcome being made aware of any suitable work that may provide an opportunity to fill the gaps identified.

# 3.1. Aichi Target Gaps

#### 3.1.1. Aichi Target 2

Aichi 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.

There are currently no global indicators available to assess progress towards Aichi Biodiversity Target 2 on the integration of biodiversity values. This Target presents challenges for the development of indicators due to the unspecific nature of 'biodiversity values', the challenge of measuring integration and the lack of universally accepted ecosystem accounting and reporting frameworks.

Three possible indicators have been identified that align to Target Elements 2.1, 2.2 and 2.4. No indicator could be found for Element 2.3 during this review; however, the WAVES partnership and the SEEA-Experimental Ecosystem Accounting framework may be sources for indicators in the near future. A summary of the development category, alignment, temporal relevance and spatial coverage is shown in Table **3.2** below.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
2i: Integration of biodiversity in Poverty Reduction Strategy Papers Analysing the extent to which biodiversity and ecosystem services are contemplated in Poverty Reduction Strategy Papers (PRSPs) provides insights about their integration into development and poverty reduction strategies.	В	2.1: High	Low	Good
<b>2ii: Investment in Environmental</b> <b>Impact Assessments (EIAs)</b> Measuring investment in EIA from international donors can be used as a proxy for the wider application of EIAs.	A	2.2: Low	High	Good
<b>2iii: Number of research studies</b> <b>involving economic evaluation</b> This indicator represents the efforts of the scientific community to measure the economic value of biodiversity.	В	2.4: Low	High	Good

Table 3.2: Summary of the potential indicators for Aichi Biodiversity Target 2 on the integration of biodiversity values.

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

#### Factsheets for potential indicators to fill the gap

#### 2i: Integration of biodiversity in Poverty Reduction Strategy Papers

Indicator /dataset summary

Delationship with Aichi Targa

Analysing the extent to which biodiversity and ecosystem services are contemplated in Poverty Reduction Strategy Papers (PRSPs) provides insights about their integration into development and poverty reduction strategies. PRSPs are required by the International Monetary Fund (IMF) and the World Bank (WB) as a basis for debt relief or monetary aid to low income countries. In these documents, countries detail their strategy to promote growth and reduce poverty.

Relationship with Alchi Target			
Aichi Target	2		
Aichi Target Element	2.1 Biodiversity values have been integrated into national and		
	local development and poverty reduction strategies.		
Alignment to Aichi Target	High: indicator explicitly measures the integration of biodiversity		
Element	in Poverty Reduction Strategy Papers.		
Indicator/dataset coverage			
Spatial Coverage	Good: 54 PRSPs, 35 from Africa, seven from America Latina,		
	seven 6rom South Asia and five from South East Asia.		
Temporal Coverage	Analysis in 2010. No subsequent update.		
Temporal relevance to	Low: an update could provide an additional year of data.		
Strategic Plan			
implementation			
Development status			
Indicator category	B – Could be used at the global level but would require further		
	development		
Organisations/institutions	Dilys Roe		
responsible			
For further information	Roe D. (2010). Whither biodiversity in development? The		
	integration of biodiversity in international and national poverty		
	reduction policy. Biodiversity 11, 13–18.		
Reason for indicator/dataset	To assess the integration of biodiversity in national poverty		
development	reduction policy.		
Probability of continued	Low: no plans to for an update without funding.		
development			
Indicator/dataset description			
A review of PRSPs that are published on the World Bank website. Each country was allocated a			

A review of PRSPs that are published on the World Bank website. Each country was allocated a score of 0-3 depending on the prioritisation afforded to biodiversity: 3) the agency has a standalone biodiversity policy; 2) the agency doesn't have a biodiversity policy but identified biodiversity as a key priority within a broader environmental policy; 1) biodiversity is mentioned in the environmental policy but not prioritised; 0) no mention is made of biodiversity.

Scientific robustness (including peer review)

A total of 54 PRSPs were reviewed against the following criteria:

• Is biodiversity mentioned?

Is the understanding of biodiversity narrowly focussed – e.g. on wildlife, forests, protected areas

 or is it more broadly understood to include genetic diversity and agricultural biodiversity, or
 even broader to encompass ecosystem services? PRSPs were scored from 0-3: (0 = not mentioned,
 1 = narrow focus; 2 = focus extends beyond wildlife/forests; 3 = focus encompasses ecosystem
 services).

• Is the link between poverty and biodiversity loss recognised? PRSPs were scored from 0-3 depending on the detail provided on this (0 = not mentioned, 1 = mentioned; 2 = elaborated; 3 = good practice).

• Is the link between biodiversity and poverty reduction recognised? PRSPs were scored from 0-3 depending on the detail provided.

#### 2ii: Investment in Environmental Impact Assessments (EIAs)

Indicator /dataset summary

Measuring investment in Environmental Impact Assessments (EIAs) from international donors can be used as a proxy for the wider application of EIAs. The CBD requires Parties to apply EIAs to projects with potential adverse impacts on biodiversity. Despite legal requirements, practice is still insufficient.

Relationship with Aichi Target				
Aichi Target	2			
Aichi Target Element	2.2 Biodiversity values integrated into national and local planning processes.			
Alignment to Aichi Target	Low: an increase in investment from internal donors in EIA activities			
Element	does not necessarily equate to the integration of EIAs into national			
	and local planning processes.			
Indicator/dataset coverage				
Spatial Coverage	Good: all countries to which the donors included in the database			
	have transferred funds to.			
Temporal Coverage	1995 to 2012			
Temporal relevance to	High: likely to have data up until at least 2016 and possibly further.			
Strategic Plan implementation				
Development status				
Indicator category	A – Indicators/datasets considered ready for global use			
Organisations/institutions	AidData			
responsible				
For further information	http://aiddata.org/			
	Tierney, Michael J., Daniel L. Nielson, Darren G. Hawkins, J.			
	Timmons Roberts, Michael G. Findley, Ryan M. Powers, Bradley			
	Parks, Sven E. Wilson, and Robert L. Hicks. 2011. More Dollars than			
	Sense: Refining Our Knowledge of Development Finance Using			
	AidData. World Development 39 (11): 1891-1906			

Reason for indicator/dataset	AidData is a research and innovation lab that seeks to improve
development	development outcomes by making development finance data more
	accessible and actionable. Development projects are reviewed,
	their activities categorised based on their description and collated
	into a database.
Probability of continued	High: data collection is time consuming but the database is
development	continually updated.
Indicator/dataset description	

Data was compiled by AidData, an organisation that collects data on international development financing and categorises each project or flow into specific activities and sectors. Data is presented in constant US dollars (set at 2009 levels). Database is online and freely available.

#### Scientific robustness (including peer review)

The project descriptions provided are sometimes brief and unclear as to the quantity of funds specifically designated for EIA activities. As such, this analysis includes the full project commitment amount for a project that had at least one activity relating to EIAs. This almost certainly leads to an over-estimation of the funds specifically directed to EIA.

Activity codes that identify projects with an EIA component are only currently available for certain donors, largely consisting of multilateral agencies and bilateral donors outside the OECD-DAC. Trends were based upon funds committed from 1995-2010 only to account for completeness and reliability concerns with earlier data. Additionally, for the purposes of this analysis, we only included donors for whom more than 95% of their projects/activities have received AidData activity codes. A full list of donors included is available.

#### 2iii: Number of research studies involving economic evaluation

#### Indicator /dataset summary

This indicator represents the efforts of the scientific community to measure the economic value of biodiversity. The uptake of such valuations into local and national policy, the focus of Aichi Target 2, is reliant upon this initial assessment and production of assessment strategies by the scientific community. The indicator uses data from the Ecosystem Service Valuation Database (ESVD) (Tittensor et al. 2014).

Relationship with Aichi Target				
Aichi Target	2			
Aichi Target Element	2.4 Biodiversity values incorporated into reporting systems.			
Alignment to Aichi Target	Low: the indicator measures interest in the scientific community			
Element	but does not directly measure uptake of assessments into policy.			
Indicator/dataset coverage				
Spatial Coverage	Good: 80 countries, all 5 regions.			
Temporal Coverage	1974 to 2010			
Temporal relevance to	High: likely to have data up until 2020 if the database is			
Strategic Plan	maintained and assuming studies continue to be published.			
implementation				
Development status				

Indicator category	B – Indicators/datasets requiring further development for use at				
	the global level.				
Organisations/institutions	Ecosystem Services Partnership				
responsible	Van der Ploeg, S. and R.S. de Groot (2010) The TEEB Valuation				
	Database – a searchable database of 1310 estimates of				
	monetary values of ecosystem services. Foundation for				
	Sustainable Development, Wageningen, The Netherlands.				
For further information	http://www.fsd.nl/esp/80763/5/0/50				
Reason for indicator/dataset	Within the context of the TEEB-project (2008-2010) the authors				
development	of the global overview of the 'Estimates of monetary values of				
	ecosystem services' developed a database on monetary values of				
	ecosystem services. Since the release of the TEEB Valuation				
	Database in 2010, the authors have continued to develop the				
	database under the name 'Ecosystem Services Valuation				
	Database' (ESVD).				
Probability of continued	Medium: collection of data is time consuming so update of the				
development	database is funding dependent.				
Indicator/dataset description					
A database of ecosystem servic	e valuation studies. 1310 included (May 2015). Database is online				
and freely available. The ESVD is based upon a database compiled for a project undertaken					
through The Economics of Ecos	through The Economics of Ecosystems and Biodiversity (TEEB). The primary literature for the TEEB				
database were gathered from other databases and literature searches, and from					
recommendations by experts.	recommendations by experts.				
Scientific robustness (including peer review)					

The indicator is based upon a database which was not initially designed to be temporally representative so the trend line may be biased towards more recent studies.

#### 3.1.2. Aichi Target 3

Aichi 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.

There are currently no global indicators available to assess progress towards Aichi Biodiversity Target 3 on reforming incentives. The Target presents challenges for the development of global indicators because the majority of incentives occur at the national to regional scale. Global indicators for these Targets would therefore need to collate together information on various national/regional incentives, which would be a resource intensive activity.

One indicator was identified in the analysis with low alignment to Target Element 3.1 on reforming harmful incentives, while six indicators were identified in the analysis that align to Target Element 3.2 on positive incentives. Subsidies exist at national to regional scales so additional indicators for Element 3.1 could be the collation of different national/regional subsidies. A summary of the potential indicators' development category, alignment, temporal relevance and spatial coverage is shown in Table **3.3** below.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
<b>3i: Government financial transfers</b> <b>to fisheries</b> This indicator shows the financial support paid to the fisheries sector by government.	В	3.1: Low	High	Moderate
<b>3ii: Financing reported for REDD+</b> This indicator measures the total finance reported for REDD+, a positive incentive for conservation and sustainable use.	В	3.2: High	High	Good
<b>3iii: Funding towards institutional</b> <b>capacity building in fisheries</b> This indicator measures international financial flows committed to projects that support institutional capacity building in fisheries.	A	3.2: Low	High	Good

Table 3.3: Summary of the potential indicators for Aichi Biodiversity Target 3 on positive incentives.

<b>3iv: Instruments used for</b>	В	3.2: High	High	Good
environmental policy and natural				
resource management				
This database contains information				
on environmental policy instruments				
and could be used to show trends in				
biodiversity related instruments.				
<b>3v: OECD support to agriculture</b>	В	3.2: Low	High	Good
(produced and consumer support				
estimates)				
This database measures support to				
agriculture.				
<b>3vi: Tax expenditures for fossil fuels</b>	В	3.2: Medium		
This database measures government				
support for the production and				
consumption of fossil fuels.				
<b>3vii: World Trade Organisation</b>	В	3.2: Medium	High	Good
'green box' agricultural subsidies				
This indicator focuses on the				
permitted subsidies that are				
expected to be the least harmful or				
beneficial to biodiversity while				
allowing the financial development				
of developing countries.				

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

#### Factsheets for potential indicators to fill the gap

#### 3i: OECD database on Government Financial Transfers (GFTs) to Fisheries

Indicator /dataset summary

GFTs are indicators of financial support paid to the fisheries sector by government and are classified under one of three broad headings:

A. Direct payments to fishers: primarily directed at increasing the income of fishers.

B. Cost reducing transfer: aimed at reducing the costs of fixed capital and variable inputs.

C. General services: transfers not necessarily received directly by fishers, but which nevertheless

reduce the costs faced by fishers (includes management, research and enforcement services, as well as the provision of infrastructure).

Relationship with Aichi Target	
Aichi Target	3
Aichi Target Element	Incentives, including subsidies, harmful to biodiversity, eliminated, phased out or reformed in order to minimize or avoid negative impacts.
Alignment to Aichi Element	Low: current structure of the OECD GFT dataset does not allow for an exact assessment of changes in the total composition of support away from potentially harmful measures and towards potentially beneficial measures.
Indicator/dataset coverage	
Spatial Coverage	Moderate: the 34 OECD member countries and Argentina, Chinese
	Tapei, Russian Federation, Thailand.
Temporal Coverage	1965 to present.

Temporal relevance to	High: data collected annually.
Strategic Plan implementation	
Development status	
Indicator category	B – Indicators/datasets requiring further development for use at
	the global level
Organisations/institutions	OECD
responsible	
For further information	Van Winkle et al (forthcoming 2015). Biodiversity Policy Response
	Indicators. OECD Environment Working Paper.
Reason for indicator/dataset	To monitor/track financial support (and composition thereof) to
development	fisheries sector.
Probability of continued	High: data collected on an annual basis.
development	
Indicator/dataset description	

The current structure of the OECD GFT dataset does not allow for an exact assessment of changes in the total composition of support away from potentially harmful measures and towards potentially beneficial measures, as many of the anticipated effects on biodiversity are undetermined. It is possible, however, to construct an indicator from the current GFT database that monitors the intensity of government support measures to marine capture fisheries that are anticipated to have a negative impact on biodiversity, caveating that without complementary information on a) the state of the fish stock, b) fishing methods employed, c) management regimes and d) effective enforcement of management regimes, the actual impacts on biodiversity are less certain. A possible indicator that could be constructed from the current database is:

(1) Proportion and amount of GFTs with potential negative impacts on biodiversity (grants and subsidised loans for vessel construction, modernisation and equipment, interest subsidies, fuel tax exemptions, insurance rebates and subsidies, and income tax rebates for fishers and unpaid social contributions).

Scientific robustness (including peer review)

GFT data is collected and reported on an annual basis and is the only source of comparable data on GFTs. The data, however, is not always reported in a timely manner (most recent-year data is often preliminary with many missing data points) and there is currently no formal review process to ensure that all policies are captured in the survey instrument. In addition, data is based on self-reporting by members and often lacks source information that would allow independent verifications.

The current OECD classification system provides a detailed perspective of how financial transfers are provided to the fisheries sector. Without complementary information on the fisheries management setting however, the economic, environmental and social effects of various types of transfers are difficult to assess. In addition, several direct and cost reducing transfers to the fisheries sector have ambiguous effects on capacity and effort. Transfers to decommission vessels and licenses, for example, are intended to reduce capacity, thereby reducing the pressure and having a positive impact on biodiversity. Without effective management controls, however, effort may leak back into the sector, neutralizing the expected positive impact.

#### **3ii: Financing reported for REDD+**

Indicator /dataset summary

This indicator measures the total finance reported for REDD+, a positive incentive for conservation

and sustainable use. The aim of REDD+ is to incentivise the reduction of emissions from					
deforestation and forest degradation in developing countries, as well as the conservation of forest					
carbon stocks, sustainable management of forests, and enhancement of forest carbon stocks.					
Relationship with Aichi Target					
Aichi Target	3				
Aichi Target Element	Positive incentives for conservation and sustainable use of				
	biodiversity developed and applied.				
Alignment to Aichi Target	High: REDD+ is a positive incentive for the sustainable use of				
Element	forests in developing countries. Tracking the financing of REDD+				
	related actions can be used to measure the application of this				
	positive incentive.				
Indicator/dataset coverage					
Spatial Coverage	Good: 40 recipient countries across regions with REDD+				
	programs.				
Temporal Coverage	2006 to 2018/2019				
Temporal relevance to	High: REDD+ arrangements already include future funding and				
Strategic Plan	more data will be added over time.				
implementation					
Development status					
Indicator category	B – Could be used at the global level but would require further				
	development				
Organisations/institutions	FAO				
responsible					
For further information	http://www.reddplusdatabase.org/#graphs_and_stats				
Reason for indicator/dataset	The voluntary REDD+ Database was developed to improve				
development transparency around REDD+, support efforts to identify and					
analyse gaps and overlaps in REDD+ financing, and help share					
	experiences on REDD+.				
Probability of continued	High: the database is updated on an ongoing basis.				
development					
Indicator/dataset description					
The Voluntary REDD+ Database	e (VRD) provides information on financing for REDD+ related				
actions, as reported by countries and institutions to the REDD+ Partnership. The database is					
publicly available.					
Scientific robustness (including peer review)					
The data are submitted and owned by the countries and other stakeholders, who make voluntary					
reports on their REDD+ activities. As a result of the voluntary data reporting and different					
reporting capacities between countries, some aspects of the database may be incomplete. No					
external review of the information in the database has been conducted.					

#### **3ii: Funding towards institutional capacity building in fisheries**

Indicator /dataset summary

This indicator measures international financial flows committed to projects that support institutional capacity building in fisheries. This metric measures the funds committed from a range of multilateral agencies and bilateral donors outside the OECD Development Assistance Committee (DAC).

Relationship with Aichi Target	
Aichi Target	3

Aichi Target Element	Positive incentives for conservation and sustainable use of			
	biodiversity developed and applied.			
Alignment to Aichi Target	Low: an increase in investment from internal donors in			
	institutional capacity building for fisheries activities does not			
	necessarily imply that sustainable use of biodiversity is being			
	developed or applied.			
Indicator/dataset coverage				
Spatial Coverage	Good: all countries to which the donors included in the database			
	have transferred funds to.			
Temporal Coverage	1995 to 2010			
Temporal relevance to	High: likely to have data up until at least 2016 and possibly			
Strategic Plan implementation	further.			
Development status				
Indicator category	A – Ready for use at the global level			
Organisations/institutions	AidData			
responsible				
For further information	http://aiddata.org/			
	Tierney, Michael J., Daniel L. Nielson, Darren G. Hawkins, J.			
	Timmons Roberts, Michael G. Findley, Ryan M. Powers, Bradley			
	Parks, Sven E. Wilson, and Robert L. Hicks. 2011. More Dollars			
	than Sense: Refining Our Knowledge of Development Finance			
	Using AidData. World Development 39 (11): 1891-1906			
Reason for indicator/dataset	Indicator used in Tittensor et al. 2014. AidData is a research and			
development	innovation lab that seeks to improve development outcomes by			
	making development finance data more accessible and			
	actionable. Development projects are reviewed, their activities			
	categorised and collated into a database.			
Probability of continued	High: data collection is time consuming but the database is			
development	continually updated.			
Indicator/dataset description				
Data was compiled by AidData,	an organisation that collects data on international development			
financing and categorises each project or flow into specific activities and sectors. Data is				
presented in constant US dollars (set at 2009 levels).				
Scientific robustness (including peer review)				

The project descriptions provided are sometimes brief and unclear as to the quantity of funds specifically designated for capacity building in fisheries. As such, this analysis includes the full project commitment amount for a project that had at least one activity relating to the indicator. This almost certainly leads to an over-estimation of the funds specifically directed to investment in institutional capacity building for fisheries.

Activity codes that identify projects are only currently available for certain donors, largely consisting of multilateral agencies and bilateral donors outside the OECD-DAC.

It may be possible to include funding for institutional capacity building in fisheries from OECD DAC in the indicator through the Creditor Reporting System, looking at ODA to 'Fishing policy and administrative management' (CRS Code 31310).

Trends were based upon funds committed from 1995-2010 only to account for completeness and reliability concerns with earlier data. Additionally, for the purposes of this analysis, we only included donors for whom more than 95% of their projects/activities have received AidData activity codes. A full list of donors included is available.

# **3iv: OECD/EEA database on instruments used for Environmental Policy and Natural Resources Management**

#### Indicator /dataset summary

Contains information about a large number of environmental policy instruments in both OECD countries and about 20 selected non-OECD countries, including Argentina, Brazil, Colombia, China, India and South Africa.

Relationship with Aichi Target				
Aichi Target	3			
Aichi Target Element	Positive incentives for conservation and sustainable use of			
	biodiversity developed and applied.			
Alignment to Aichi Element	High			
Indicator/dataset coverage				
Spatial Coverage	Good: data for all five regions and 53 countries			
Temporal Coverage	1998 to present			
Temporal relevance to	High: although requires countries to submit data regularly.			
Strategic Plan implementation				
Development status				
Indicator category	B – Indicators/datasets requiring further development for use at			
	the global level			
Organisations/institutions	OECD/EEA			
responsible				
For further information	Van Winkle et al (forthcoming, 2015). "Biodiversity Policy Response			
	Indicators". OECD Environment Working Paper.			
	www.oecd.org/env/policies/database			
	http://www.oecd.org/env/tools-evaluation/env%20policy-			
	natural%20resources%20brochure.pdf			
Reason for indicator/dataset	To monitor/track environmental policy instruments.			
de velenne ent				
development				
Probability of continued	High: regularly updated database.			

Indicator/dataset description

Data is collected at the instrument level on:

Environmentally-related taxes, fees and charges Deposit refund systems Environmentally motivated subsidies Tradable permit systems (including ITQs for fisheries) Voluntary approaches

The instruments are further classified according to the environmental domains in which the policy is directed, such as natural resource management, land management, climate, etc.

Scientific robustness (including peer review)

The database provides a good framework and template for further investigation of the development of a set of indicators for positive incentives for biodiversity. A future consideration is to re-classify the database to incorporate biodiversity as its own environmental domain, to introduce explicit labels for instrument categories for payments for ecosystem services and biodiversity offsets, and to request more detailed information on geographic scope of the instruments. The types of proxy indicators that could then be extracted from this database to help monitor progress towards Aichi Biodiversity Target 3 (in the context of positive incentives) include:

(1) The number of countries implementing positive incentives (by type) for biodiversity over time.

(2) The number of positive incentives for biodiversity by instrument type implemented over time.

(3) The number of positive incentives by sector (fish, forestry, agri-biodiversity, etc.) over time.

(4) The revenue generated (or expenditure created) by positive incentives for biodiversity (as relevant) over time.

(5) The number of hectares under positive incentive programmes (by country, by instrument, in total, etc.).

#### **3v: OECD Agriculture Producer and Consumer Support Estimates**

Indicator /dataset summary

The OECD uses a comprehensive system for measuring and classifying support to agriculture – the Producer and Consumer Support Estimates (PSE and CSE) and related indicators. The indicators have been developed to:

- 1. monitor and evaluate developments in agricultural policy;
- 2. establish a common base for policy dialogue among countries; and
- 3. provide economic data to assess the effectiveness and efficiency of policies.

Relationship with Aichi Target	
Aichi Target	3
Aichi Target Element	Positive incentives for conservation and sustainable use of
	biodiversity developed and applied.
Alignment to Aichi Element	Low
Indicator/dataset coverage	
Spatial Coverage	Good: data for all five regions with 47 countries in total.
Temporal Coverage	1998 to present.
Temporal relevance to	High: regularly updated.
Strategic Plan implementation	
Development status	
Indicator category	B – Indicators/datasets requiring further development for use at
	the global level
Organisations/institutions	OECD

responsible					
For further information	Van Winkle et al. (forthcoming 2015). Biodiversity Policy Response Indicators. OECD Environment Working Paper.				
Reason for indicator/dataset development	See summary				
Probability of continued	High				
Indicator/dataset description					
Policy measures supporting in	dividual producers are classified according to the implementation				
criteria. For a given policy mea which the associated transfer payment. Policy measures are of output, an animal head, a la production parameters; (iii) wh the payment rate is fixed or among other measures. These policies according to implem production, trade, income, the	sure, the implementation criteria are defined as the conditions under is are provided to farmers, or the conditions of eligibility for the thus classified by (i) the basis upon which support is provided (a unit nd unit, etc.); (ii) whether support is based on current or non-current nether production is required to receive support or not; (iv) whether variable; and (v) whether the policy transfer is specific or variable, policy characteristics affect producer behaviour, and distinguishing nentation criteria enables further analysis of policy impacts on environment, etc. The current PSE classifications are as follows:				
A. Support based on co output)	mmodity output (Market Price Support and payments based on				
B. Payments based on i	B. Payments based on input use				
C. Payments based on current A/An/R/I, production required [Area (A), Animal Numbers (AN), Receipts (R) or Income (I)]					
D. Payments based on r	non-current A/AN/R/I, production required				
E. Payments based on non-current A/AN/R/I, production not required					
F. Payments based on r	non-commodity criteria				
G. Miscellaneous					
The possible indicators that cou	Ild be extracted from this database are:				
1. Proportion and amou	nt of PSE support not tied to production.				
<ol> <li>Proportion and amo Commodity Output +I</li> </ol>	unt of PSE support to potentially most harmful subsidies (MPS + Non-constrained variable input use).				
3. Proportion and amou	nt of PSE with voluntary environmental input constraints.				
4. Payments based on ne	on-commodity criteria.				
Scientific robustness (including	peer review)				
Overall the dataset measures the of support and therefore result impact on the environment and	ne <i>provision</i> of support to agricultural producers and not the <i>impact</i> in some limitations to interpretation of the dataset in terms of the biodiversity.				

The data would need to be complemented with domestic studies examining impacts.

**3vi: OECD Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels** 

#### Indicator /dataset summary

This database measures government support for the production (i.e. extraction) and consumption (i.e. burning/use) of fossil fuels (coal, oil, and natural gas). This database could be used to monitor how economic instruments that support the production and use of fossil fuels are being reduced, reformed, or phased out.

Relationship with Aichi Target				
Aichi Target	3			
Aichi Target Element	Incentives, including subsidies, harmful to biodiversity, eliminated, phased out or reformed in order to minimize or avoid negative impacts.			
Alignment to Aichi Element	Medium:			
Indicator/dataset coverage				
Spatial Coverage	Moderate: the 34 OECD member countries and Brazil, India, and Russia.			
Temporal Coverage	2005 to present.			
Temporal relevance to	High: regularly updated.			
Strategic Plan implementation				
Development status				
Indicator category	B – Indicators/datasets requiring further development for use at the global level			
Organisations/institutions responsible	OECD			
For further information	Van Winkle et al (forthcoming 2015) www.oecd.org/			
Reason for indicator/dataset development	Part of OECD Inventory.			
Probability of continued development	High: regularly updated.			
Indicator/dataset description				
The OFCD investory takes at al	a factor of monocurse that support the use (CCE) as and writes			

The OECD Inventory takes stock of a broad set of measures that support the use (CSE) or production (PSE) of fossil fuels (classified by type: coal, natural gas, and petroleum).

Scientific robustness (including peer review)

Caution must be exercised in aggregating and interpreting these support measures, as the majority of mechanisms identified in the inventory are tax concessions, which are based on the *relative* preferences within a country's tax system and estimated with reference to a benchmark tax treatment set by that country.

These benchmarks vary from country to country, hence the value of these support measures is not comparable across countries. In addition, a change in fossil fuel support (through tax expenditures) may not influence the incentive structure of fossil fuel producers or consumers. For instance, if a farmer receives a tax exemption for fossil fuels, the value of that exemption is based on the amount the farmer would have to pay if they were not exempt. If a government increases the overall fossil fuel tax, and farmers still enjoy their tax exemption privilege, the indicator will reflect that the value of support to farmers increased, although in fact this increase will likely not impact the farmer's behaviour, and thus will likely not result in an increase in fossil fuel consumption.

In addition, aggregating tax expenditure estimates may be problematic, as the revenue foregone method of estimating the value of a tax concession assumes that the removal of the concession would not lead to a change in behaviour, a problem which is compounded when aggregating tax expenditures together. These limitations must be caveated when interpreting both national and

#### **3vii: World Trade Organisation 'green box' agricultural subsidies**

Indicator /dataset summary

The World Trade Organisation (WTO) Agreement on Agriculture rests on three pillars: market access, export subsidies and domestic support, and has been classified into different "boxes". This indicator focuses on the green box (subsidies not distorting trade and not targeted at specific products, providing direct income to farmers, environmental protection and regional development programmes), the permitted subsidies which are expected to be the least harmful or beneficial to biodiversity while allowing the financial development of developing countries.

Relationship with Alchi Target				
Aichi Target	3			
Aichi Target Element	Positive incentives for conservation and sustainable use of			
	biodiversity developed and applied.			
Alignment to Aichi Target	Medium: "Green box" subsidies encompass environmental			
	protection measures so should be the least harmful of subsidies			
	to biodiversity; however, environmental protection and related			
	measures are only one of the support measures included in this			
	category			
Indicator/dataset coverage				
Spatial Coverage	Good: 96 countries from all 5 regions.			
Temporal Coverage	1995 to 2011			
Temporal relevance to	High: WTO data will be regularly updated			
Strategic Plan				
implementation				
Development status				
Indicator category	B – Indicators/datasets requiring further development for use at			
	the global level			
Organisations/institutions	DIVERSITAS			
responsible				
For further information	https://www.wto.org/english/tratop_e/agric_e/agboxes_e.htm			
Reason for indicator/dataset	Indicator used in Tittensor et al. 2014.			
development				
Probability of continued	Medium: while WTO data will continue to be available, its			
development	collation into the indicator is funding dependent			
Indicator/dataset description				
The WTO 'green box' agricultural subsidies data is gathered from countries across the world and is				
perhaps the most comprehensive record of spending available. "Green box" subsidies encompass				
environmental protection measures, and, based on a 2013 proposal by the G-33, also land				
rehabilitation, soil conservation and resource management, as well as drought management and				
flood control.				
Scientific robustness (including peer review)				

The consistency of data may be questionable as not all countries report their data in a consistent and regular fashion. In addition, green box spending should be the least harmful of subsidies to biodiversity; however, environmental protection and related measures are only one of the support measures included in this category

When used in Tittensor et al., (2014), the total spending for all countries that reported per year was calculated and then converted to constant USD set at 2010 prices. To adjust for variability in the number of countries reporting, a correlation plot against total spending was examined, and outlying years removed until no correlation remained. This process resulted in two years, 2010 and 2011, being removed from the dataset.

#### 3.1.3. Aichi Target 15

Aichi Target 2: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks have been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

There are currently no BIP indicators to assess progress towards Aichi Biodiversity Target 15 on ecosystem restoration and resilience. The Target presents challenges for the development of global indicators due to the difficulty of measuring improvements in ecosystem resilience and the geographic variability in what is considered a 'degraded' ecosystem. However, it may be possible to disaggregate the *Living Planet Index* to specific habitat dependent species and use it in conjunction with habitat loss data to look for recoveries in degraded ecosystems and therefore monitor Target Element 15.2. The disaggregated indicator is summarised in Table **3.4** below.

Table 3.4: Summary of the disaggregated BIP indicator for Aichi Biodiversity Target 15 on ecosystem resilience.

BIP Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
Lining Planet Index (habitat specialists) The Living Planet Index could be disaggregated to show trends in habitat specialists.	В	Medium	High	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

The review identified one possible source for an indicator, the Global Restoration Network Database, however it would have low alignment to Target Element 15.2. This potential indicator is summarised in Table **3.5** below.

Table 3.5 Summary of the potential indicators for Aichi Biodiversity Target 15 on ecosystem restoration and resilience.

Potential Indicator	Development category*	Alignment to Aichi Target	Temporal relevance to Strategic Plan	Spatial coverage
<ul> <li>15i: Area of restoration projects</li> <li>in the Global Restoration</li> <li>Network Database</li> <li>This indicator measures the area</li> <li>of active restoration projects</li> <li>included in The Global Restoration</li> <li>Network (GRN) Database.</li> </ul>	В	15.2: Low	-	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

#### Factsheets for potential indicators to fill the gap

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# 15i: Area of restoration projects in the Global Restoration Network Database

Indicator /dataset summary	
This indicator measures the are	ea of active restoration projects included in The Global Restoration
Network (GRN) Database.	
Relationship with Aichi Target	
Aichi Target	15
Aichi Target Element	At least 15 per cent of degraded ecosystems are restored,
	contributing to climate change mitigation and adaption, and to
	combating desertification.
Alignment to Aichi Target	Low: not all restoration case studies included in the GRN
Element	Database link the restoration to climate change mitigation and
	adaptation or combating desertification.
Indicator/dataset coverage	
Spatial Coverage	Good: at least 20 countries from all 5 regions
Temporal Coverage	Not enough information to assign spatial coverage.
Temporal relevance to	Not enough information to assign temporal relevance.
Strategic Plan	
implementation	
Development status	
Development status Indicator category	B – Could be used at the global level but would require further
Development status Indicator category	B – Could be used at the global level but would require further development
Development status Indicator category Organisations/institutions	<ul> <li>B – Could be used at the global level but would require further development</li> <li>The Global Restoration Network (GRN)</li> </ul>
Development status Indicator category Organisations/institutions responsible	B – Could be used at the global level but would require further development The Global Restoration Network (GRN)
Development status Indicator category Organisations/institutions responsible For further information	B – Could be used at the global level but would require further development The Global Restoration Network (GRN) http://www.globalrestorationnetwork.org/database/
Development status Indicator category Organisations/institutions responsible For further information Reason for indicator/dataset	B – Could be used at the global level but would require further development The Global Restoration Network (GRN) http://www.globalrestorationnetwork.org/database/ The GRN developed the database in order to provide a central
Development status Indicator category Organisations/institutions responsible For further information Reason for indicator/dataset development	B – Could be used at the global level but would require further development The Global Restoration Network (GRN) http://www.globalrestorationnetwork.org/database/ The GRN developed the database in order to provide a central resource for policymakers, professionals and communities to find
Development status Indicator category Organisations/institutions responsible For further information Reason for indicator/dataset development	B – Could be used at the global level but would require further development The Global Restoration Network (GRN) http://www.globalrestorationnetwork.org/database/ The GRN developed the database in order to provide a central resource for policymakers, professionals and communities to find restoration case studies.
Development status Indicator category Organisations/institutions responsible For further information Reason for indicator/dataset development Probability of continued	B – Could be used at the global level but would require further development The Global Restoration Network (GRN) http://www.globalrestorationnetwork.org/database/ The GRN developed the database in order to provide a central resource for policymakers, professionals and communities to find restoration case studies. Not enough information to assign probability.
Development status Indicator category Organisations/institutions responsible For further information Reason for indicator/dataset development Probability of continued development	B – Could be used at the global level but would require further development         The Global Restoration Network (GRN)         http://www.globalrestorationnetwork.org/database/         The GRN developed the database in order to provide a central resource for policymakers, professionals and communities to find restoration case studies.         Not enough information to assign probability.
Development status Indicator category Organisations/institutions responsible For further information Reason for indicator/dataset development Probability of continued development Indicator/dataset description	B – Could be used at the global level but would require further development The Global Restoration Network (GRN) http://www.globalrestorationnetwork.org/database/ The GRN developed the database in order to provide a central resource for policymakers, professionals and communities to find restoration case studies. Not enough information to assign probability.
Development status Indicator category Organisations/institutions responsible For further information Reason for indicator/dataset development Probability of continued development Indicator/dataset description The GRN is a free, online portal	B – Could be used at the global level but would require further development The Global Restoration Network (GRN) http://www.globalrestorationnetwork.org/database/ The GRN developed the database in order to provide a central resource for policymakers, professionals and communities to find restoration case studies. Not enough information to assign probability. for information on ecological restoration. The GRN database is
Development status Indicator category Organisations/institutions responsible For further information Reason for indicator/dataset development Probability of continued development Indicator/dataset description The GRN is a free, online portal populated with case studies an	B – Could be used at the global level but would require further development The Global Restoration Network (GRN) http://www.globalrestorationnetwork.org/database/ The GRN developed the database in order to provide a central resource for policymakers, professionals and communities to find restoration case studies. Not enough information to assign probability. for information on ecological restoration. The GRN database is d literature on ecological restoration. 124 projects were analysed
Development status Indicator category Organisations/institutions responsible For further information Reason for indicator/dataset development Probability of continued development Indicator/dataset description The GRN is a free, online portat populated with case studies an for CBD Technical Series No. 78	B – Could be used at the global level but would require further development The Global Restoration Network (GRN) http://www.globalrestorationnetwork.org/database/ The GRN developed the database in order to provide a central resource for policymakers, professionals and communities to find restoration case studies. Not enough information to assign probability. for information on ecological restoration. The GRN database is d literature on ecological restoration. 124 projects were analysed s.
Development status Indicator category Organisations/institutions responsible For further information Reason for indicator/dataset development Probability of continued development Indicator/dataset description The GRN is a free, online portal populated with case studies an for CBD Technical Series No. 78 Scientific robustness (including	B – Could be used at the global level but would require further development The Global Restoration Network (GRN) http://www.globalrestorationnetwork.org/database/ The GRN developed the database in order to provide a central resource for policymakers, professionals and communities to find restoration case studies. Not enough information to assign probability. for information on ecological restoration. The GRN database is d literature on ecological restoration. 124 projects were analysed c. peer review)

### 3.2. Aichi Target Element Gaps

### 3.2.1. Aichi Target 1 Element 2

Aichi 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.

Aichi Target 1 Element 2: People are aware of the steps they can take to conserve and sustainably use biodiversity

There are currently no global indicators under the BIP for this Aichi Target Element. The review identified one possible source for an indicator, the Greendex Index, however the Index is currently only applied across 18 countries. This potential indicator is summarised in Table **3.6** below.

**Table 3.6:** Summary of the potential indicators for Aichi Biodiversity Target 1 Element 2 on peoples' awareness of steps they can take to conserve and sustainably use biodiversity.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
1.2i: Greendex - Consumer choice and the environment Greendex is a scientifically derived sustainable consumption index of actual consumer behaviour and material lifestyles across 18 countries.	В	Medium	Medium	Moderate

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

#### Factsheets for potential indicators to fill the gap

1.2i: Greendex - Consume	r choice and the Environment
Indicator /dataset summa	ry
Greendex is a scientifically	derived sustainable consumption index of actual consumer behaviour and
material lifestyles across	18 countries. It measures consumer behaviour and material lifestyle
according to 65 different v	variables. From http://environment.nationalgeographic.com/
Relationship with Aichi Tai	rget
Aichi Target	1
Aichi Target Element	People are aware of the steps they can take to conserve and sustainably
	use biodiversity.
Alignment to Aichi	Medium: this international consumer survey is designed to monitor
Element	consumer progress towards environmentally sustainable consumption
	only.

Indicator/dataset coverage	2		
Spatial Coverage	Moderate: 18 countries and all 5 regions.		
Temporal Coverage	2008-2014		
Temporal relevance to	Medium: Greendex findings have been available every two years since		
Strategic Plan	2010. Thus, the assumption is that there should be at least four data		
implementation	points by 2018.		
Development status			
Indicator category	B – Could be used at the global level but would require further		
	development		
Organisations/institution	The National Geographic and GlobeScan		
s responsible			
For further information	http://environment.nationalgeographic.com/environment/greendex/abo		
	ut-the-study/		
Reason for	The key objectives of the Greendex are to provide regular quantitative		
indicator/dataset	measures of consumer behaviour and to promote sustainable		
development	consumption. A group of international experts helped to determine the		
	behaviours that were most critical to investigate. These experts are		
	professionals who have demonstrated an outstanding commitment to		
	advancing global sustainability in their positions as leaders of relevant		
	sustainable development organisations.		
Probability of continued	High: National Geographic has partnered with GlobeScan to measure and		
development	monitor consumer progress toward environmentally sustainable		
	consumption over time.		
Indicator/dataset descript	ion		
This quantitative consume	r study of 18,000 consumers in a total of 18 countries (14 in 2008, 17 in		
2009 through 2012) asked	about such behaviour as energy use and conservation, transportation		
choices, food sources, the	relative use of green products versus conventional products, attitudes		
toward the environment a	nd sustainability, and knowledge of environmental issues.		
Scientific robustness (inclu	ding peer review)		
Structurally, the Greendex	is a meta-index composed of four sub-indices: housing, transportation,		
food, and consumption of	goods. Each respondent earns a score that reflects the environmental		
impact of his or her consumption patterns. Points are awarded or subtracted for specific forms of			
consumer behaviour, resulting in a score out of a maximum total for each respondent.			
To ensure that no demographic groups were over-represented in the quantitative survey sample,			
quota caps were set for education, age, and gender. The data for each country were weighted			
according to the latest census data to reflect the demographic profile of each country. The margin of			
error of random probability survey samples of this size is approximately +/- 3.1 percent 95 percent			
of the time in each country.			
This indicator would benefit from the addition of more countries to improve its spatial coverage.			

#### 3.2.2. Aichi Target 4 Element 1

Aichi 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.

Aichi Target 4 Element 1: Governments, business and stakeholders at all levels have taken steps to achieve, or have implemented, plans for sustainable production and consumption...

There are currently no global indicators under the BIP for this Aichi Target Element. The review identified one possible source for an indicator, the proportion of countries that are Category 1 CITES signatories. The potential indicator is summarised in Table **3.7** below.

**Table 3.7:** Summary of the potential indicators for Aichi Biodiversity Target 4 Element 1 governments, business and stakeholder achieving sustainable production and consumption.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
4.1i: Proportion of countries that are	А	High	High	Good
Category 1 CITES signatories				
This indicator has been developed to				
monitor progress made by the				
international community towards the				
development of full legislation for				
effective implementation of CITES to				
ensure that international trade in CITES-				
listed species is sustainable, traceable				
and legal.				

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

#### Factsheets for potential indicators to fill the gap

#### 4.1i: Proportion of countries that are Category 1 CITES signatories

#### Indicator /dataset summary

This indicator has been developed to monitor progress made by the international community towards the development of full legislation for effective implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) to ensure that international trade in CITES-listed species is sustainable, traceable and legal. Parties to CITES are required to take appropriate measures to enforce the provisions of the Convention and to prohibit trade in specimens in violation of those provisions (Article VIII of the Convention) through the implementation of appropriate policies, legislation and procedures.

Relationship with Aichi Target	
Aichi Target	4
Aichi Target Element	Governments, business and stakeholders at all levels have taken
	steps to achieve, or have implemented, plans for sustainable
	production and consumption
Alignment to Aichi Target	High: measures the steps taken by nations towards the prevention
Element	of unsustainable consumption of some 35,000 CITES-listed species.
Indicator/dataset coverage	
Spatial Coverage	Good: 180 countries and all five regions.
Temporal Coverage	1994 – 2013
Temporal relevance to	High: could be updated in 2020 with funding.
Strategic Plan implementation	
Development status	
Indicator category	A – Ready for use at the global level
Organisations/institutions	Convention on International Trade in Endangered Species of Wild
responsible	Fauna and Flora (CITES)
For further information	Tittensor et al. 2014
Reason for indicator/dataset	Developed for Tittensor et al. 2014
development	
Probability of continued	Medium: future update is funding dependent
development	
Indicator/dataset description	

The Parties are classified under three categories, according to their progress in developing effective legislation for implementing the provisions of the Convention. The indicator is then a measure of the proportion of Category 1 listed Parties relative to those in Categories 2 and 3. The categories are defined as follows (CITES, 2012):

• Category 1: Legislation that is believed generally to meet the requirements for implementation of CITES.

• Category 2: Legislation that is believed generally not to meet all of the requirements for the implementation of CITES.

• Category 3: Legislation that is believed generally not to meet the requirements for the implementation of CITES.

In addition, Parties may be classified as 'under review', during which time their legislation is being reviewed as result of new information provided by the member concerned; or as 'pending', normally including new Parties or Parties that have not responded to the Secretariat, for which their legislative analyses are under preparation.

Scientific robustness (including peer review)

The indicator is relevant only for legal international trade in CITES-listed species: not for illegal trade, domestic trade, non- CITES-listed species, or consumption/use of species not resulting in international trade. The indicator is also very insensitive, measuring only the number of Parties with national legislation consistent with CITES commitments and not the degree of application and enforcement of this legislation, nor the effectiveness of actions taken to reduce unsustainable exploitation.

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

#### 3.2.3. Aichi Target 5 Element 2

Aichi Target 5 Element 2: The loss of all habitats is at least halved and where feasible brought close to zero

There are currently no active global indicators under the BIP for this Aichi Target Element. There is however an inactive BIP indicator, the *Extent of marine habitats*, which could be utilised to monitor progress towards this Aichi Target Element. The indicator is currently classed as inactive, as no organisation/institution is currently taking it forward and there is a lack of resources to support its further development. A summary of this indicator is provided in Table **3.8** below with indicator information being available from the BIP website: <a href="http://www.bipindicators.net/globalindicators">http://www.bipindicators.net/globalindicators</a>.

Table 3.8: Summary of the inactive BIP indicators for Aichi Biodiversity Target 5 Element 2 on the loss of all habitats.

ory* Aichi Tai Element	get relevance to Strategic Pla	coverage n
High	Medium	-
	ory* Aichi Tar Element High	ory* Aichi Target relevance to Element Strategic Pla High Medium

Five additional indicators have been identified which could be used to fill the gap for this Aichi Target Element. These indicators deal with different habitat types and could potentially be used in unison to monitor progress towards this Aichi Target Element. A summary of the development category, alignment, temporal relevance and spatial coverage is shown in Table *3.9* below.

Table 3.9. Summary of the potential indicators for Aichi Biodiversity Target 5 Element 2 on the loss of all habitats.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
<b>5.2i: Global surface water extent</b> This indicator uses the Seasonal Surface Water Dynamics product created by the Joint Research Centre as part of the Copernicus services.	В	High	Low	Good
5.2ii: Natural habitat extent This indicator measures the global	A	High	High	Good

extent of land that remains natural (i.e. the proportion of the land surface which is non-agricultural; though note that urban area is not accounted for in this indicator).				
<b>5.2iii: Species Habitat Change Index</b> This indicator assesses for thousands of species worldwide trends in suitable habitats within their range, combining remote sensing and local species observations.	A	High	High	Good
<b>5.2iv: Urban Extent</b> This indicator measures the extent and spatial distribution of global human settlement from 1975 to 2014 based on the Global Human Settlement Layer (GHSL).	В	Medium	Low	Good
5.2v: Wetland Extent Trends (WET) Index The Wetland Extent Trends (WET) Index is a proof-of-concept for a new method to estimate broad trends in habitat extent for habitats with incomplete and heterogeneous data.	В	Medium	High	Good
5.2vi. Local Biodiversity Intactness Index The index provides estimates of human impacts on the intactness of local biodiversity worldwide, and how this may change over time.	A	High	High	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

# Factsheets for potential indicators to fill the gap

5.2i: Global surface water exter	nt	
Indicator /dataset summary		
This indicator uses the Seasonal	Surface Water Dynamics product created by the Joint Research	
Centre as part of the Copernicus	s services	
Relationship with Aichi Target		
Aichi Target	5	
Aichi Target Element	The rate of loss of all habitats is at least halved and where feasible	
	brought close to zero.	
Alignment to Aichi Element	High: Water bodies provide critical natural habitat to biodiversity	
	especially in arid climates.	
Indicator/dataset coverage		
Spatial Coverage	Good: Global coverage	
Temporal Coverage	1984-2000-2013 (global scale processing is ongoing so may not be	
	all complete yet)	

Temporal relevance to	Low: 1 complete time point (2013-2014)
Strategic Plan implementation	
Development status	
Indicator category	B – Indicators/datasets requiring further development for use at
	the global level
Organisations/institutions	Joint Research Centre (JRC), European Commission
responsible	
For further information	Jean-Francois Pekel, Andrew Cottam, Alan Belward (JRC), Noel
	Gorelick (GEE)
Reason for indicator/dataset	Our knowledge concerning surface water locations and dynamics is
development	inadequate and the information gap is significant. No previous
	attempt to create categories of water bodies based on seasonality -
	this is an important characteristic of water bodies as they are highly
	variable natural habitats both in space and time
Probability of continued	High: there is long-term investment in Copernicus services by the
development	European Commission
Indicator/dataset description	

5 categories of water body classified in this product:

- (i) Permanent water surfaces
- (ii) Seasonal water surfaces (and dates)
- (iii) Ephemeral water surfaces (and dates)
- (iv) New (and ex) water surfaces
- (v) Never water surfaces

The method uses Google Earth Engine for processing and mostly Landsat imagery but the method is sensor invariant.

Scientific robustness (including peer review)

Dynamic water mapping at high spatial and temporal resolution

Overall accuracy >90% (based on 20K validation pixels)

Further enquiries needed to confirm global coverage for each of the time points

# 5.2ii: Natural habitat extent

Indicator /dataset summary

This indicator measures the global extent of land that remains natural (i.e. the proportion of the land surface which is non-agricultural; though note that urban area is not accounted for in this indicator).

Relationship with Aichi Target	
Aichi Target	5
Aichi Target Element	The rate of loss of all habitats is at least halved and where
	feasible brought close to zero.
Alignment to Aichi Target	High: this indictor measures the global extent of land that
	remains natural
Indicator/dataset coverage	
Spatial Coverage	Good: data for all five regions.

Temporal Coverage	1961 to 2011.
Temporal relevance to	High: underlying data on agricultural habitats annually updated.
Strategic Plan implementation	
Development status	
Indicator category	A – Ready for use at the global level
Organisations/institutions	Food and Agricultural Organisation of the United Nations (FAO)
responsible	
For further information	See Tittensor et al. 2014 and data from
	http://faostat3.fao.org/home/E
Reason for indicator/dataset	Underlying data on the global extent of agricultural habitats is
development	collect by the FAO
Probability of continued	High: underlying FAO data is annually updated.
development	
Indicator/dataset description	
Data on the global extent of agricultural habitats was collected by the Food and Agricultural	
Organisation of the United Nations (FAO). Total natural habitat extent was calculated as the	
proportion of land that has not been converted to agricultural use.	
Scientific robustness (including peer review)	
The data is based upon the amount of natural habitat converted to agriculture only and will	
therefore underestimate the total loss of habitat due to other causes such as the construction of	
urban areas. Land that has been abandoned post-agricultural use will also be missed by this	
indicator.	

5.2iii: Species Habitat Change Index	
Indicator /dataset summary	
The Species Habitat Change Index assesses for thousands of species worldwide trends in suitable	
habitats within their range, combining remote sensing and local species observations.	
Relationship with Aichi Target	
Aichi Target	5
Aichi Target Element	The rate of loss of all habitats is at least halved and where feasible
	brought close to zero.
Alignment to Aichi Target	High: the Index covers a large and geographically highly
	representative number of species worldwide.
Indicator/dataset coverage	
Spatial Coverage	Good: all countries and all five regions.
Temporal Coverage	2001 to 2014 and beyond
Temporal relevance to	High: Data for thousands of species annually going forward to 2020
Strategic Plan implementation	and beyond.
Development status	
Indicator category	B – Could be used at the global level but would require further
	development.
Organisations/institutions	Map of Life / GEO BON / Future Earth, in collaboration with GBIF.
responsible	

For further information	Manuscript in preparation. For example of single species detail see
	http://species-
	beta.mol.org/species/habitat/Taphozous_hildegardeae
Reason for indicator/dataset	To create an indicator that captures in a globally representative,
development	transparent and replicable way how their suitable habitats are lost.
Probability of continued	High: Landsat and MODIS data collection is ongoing and informatics
development	infrastructure for continued metric calculation and reporting is
	developed.
Indicator/dataset description	

The Species Habitat Change Index quantifies the rate of change in suitable habitat for species, globally. Using remotely sensed information from Landsat and MODIS satellites, it tracks how within a species range the area of its required habitat is altered due to direct human encroachment or other changes. It validates estimates and captures their uncertainty using local species observations. Scientific Robustness (including peer review)

Data can be disaggregated from the global to the national scale and to single species. Calculations are fully transparent, accessible and replicable through the Map of Life web-interface. Uncertainty of estimates will continuously decrease as further species observations are mobilised.

5.2iv: Urban Extent	
Indicator/dataset summary	
This indicator measures the extent and spatial distribution of global human settlement from 1975 to	
2014 based on the Global Human Settlement Layer (GHSL).	
Relationship with Aichi Target	
Aichi Target	5
Aichi Target Element	The rate of loss of all habitats is at least halved and where feasible
	brought close to zero.
Alignment to Aichi Element	Medium: urban settlement is a proxy for natural habitat loss.
Indicator/dataset coverage	
Spatial Coverage	Good: data for all five regions.
Temporal Coverage	1975, 1990, 2000 and 2014.
Temporal relevance to	Low: 1 time point post-2011.
Strategic Plan implementation	
Development status	
Indicator category	B – More work needed to compute the total amount of global
	urban settlement for each time point from the spatial dataset
Organisations/institutions	Joint Research Centre (JRC), European Commission
responsible	
For further information	Martino Pesaresi Email: martino.pesaresi@jrc.ec.europa.eu
	Tel: +39 0332 789524 (direct line) Fax +39 0332 785154
Reason for indicator/dataset	No indicator exists to measure trends in global urban extent. This
development	was identified as a weakness of the Natural habitat extent
	indicator.

Probability of continued	High
development	

Indicator/dataset description The GHSL Landsat is a spatial raster dataset that maps human settlements globally based on the Landsat satellite time series. The GHSL Landsat uses the Global Land Survey (GLS) collection of Landsat imagery, which is a carefully coordinated collection of high resolution imagery for global modelling and is produced by the Global Land Cover Facility (www.landcover.org). This allows also mapping of settlements back in time until the year 1975. In addition, Landsat GHSL uses recent Landsat-8 from 2013/2014 for the latest coverage.

Scientific robustness (including peer review)

For the year 2014, only the areas with more than 5000 m<sup>2</sup> of built-up area are included in the current version (2740 scenes, approx. 1/3 of the landmass). Missing areas are filled with information from GLS2000. The next release (planned for January 2015) will include more than 90% of the landmass. Both a 300m and a full resolution (~30m) layer exists. It is advisable to use the 300m layers for global calculations in order to minimise the processing effort.

#### 5.2v: Wetland Extent Trends (WET) Index Indicator /dataset summary The Wetland Extent Trends (WET) Index is a proof-of-concept for a new method to estimate broad trends in habitat extent for habitats with incomplete and heterogeneous data. Relationship with Aichi Target Aichi Target 5 Aichi Target Element The rate of loss of all habitats is at least halved and where feasible brought close to zero. Alignment to Aichi Target Medium: the Index focuses on wetland only, but under this habitat type includes both marine/coastal and inland wetlands. Indicator/dataset coverage **Spatial Coverage** Good: over 200 countries and all five regions. **Temporal Coverage** 1970 to 2008. Temporal relevance to High: additional data points depend on availability from literature Strategic Plan implementation Development status B – Could be used at the global level but would require further Indicator category development Organisations/institutions **UNEP-WCMC** responsible For further information Manuscript in preparation. Preliminary results in CBD technical Series No. 78 and Gardner et al., 2015. Reason for indicator/dataset To create an indicator that estimates the global baseline rate of decline of wetland extent for the Ramsar Convention. development Probability of continued Medium: development is funding dependent and also depends development on the availability of the literature.

Indicator/dataset description

The WET Index estimates the average rate of change in wetland extent over the recent period of 1970 to 2008 using time-series data from the published scientific literature. The Index enables the rate of loss of wetlands to be estimated, providing an indication of the status of wetlands globally. Scientific robustness (including peer review)

Data can be disaggregated from the global scale to the six Ramsar regions and into inland and marine/coastal wetlands. However, wetland extent data is unevenly distributed both geographically and thematically *i.e.*, there are more studies of wetlands in North America than in the Neotropics and more extensive datasets for mangrove than lagoons.

#### 5.2vi. Local Biodiversity Intactness Index

Indicator /dataset summary

The Local Biodiversity Intactness Index (LBII) is based on a purpose-built global database of local biodiversity surveys combined with high-resolution global land-use data. The index provides estimates of human impacts on the intactness of local biodiversity worldwide, and how this may change over time.

Relationship with Aichi Targets	
Aichi Target	5
Aichi Target Element	The rate of loss of all habitats is at least halved and where feasible
	brought close to zero.
Alignment to Aichi Target	Good: This indicator is well aligned to the needs of Aichi Target 5,
	12 and 14: The LBII directly estimates the effects of human
	pressures on the intactness of local ecological assemblages
	worldwide. Because models are based on a wide and
	taxonomically-representative set of animal and plant species, the
	LBII reflects the status of overall terrestrial biodiversity better than
	is possible by focusing on any one taxon, e.g., vertebrates. Local
	communities' worldwide, especially poor and vulnerable ones,
	depend crucially on local (rather than global) biodiversity for their
	needs; LBII reports on the average intactness of local biodiversity
	within any area of interest.
Indicator/dataset coverage	
Spatial Coverage	Good: covers the entirety of the world's terrestrial area at a spatial
	resolution of 1km <sup>2</sup> .
Temporal Coverage	High: Uses the annual global land-use data being produced by
	CSIRO as part of the proposed Biodiversity Habitat Index (Target 5),
	which uses remotely-sensed data sets available from 2001 onwards
	(Hansen et al. 2013 Science 342: 850-853; Friedl et al. 2010 Remote
	Sensing of Environment 114: 168-182).
Temporal relevance to	High: Annual data points for 2011-2020 (assuming that the remote-
Strategic Plan implementation	sensing products used in land-use layers are updated annually), and
	projections possible given future scenarios of land use and related
	pressures (e.g., the Representative Concentration Pathways). The

	LBII has the additional attribute of being able to be projected into
	the future under different scenarios
Development status	
Indicator category	• A – This Index is ready for global use (requires no further development)– the database and the model approach is published and there is funding and a partnership in place to continue making the index into the future on annual time steps and with projections if required.
Organisations/institutions responsible	The PREDICTS project (Natural History Museum (London), UNEP- WCMC, University of Sussex, University College London, Imperial College London and Swansea University) in collaboration with CSIRO.
For further information	Global models of net change in local species-richness and abundance were published in <i>Nature</i> (Newbold et al. 2015 <i>Nature</i> 520:45-50) along with hindcasts, projections under the four Representative Concentration Pathways, and country-level analyses highlighting the risks to the poor and vulnerable of business as usual. Description of the underlying database has already been published (Hudson et al. <i>Ecology &amp; Evolution</i> 4:4701-4735); the first public release of the database will take place in late 2015/early 2016. Land-use data are described in proposal for the Biodiversity Habitat Index (Target 5). An overview of PREDICTS can be seen at <u>www.predicts.org.uk</u> .
Reason for indicator/dataset development	Existing indicators for these targets lack a broad biodiversity perspective; in particular, they are heavily biased towards vertebrates, which make up only 0.5% of the world's species. The LBII can report on both species-richness and mean abundance, and is being developed further to also report on geographic range rarity (endemism). LBII is strongly complementary to the proposed Biodiversity Habitat Index (Target 5), which focuses on the overall diversity of a larger region rather than the average local diversity within the region. LBII was first proposed in 2005 (Scholes & Biggs 2005 Nature 434:45-49) but the data needed to make it operational have only now been brought together.
Probability of continued development	High: PREDICTS team have a new 3-year grant from a UK Research Council to further develop the framework, and also have the capacity to expand the current database and analyses further.

Indicator/dataset description

The Local Biodiversity Intactness Index (LBII) estimates how much of a terrestrial site's original biodiversity remains in the face of human land use and related pressures. Because LBII relates to site-level biodiversity, it can be averaged and reported for any larger spatial scale (e.g., countries, biodiversity hotspots or biomes as well as globally) without additional assumptions, and related to socioeconomic data (e.g., Human Development Index). A purpose-collated taxonomically-representative global database of existing biodiversity survey data is analysed using mixed-effects

statistical models to estimate effects of land use and related pressures on site-level biodiversity and compositional similarity to intact ecological assemblages. Model estimates are then applied to maps of land use and other pressures to estimate the spatial pattern of biotic intactness. With the advent of global, annual, fine-scale land-use data, LBII can report annually and at fine resolution. LBII is both cost-effective and scientifically rigorous.

#### Scientific robustness (including peer review)

The modelling, mapping and projection approaches at the core of the LBII were published as a peerreviewed Article in *Nature* in 2015 (Newbold et al. Nature 520:45-50) using coarse-scale (0.5 degree) land-use data. Models of land-use effects on compositional similarity are currently in review (Newbold et al. Ecography); LBII is estimated by combining these two kinds of model. Several other related papers are published (Newbold et al. 2014 Proc R Soc B 281:20141371), in press (De Palma et al. 2015 J Appl Ecol in press) or currently undergoing peer review. A peer-reviewed description of the database underpinning the analysis has already been published (Hudson et al. 2014 Ecol & Evol 4:4701-4735), and a full public release of the database is currently in preparation.

#### 3.2.4. Aichi Target 6 Element 2

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

Aichi Target 6 Element 2: Recovery plans and measures are in place for all depleted species

There are currently no global indicators under the BIP for this Aichi Target Element and no suitable indicators were found during this review. However, suitable datasets and/or indicators may have been missed and if so, we welcome being made aware of these.
## 3.2.5. Aichi Target 7 Element 2

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

Aichi Target 7 Element 2: Areas under aquaculture are managed sustainably, ensuring conservation of biodiversity

Currently there are no indicators in the global suite to monitor progress to Aichi Target 7 Element 2. This review identified a potential indicator that could be developed to fill this gap. The indicator is summarised in Table **3.10** below and the following factsheet.

Table 3.10: Summary of the potential indicators for Aichi Biodiversity Target 7 Element 2 on sustainable aquaculture.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
7.2i: Aquaculture certification This indicator shows tonnage from certified aquaculture farms.	В	High	High	Moderate

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

#### Factsheets for potential indicators to fill the gap

7.2i: Aquaculture certification (ASC)		
Indicator /dataset summary		
This indicator shows tonnage from	om certified aquaculture farms.	
Relationship with Aichi Target		
Aichi Target	7	
Aichi Target Element	Areas under aquaculture are managed sustainably, ensuring	
	conservation of biodiversity	
Alignment to Aichi Element	High: this indicator measures the adoption of aquaculture	
	certification schemes aimed to improve sustainability.	
Indicator/dataset coverage		
Spatial Coverage	Moderate: 3-4 regions (more than 10 countries total)	
Temporal Coverage	2010-2015	
Temporal relevance to	High: certification only came into effect after 2010 so will only	
Strategic Plan implementation	cover farms certified since then but with farms being certified every	
	year there is likely to be annual data until 2020.	
Development status		

Indicator category	B – Indicators/datasets requiring further development for use at
	the global level
Organisations/institutions	Aquaculture Stewardship Council
responsible	
For further information	http://www.asc-
	aqua.org/index.cfm?act=tekst.item&iid=2&iids=385&Ing=1
Reason for indicator/dataset	Aquaculture certification ensures sustainable fisheries
development	
Probability of continued	High: database will continue to grow as the aquaculture fisheries
development	become certified.
Indicator/dataset description	

Aquaculture farms which have been certified to ASC standards. Can be disaggregated by fish type or by country.

Scientific robustness (including peer review)

As a member of the International Social and Environmental Accreditation and Labelling (ISEAL) organisation, ASC's operations meet the requirements for credible standard setting. The ASC standards were developed in line with ISEAL's Codes of Good Practice, meeting the requirements for inclusive and transparent standard setting.

Worth noting that there are other certification programmes - namely Global Aquaculture Alliance (GAA), Global GAP, Aqua GAP and the Best Aquaculture Practices (BAP). All of these should be considered together in a potential indicator (Jonell et al., 2013).

Jonell M, Phillips M, Rönnbäck, Troell M (2013) Eco-certification of farmed seafood: Will it make a difference? Ambio, **42**, 659-674.

### 3.2.6. Aichi Target 8 Element 1

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

Aichi Target 8 Element 1: Pollutants (of all types) have been brought to levels that are not detrimental to ecosystem function and biodiversity

There is currently no unique BIP indicator to assess progress towards this Aichi Target Element. However, both the *Living Planet Index* and the *Red List Index* can be disaggregated to show trends in species threatened by pollution. In addition, there is an inactive BIP indicator, the *Water Quality Index for Biodiversity*, which could be utilised to monitor progress towards this Aichi Target Element. The indicator is currently classed as inactive as no organisation/institution is currently taking it forward and there is a lack of resources to support its further development. A summary of these indicators is provided in Table **3.11** below with indicator information being available from the BIP website: http://www.bipindicators.net/globalindicators.

BIP Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
<b>Living Planet Index (pollutants)</b> This indicator shows trends in species known to be threatened by pollution.	A	High	High	Good
Red List Index (impacts of pollution) This indicator shows trends in the status of all species worldwide in groups that have been comprehensively assessed at least twice for the IUCN Red List (currently birds, mammals, amphibians, corals and cycads, with additional groups to be added by 2020), but reflects only those trends driven by the negative impacts of pollution or the positive impacts of its control.	A	High	High	Good
Water Quality Index for Biodiversity Currently inactive, this indicator monitors several measures of water quality to determine how water quality is affecting biodiversity.	В	Medium	-	Moderate

**Table 3.11:** Summary of disaggregated and inactive BIP indicators for Aichi Biodiversity Target 8 Element 1 on pollutants of all types.

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3). This review identified three indicators that align to this Element gap. These potential indicators are summarised in Table 3.12 below.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
8.1i: Global river nutrient export This indicator shows river export of nitrogen, phosphorus, silica and carbon based on a model.	В	High	Low	Good
8.1ii: Insecticide use This indicator shows the amount of insecticides used globally.	В	Medium	High	Good

Table 3.12: Summary of potential indicators for Aichi Biodiversity Target 8 Element 1 on all pollutants.

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

|--|

8.1i: Global river nutrient expo	rt
Indicator /dataset summary	
This indicator shows river expor	t of nitrogen, phosphorus, silica and carbon based on a model.
Relationship with Aichi Target	
Aichi Target	8
Aichi Target Element	Pollutants (of all types) have been brought to levels that are not
	detrimental to ecosystem function and biodiversity
Alignment to Aichi Element	High: changes in the amount, form (dissolved inorganic, organic,
	particulate), and ratios in nutrient inputs to coastal ecosystems
	contribute to numerous negative human health and environmental
	impacts, such as loss of habitat and biodiversity, increase in blooms
	of certain species of harmful algae, eutrophication, hypoxia and fish
	kills
Indicator/dataset coverage	
Spatial Coverage	Good: data for all five regions.
Temporal Coverage	1970 to 2000 and scenarios for 2030 and 2050.
Temporal relevance to	Low: no updates foreseen within Strategic Plan timeframe.
Strategic Plan implementation	
Development status	
Indicator category	B – Indicators/datasets requiring further development for use at
	the global level
Organisations/institutions	NOAA CMER Program, Institute of Marine and
responsible	Coastal Sciences, Rutgers University, New Brunswick, New Jersey,
	USA

For further information http://marine.rutgers.edu/globalnews/documents.htm			
Reason for indicator/dataset	eason for indicator/dataset Indicative of coastal and marine pressures on biodiversity.		
development			
Probability of continued	Low: No indication of further work in this area.		
development			
Indicator/dataset description			
Indicator is based on an updated Global NEWS model. Past trends (1970–2000) and four future			
scenarios were analysed.			
Scientific robustness (including peer review)			
Peer reviewed, see:			
Seitzinger, S.P.; Mayorga, E.; Bouwman, A.F.; Kroeze, C.; Beusen, A.H.W.; Billen, G.; Van Drecht, G.;			
Dumont, E.; Fekete, B.M.; Garnier, J.; Harrison, J.A 2010 Global river nutrient export: A scenario			
analysis of past and future trends. Global Biogeochemical Cycles, 24, GB0A08.			

10.1029/2009GB003587

# 8.1ii: Insecticide use

Indicator /dataset summary

This indicator shows the amount of insecticides used globally.

Relationship with Aichi Target			
Aichi Target	8		
Aichi Target Element	Pollutants (of all types) have been brought to levels that are not		
	detrimental to ecosystem function and biodiversity.		
Alignment to Aichi Target	Medium: covers all insecticide use (a whole range of compounds)		
	but not other pollutants.		
Indicator/dataset coverage			
Spatial Coverage	Good: data for all five regions.		
Temporal Coverage	1992 to 2011		
Temporal relevance to	High: annually updated.		
Strategic Plan implementation			
Development status			
Indicator category	B – Indicators/datasets requiring further development for use at		
	the global level.		
Organisations/institutions	Food and Agricultural Organization of the United Nations (FAO)		
responsible			
For further information	FAOSTAT: http://faostat3.fao.org/search/insecticide/E		
Reason for indicator/dataset	Excess insecticides are a major stressor on living organisms		
development	(especially pollinators) and can be amplified through the food		
	chain.		
Probability of continued	Medium: maintained by FAO but depends on regular country		
development	reporting.		
Indicator/dataset description			
Globally approximately 9,000 species of insects and mites damage crops and are therefore			
eradicated using insecticides, but this also has a harmful effect on other invertebrates and can			

be amplified through the food chain. This indicator describes chlorinated hydrocarbons, organophosphates, carbamates insecticides and pyrethroids, botanic and other insecticides.

Scientific robustness (including peer review)

The reporting by countries is sporadic, making year on year comparisons difficult, and ruling out the possibility of making regional assessments. Years with few countries were removed from the analysis until there was no substantial correlation (i.e. the number of countries reporting was not correlated with the data). This resulted in the removal of 1990, 1991 and 2011. From Tittensor et al. 2014.

# 3.2.7. Aichi Target 9 Element 2

Aichi 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.

Aichi Target 9 Element 2: Pathways identified and prioritized

There are currently no global indicators under the BIP for this Aichi Target Element. The IUCN SSC Invasive Species Specialist Group with its partners has identified and is working on developing a potential indicator on the identification and prioritization of pathways as outlined in Table **3.13** below.

Table 3.13: Summary of the potential indicators for Aichi Biodiversity Target 9 Element 2 on the identification and prioritisations of IAS pathways.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
9.2i: Frequency of introduction pathways of past invasion events Global Dataset documents pathways/vectors of introduction of known alien and invasive species.	В	High	High	Good
* ~				

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

#### Factsheets for potential indicators to fill the gap

#### 9.2i: Frequency of introduction pathways of past invasion events

Indicator /dataset summary

The IUCN SSC Invasive Species Specialist Group (ISSG) with partners including Centre for Ecology and Hydrology (CEH) – under the framework of the Global Invasive Alien Species Information Partnership (GIASIPartnership) are currently developing a resource that documents pathways/vectors of introduction of known alien and invasive species. This dataset will be the basis of this potential indicator.

Relationship with Aichi Target	
Aichi Target	9
Aichi Target Element	IAS pathways are identified and prioritised
Alignment to Aichi Element	High: the dataset focuses on the pathways/vectors of
	introduction of alien and potentially invasive species- the

	identification and prioritisation (for management) of which is
	addressed in Aichi Target 9.
Indicator/dataset coverage	
Spatial Coverage	Good: should cover all CBD Parties across the five regions.
Temporal Coverage	1980 to 2015
Temporal relevance to	High: although dependent on record availability.
Strategic Plan	
implementation	
Development status	
Indicator category	B – Indicators/datasets requiring further development for use at
	the global level.
Organisations/institutions	IUCN SSC Invasive Species Specialist Group
responsible	
For further information	http://www.issg.org/
Reason for indicator/dataset	This resource/ dataset is being developed under the work plan of
development	the Global Invasive Alien Species Information Partnership
	(GIASIPartnership)
Probability of continued	High
development	
Indicator/dataset description	

The dataset records pathways/vectors of introduction of known alien and potentially invasive species. The pathway classification that forms the basis of categorisation of pathways was developed by members of the ISSG (based on Hulme et al 2008) (see Analysis of Pathways for the Introduction of Invasive Alien Species <a href="http://www.cbd.int/doc/meetings/cop/cop-12/information/cop-12-inf-10-en.pdf">http://www.cbd.int/doc/meetings/cop/cop-12/information/cop-12-inf-10-en.pdf</a>). Additional annotations include region and country of introduction, the higher taxonomy of the alien species, date of introduction or first record, environment/system in which the species occurs, information source. Preliminary results of this approach are reported in Essl et al. (in press).

Hulme, P.E., Bacher, S., Kenis, M., Klotz, S., Kuhn, I., Minchin, D., Nentwig, W., Olenin, S., Panov, V., Pergl, J., Pyßek, P., Roques, A., Sol, D., Solarz, W. & Vila, M. (2008) Grasping at the routes of biological invasions: a framework for integrating pathways into policy. *Journal of Applied Ecology*, **45**, 403–414.

Essl, Franz; Bacher, Sven; Blackburn, Tim; Booy, Olaf; Brundu, Giuseppe; Brunel, Sarah; Cardoso, Ana-Christina; Eschen, Rene; Gallardo, Belinda; Galil, Bella; Garcia-Berthou, Emili; Genovesi, Piero; Groom, Quentin; Harrower, Colin; Hulme, Philip; Katsanevakis, Stelios; Kenis, Marc; Kühn, Ingolf; Kumschick, Sabrina; Martinou, Kelly; Nentwig, Wolfgang; O'Flynn, Colette; Pagad, Shyama; Pergl, Jan; Pysek, Petr; ., in press. Crossing frontiers in tackling pathways of biological invasions. BioScience

Scientific robustness (including peer review)

All data is validated and verified by experts. An effort is made to include as many primary sources of information as is possible.

### 3.2.8. Aichi Target 10 Element 1

Aichi 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.

Aichi Target 10 Element 1: Multiple anthropogenic pressures on coral reefs are minimized, so as to maintain their integrity and functioning

There is currently no unique global indicator under the BIP for this Aichi Target Element. However, the *Living Planet Index* and the *Red List Index* can be disaggregated to show trends in reefdependent species and coral species respectively. The key reference for the *Red List Index* disaggregation is Carpenter et al. (2008) One-third of reef-building corals face elevated extinction risk from climate change and local impacts. *Science*, 321(5888), 560-563. Data is for 1996-2008 currently, but will be updated by 2018. A summary of these indicators is provided in Table **3.14** below.

BIP Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
Living Planet Index (reef-dependent species) This indicator shows trends in reef- dependent species.	A	High	High	Good
Red List Index (reef-building coral species) This indicator shows trends in the status of coral species worldwide that have been comprehensively assessed at least twice for the IUCN Red List.	В	High	High	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

This review identified three potential indicators that focus specifically on coral reefs. The three potential indicators are summarised in Table **3.15** below.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
10.1i: Global coral reef health indicators Describes the area of coral reef subject to bleaching alerts, degree heating weeks, bleaching hotspots, maximum and mean sea surface temperature and their anomalies across the globe.	В	High	High	Good
<b>10.1ii: Mean global coral reef cover</b> This indicator of coral reef health estimates the percentage of living coral cover on the reef's surface.	В	High	-	Good
<b>10.1iii: Number of countries</b> <b>reporting coral bleaching</b> This indicator shows the trends in coral bleaching 1980-2010.	В	High	High	Moderate

 Table 3.15: Summary of the potential indicators for Aichi Biodiversity Target 10 Element 1 on coral reefs.

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

# Factsheets for potential indicators to fill the gap

10.1i: Global coral reef health indicators		
Indicator /dataset summary		
Describes the area of coral reef subject to bleaching alerts, degree heating weeks, bleaching		
hotspots, maximum and mean s	sea surface temperature and their anomalies across the globe.	
Relationship with Aichi Target		
Aichi Target	10	
Aichi Target Element	The multiple anthropogenic pressures on coral reefs are minimized,	
	so as to maintain their integrity and functioning.	
Alignment to Aichi Element	High: areas of coral bleaching are caused by sea surface	
	temperature anomalies driven by climate change.	
Indicator/dataset coverage		
Spatial Coverage	Good: data for all regions with corals.	
Temporal Coverage	2001 to 2014	
Temporal relevance to	High: three time points post 2011 and additional weekly to monthly	
Strategic Plan implementation	updates ongoing which can be aggregated to annual time scales.	
Development status		
Indicator category	B – Indicators/datasets requiring further development for use at	
	the global level	
Organisations/institutions	NOAA Coral Reef Watch	
responsible		
For further information	http://coralreefwatch.noaa.gov/satellite/composites/index.php	
Reason for indicator/dataset	Uses satellite tools to pinpoint the locations and monitor areas	
development	around the world where corals are presently at risk for bleaching.	
Probability of continued	High: annual, monthly and bi-weekly updates ongoing.	

development			
Indicator/dataset description			
The trend indicators will rely on	The trend indicators will rely on Coral Reef Watch's heritage suite of operational 50-km products;		
but it will be updated in the coming months with the new 5-km products released in February 2015.			
Scientific robustness (including peer review)			
All of the data provided are based on satellite measurements of sea surface temperature (SST). The			
first 50-km data product is simply the SST measured globally per pixel. Next, this is compared to the			
current temperature with a long-term mean at each location, to calculate an SST Anomaly. The			
following are derivative products from SST anomalies:			
<ul> <li>Hotspot= where SST is a</li> </ul>	bove the mean value you would expect to see in the warmest month		
of the year			

- The Degree heating week = the HotSpot stress totalled over a twelve-week period
- Bleaching alert=SST above bleaching threshold, DHW 4 or higher

Indicator requires the calculation of the global areas for each indicator from the satellite data products.

10.1ii: Mean global coral reef cover		
Indicator /dataset summary		
This indicator of coral reef health estimates the percentage of living coral cover on the reef's surface.		
Relationship with Aichi Target		
Aichi Target	10	
Aichi Target Element	The multiple anthropogenic pressures on coral reefs are minimized,	
	so as to maintain their integrity and functioning.	
Alignment to Aichi Element	High: trends in this indicator show the potential of reefs to	
	regenerate and recover after environmental stresses and pressures.	
Indicator/dataset coverage		
Spatial Coverage	Good: 24 countries that span the Indian, Pacific, and Caribbean	
	oceans.	
Temporal Coverage	1995 to 2011	
Temporal relevance to	Not enough information to assign temporal relevance. As this is a	
Strategic Plan implementation	collation of published reef estimates future updates are dependent	
	on updates to existing estimates and cover estimates for new reefs.	
Development status		
Indicator category	B – Indicators/datasets requiring further development for use at	
	the global level	
Organisations/institutions	Marine Spatial Ecology Lab, University of Queensland	
responsible		
For further information	http://www.marinespatialecologylab.org/	
Reason for indicator/dataset	The most widely-gathered metric of coral reef health is the	
development	percentage of living coral cover on the reef's surface. Aichi Target	
	10 specifically lists coral reefs as vulnerable ecosystems, and coral	
	reef cover can be used to assess the state of global reefs.	
Probability of continued	Not enough information to assign probability. Coral cover data	
development	were collated from published sources.	
Indicator/dataset description		
This indicator is compiled from more than 35 countries, representing more than 120 reefs and		
encompassing 886 records.		
Scientific robustness (including peer review)		
The global average masks considerable underlying variability in the change within ocean basins,		

regions, and localities. Low- and high-frequency stochastic events can have a strong effect on these data (e.g. the El Nino Southern Oscillation; ENSO). Inconsistent reporting of habitat type and depth prevented a clear assessment of the contribution of local habitat.

10.1iii: Number of countries reporting coral bleaching		
Indicator /dataset summary		
This indicator shows trends in coral bleaching between 1980 and 2010.		
Relationship with Aichi Target		
Aichi Target	10	
Aichi Target Element	The multiple anthropogenic pressures on coral reefs are minimized,	
	so as to maintain their integrity and functioning.	
Alignment to Aichi Element	High: coral bleaching is a major pressure on coral reef health and	
	functioning. Tracking the number of countries reporting coral	
	bleaching can indicate the occurrence of mass bleaching event in	
	multiple regions.	
Indicator/dataset coverage		
Spatial Coverage	Good: data for all regions with corals.	
Temporal Coverage	1980 to 2010	
Temporal relevance to	Not enough information to assign temporal relevance.	
Strategic Plan implementation		
Development status		
Indicator category	B – Indicators/datasets requiring further development for use at	
	the global level	
Organisations/institutions	ReefBase for source data. Reefs at Risk Revisited report (WRI) for	
responsible	presentation of the indicator.	
For further information	http://www.reefbase.org/gis_maps/datasets.aspx	
	http://www.wri.org/publication/reefs-risk-revisited	
Reason for indicator/dataset	Natural variation in water temperatures, together with other local	
development	stressors, has always caused occasional, small-scale episodes of	
	coral bleaching. Recent years, however, have seen a rise in the	
	occurrence of abnormally high ocean temperatures which has led	
	to more frequent, more intense, and more widespread "mass	
	bleaching" events where numerous corals of many different species	
	across a large area bleach simultaneously.	
Probability of continued	Not enough information to assign probability.	
development		
Indicator/dataset description		
Approximately 370 observation	s of coral bleaching were reported globally between 1980 and 1997,	
while more than 3,700 were reported between 1998 and 2010.		
Scientific robustness (including peer review)		
The increase in recorded observations over time reflects rising sea surface temperatures as well as		
increased awareness, monitoring, and communication of bleaching events and could skew the		
trends shown. Data for 2010 are incomplete.		

# 3.2.9. Aichi Target 11 Element 4

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

Aichi Target 11 Element 4: Conserved areas are well connected and integrated into the wider landscape and seascape

There are currently no global indicators under the BIP for this Aichi Target Element. The review identified two possible indicators that could be used for this Target Element which is summarised in Table **3.16** below.

Table 3.16: Summary of the potential indicators for Aichi Biodiversity Target 11 Element 4 on the connectedness and integration of conserved areas.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
11.4i: Land-/Seascape Connectivity Index This indicator uses two indicators to assess the extent to which conserved areas are well-connected and integrated into the wider land and seascape.	В	High	High	Good
<b>11.4ii: Protected AreaRepresentativeness &amp; ConnectednessIndex</b> This indicator uses biologically-scaledenvironmental mapping and modellingglobally to assess the extent to whichterrestrial protected areas areecologically representative and wellconnected and integrated into the widerlandscape.	В	Medium	High	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

Factsheets for potential indicators to fill the gap

#### 11.4i: Land-/Sea-scape Connectivity Index

Indicator /dataset summary

The Land-/Sea-scape Connectivity Policy Index uses two indicators to assess the extent to which conserved areas are well-connected and integrated into the wider land and seascape. (i) The number

of countries that have an enabling instrument or other type of enabling mechanism for connectivity conservation initiatives. The second indicator. (ii) The number of countries that have established/implemented a connectivity conservation initiative. This information is derived from the UNEP-WCMC Global Database on Connectivity Conservation Initiatives.

Relationship with Aichi Target	
Aichi Target	11
Aichi Target Element	Conserved areas are well connected into the wider landscape and
	seascape.
Alignment to Aichi Target	High: the index directly assesses the connectedness of protected
	areas globally.
Indicator/dataset coverage	
Spatial Coverage	Good: covers the entire terrestrial, marine, flyways and waterways of all countries and continents.
Temporal Coverage	Utilises the full temporal coverage of the WDPA through the
	inclusion of transboundary protected areas and other conservation areas.
Temporal relevance to	High: 5 or more post 2011.
Strategic Plan implementation	
Development status	
Indicator category	B – Indicators/datasets requiring further development for use at the global level
Organisations/institutions	UNEP-WCMC, UNEP, IUCN-WCPA
For further information	
Reason for indicator/dataset	To provide a comprehensive status report on the trends and gaps in
development	policy on connectivity conservation and to identify priority areas
	where significant connectivity initiatives can be established.
Probability of continued	High: The United Nations Environment Programme (UNEP) and
development	UNEP-WCMC have launched a new project that will search for and
	bring together a wealth of information on connectivity conservation
	that UNEP will use to develop criteria and methodologies for
	prioritizing connectivity conservation. The project also aims to
	develop indictors to measure and track progress towards a well-
	development of a global connectivity strategy. This strategy will
	provide policy and legislative tools and guidance to LINEP member
	countries for establishing connectivity conservation initiatives
	based upon the identification of best practice cases and lessons
	learned.
Indicator/dataset description	
The index is used based on the	identification and collection of data on connectivity initiatives

The index is used based on the identification and collection of data on connectivity initiatives, including best practice case studies from across the globe. A global database has been created that will include attributes related to the legal instruments or other types of enabling mechanisms for connectivity conservation. Reference will be made to Case Studies/Experience including Lessons Learned. The status of each initiative will also be recorded to determine the country has established/implemented a connectivity initiative. The analysis will also consider the number of countries that have integrated protected areas into the wider landscape using the WDPA. Scientific robustness (including peer review)

The techniques underpinning this index will be consulted with via experts who have worked in the field of connectivity conservation for over 20 years. The methods and results will be published in the

#### 11.4ii: Protected Area Representativeness & Connectedness (PARC) Index

Indicator /dataset summary

The Protected Area Representativeness & Connectedness (PARC) Index uses biologically-scaled environmental mapping and modelling globally to assess the extent to which terrestrial protected areas are ecologically representative and well connected and integrated into the wider landscape.

Relationship with Aichi Target	
Aichi Target	11
Aichi Target Element	Conserved areas are well connected and integrated into the wider
	landscape and seascape.
Alignment to Aichi Target	High: the index directly assesses the ecological representativeness
	and connectedness of terrestrial protected areas worldwide.
Indicator/dataset coverage	
Spatial Coverage	Good: covers the entire terrestrial area of all countries and
	continents, at 1km grid resolution.
Temporal Coverage	Utilises the full temporal coverage of the WDPA.
Temporal relevance to	High: ten annual data points, 2011-2020.
Strategic Plan implementation	
Development status	
Indicator category	B – Indicators/datasets requiring further development for use at
	the global level
Organisations/institutions	CSIRO and GEO BON, in collaboration with Map of Life (Yale
Organisations/institutions responsible	CSIRO and GEO BON, in collaboration with Map of Life (Yale University et al.) and GBIF.
Organisations/institutions responsible For further information	CSIRO and GEO BON, in collaboration with Map of Life (Yale University et al.) and GBIF. Manuscript in preparation, describing latest implementation of this
Organisations/institutions responsible For further information	CSIRO and GEO BON, in collaboration with Map of Life (Yale University et al.) and GBIF. Manuscript in preparation, describing latest implementation of this methodology. Earlier proof-of-concept application described in
Organisations/institutions responsible For further information	CSIRO and GEO BON, in collaboration with Map of Life (Yale University et al.) and GBIF. Manuscript in preparation, describing latest implementation of this methodology. Earlier proof-of-concept application described in Ferrier, S et al (2004) Mapping more of terrestrial biodiversity for
Organisations/institutions responsible For further information	CSIRO and GEO BON, in collaboration with Map of Life (Yale University et al.) and GBIF. Manuscript in preparation, describing latest implementation of this methodology. Earlier proof-of-concept application described in Ferrier, S et al (2004) Mapping more of terrestrial biodiversity for global conservation assessment. <i>BioScience</i> 54: 1101-1109.
Organisations/institutions responsible For further information Reason for indicator/dataset	CSIRO and GEO BON, in collaboration with Map of Life (Yale University et al.) and GBIF. Manuscript in preparation, describing latest implementation of this methodology. Earlier proof-of-concept application described in Ferrier, S et al (2004) Mapping more of terrestrial biodiversity for global conservation assessment. <i>BioScience</i> 54: 1101-1109. To provide a rigorous, yet cost-effective, approach to assessing
Organisations/institutions responsible For further information Reason for indicator/dataset development	CSIRO and GEO BON, in collaboration with Map of Life (Yale University et al.) and GBIF. Manuscript in preparation, describing latest implementation of this methodology. Earlier proof-of-concept application described in Ferrier, S et al (2004) Mapping more of terrestrial biodiversity for global conservation assessment. <i>BioScience</i> 54: 1101-1109. To provide a rigorous, yet cost-effective, approach to assessing protected-area representativeness and connectedness globally, by
Organisations/institutions responsible For further information Reason for indicator/dataset development	CSIRO and GEO BON, in collaboration with Map of Life (Yale University et al.) and GBIF. Manuscript in preparation, describing latest implementation of this methodology. Earlier proof-of-concept application described in Ferrier, S et al (2004) Mapping more of terrestrial biodiversity for global conservation assessment. <i>BioScience</i> 54: 1101-1109. To provide a rigorous, yet cost-effective, approach to assessing protected-area representativeness and connectedness globally, by harnessing the power of recent advances in remote environmental
Organisations/institutions responsible For further information Reason for indicator/dataset development	CSIRO and GEO BON, in collaboration with Map of Life (Yale University et al.) and GBIF. Manuscript in preparation, describing latest implementation of this methodology. Earlier proof-of-concept application described in Ferrier, S et al (2004) Mapping more of terrestrial biodiversity for global conservation assessment. <i>BioScience</i> 54: 1101-1109. To provide a rigorous, yet cost-effective, approach to assessing protected-area representativeness and connectedness globally, by harnessing the power of recent advances in remote environmental mapping, biodiversity informatics, and macroecological modelling.
Organisations/institutions responsible For further information Reason for indicator/dataset development Probability of continued	CSIRO and GEO BON, in collaboration with Map of Life (Yale University et al.) and GBIF. Manuscript in preparation, describing latest implementation of this methodology. Earlier proof-of-concept application described in Ferrier, S et al (2004) Mapping more of terrestrial biodiversity for global conservation assessment. <i>BioScience</i> 54: 1101-1109. To provide a rigorous, yet cost-effective, approach to assessing protected-area representativeness and connectedness globally, by harnessing the power of recent advances in remote environmental mapping, biodiversity informatics, and macroecological modelling. High: Active research program in CSIRO is continuing to refine
Organisations/institutions responsible For further information Reason for indicator/dataset development Probability of continued development	CSIRO and GEO BON, in collaboration with Map of Life (Yale University et al.) and GBIF. Manuscript in preparation, describing latest implementation of this methodology. Earlier proof-of-concept application described in Ferrier, S et al (2004) Mapping more of terrestrial biodiversity for global conservation assessment. <i>BioScience</i> 54: 1101-1109. To provide a rigorous, yet cost-effective, approach to assessing protected-area representativeness and connectedness globally, by harnessing the power of recent advances in remote environmental mapping, biodiversity informatics, and macroecological modelling. High: Active research program in CSIRO is continuing to refine underpinning analytical methodology. Ongoing application will
Organisations/institutions responsible For further information Reason for indicator/dataset development Probability of continued development	CSIRO and GEO BON, in collaboration with Map of Life (Yale University et al.) and GBIF. Manuscript in preparation, describing latest implementation of this methodology. Earlier proof-of-concept application described in Ferrier, S et al (2004) Mapping more of terrestrial biodiversity for global conservation assessment. <i>BioScience</i> 54: 1101-1109. To provide a rigorous, yet cost-effective, approach to assessing protected-area representativeness and connectedness globally, by harnessing the power of recent advances in remote environmental mapping, biodiversity informatics, and macroecological modelling. High: Active research program in CSIRO is continuing to refine underpinning analytical methodology. Ongoing application will draw on continual improvements in quantity, quality and
Organisations/institutions responsible For further information Reason for indicator/dataset development Probability of continued development	CSIRO and GEO BON, in collaboration with Map of Life (Yale University et al.) and GBIF. Manuscript in preparation, describing latest implementation of this methodology. Earlier proof-of-concept application described in Ferrier, S et al (2004) Mapping more of terrestrial biodiversity for global conservation assessment. <i>BioScience</i> 54: 1101-1109. To provide a rigorous, yet cost-effective, approach to assessing protected-area representativeness and connectedness globally, by harnessing the power of recent advances in remote environmental mapping, biodiversity informatics, and macroecological modelling. High: Active research program in CSIRO is continuing to refine underpinning analytical methodology. Ongoing application will draw on continual improvements in quantity, quality and availability of environmental and biological data worldwide.

The index is underpinned by global modelling of fine-scaled spatial variation in biodiversity composition (beta diversity) derived by scaling environmental and geographical gradients using >300 million location records for >400,000 plant, invertebrate and vertebrate species. This modelling is then integrated with data on protected-area boundaries (WDPA) and statistically-downscaled land use in surrounding landscapes (see Factsheet 5.2i, Biodiversity Habitat Index) to derive separate indices, or a single composite index, of ecological representativeness and connectedness of

protected areas within any specified region (e.g. an ecoregion, a country, or an entire biome). Scientific robustness (including peer review)

The analytical techniques underpinning this index (for biological scaling of environmental gradients, and for assessing ecological representativeness and connectivity) have all been subjected to extensive peer review in the scientific journal literature over the past 15 years.

# 3.2.10. Aichi Target 12 Element 1

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

Aichi Target 12 Element 1: Extinction of known threatened species has been prevented

There are currently no global indicators under the BIP for this Aichi Target Element. The review identified two complementary possible indicators: *Mammal and bird extinction rate*, and *Extinctions prevented by conservation action*. These are summarised in Table **3.17** below.

*Table 3.17:* Summary of the potential indicators for Aichi Biodiversity 12 Element 1 on the prevention of extinction of known threatened species.

Potential Indicator	Development category*	Alignment to Aichi Target	Temporal relevance to Strategic Plan	Spatial coverage
<b>12.1i: Mammal and bird</b> <b>extinction rate</b> This indicator shows the rate of extinctions of birds and mammals since 1800 in 25-year periods.	A	High	High	Good
12.1ii Extinctions prevented by conservation action	В	High	High	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

#### Factsheets for potential indicators to fill the gap

12.1i: Mammal and bird extinction rate		
Indicator /dataset summary		
This indicator shows the rate of extinctions of birds and mammals since 1800 in 25-year periods. It is		
based on those species listed as Extinct on the IUCN Red List (plus those considered Possibly Extinct		
i.e., likely to have gone extinct but for which this requires confirmation – currently available for birds		
and to be added for mammals in 2016).		
Relationship with Aichi Target		
Aichi Target	12	
Aichi Target Element	The extinction of known threatened species has been prevented.	

Alignment to Aichi Target	High: indicator directly shows the rate of extinctions of birds and
	mammals. A decrease in extinction rate suggests that the extinction
	of threatened species on the IUCN Red List has been avoided.
Indicator/dataset coverage	
Spatial Coverage	Good: data for all five regions.
Temporal Coverage	1825 to 2000
Temporal relevance to	High: underlying data likely to be maintained by IUCN and BirdLife
Strategic Plan implementation	International. However, the temporal sensitivity of this index is
	rather low, given the difficulties in documenting extinctions, and
	the typical time-lags in doing so (inclusion of 'Possibly Extinct'
	species only partly addresses this issue).
Development status	
Indicator category	A – Ready for use at the global level
Organisations/institutions	BirdLife International, IUCN
responsible	
For further information	Used in Tittensor et al. 2014.
	Data from:
	Birdlife International, 2014 IUCN Red List for Birds (Cambridge, UK,
	2014) and the IUCN Red List
	http://www.iucnredlist.org/about/publication/red-list-index
Reason for indicator/dataset	Data is from the IUCN Red List which monitors the extinction risk of
development	threatened species.
Probability of continued	High: underlying data will be maintained, but the indicator will
development	subsequently have to be recalculated.
Indicator/dataset description	
The data comprise the number	of extinctions in 25-year intervals from 1800 to 2000 for mammals
(IUCN 2014) and birds (108). In	total, 46 mammal species and 92 bird species were declared extinct
since 1800. Many of the dates o	f extinction are based on the mid-point between the last confirmed
record and the first survey that	failed to record the species. Given the time-lag in declaring a species
extinct in the IUCN Red List, the	indicator also includes the 17 bird species currently classified as
Critically Endangered (Possibly E	Extinct) by BirdLife International and IUCN for which the most likely
date of extinction was available	. These are species that are likely to have gone extinct but for which
confirmation is required. For the	e 30 species of mammals listed as Critically Endangered (Possibly
Extinct), the most likely dates of	Extinction were not available, so these were excluded in 2014, but
will be added in future updates.	Extinctions for other taxonomic groups are much less well
Colontific rehustroos (including	
Scientific robustness (including	peer review) A(bile the date inductor (Dessible Setimet/ energies (these likely to have
exunction is difficult to detect.	while the data includes Possibly Extinct species (those likely to have
mammals was not available. He	nnation is required, for birds, updated data on Possibly Extinct nee the recent rate is likely to be underestimated, particularly for
	nce the recent rate is likely to be underestimated, particularly for
111d11111d15.	

Determining the timing of extinction is difficult, therefore the data are pooled into 25- year intervals, meaning that the indicator's ability to detect finer scale temporal changes in the rate of extinctions is limited.

The applicability of these projections for representing trends in other taxa remains unexplored.

#### 12.1ii: Extinctions prevented by conservation action

Indicator /dataset summary			
This indicator shows the number of extinctions of mammals, birds, amphibians, conifers and cycads			
that were prevented by conserv	ation action during 2010-2020.		
Relationship with Aichi Target			
Aichi Target	12		
Aichi Target Element	The extinction of known threatened species has been prevented.		
Alignment to Aichi Target	High: indicator directly shows the number of extinctions that have		
	been prevented for those taxonomic groups that have been		
	comprehensively assessed for the IUCN Red List.		
Indicator/dataset coverage			
Spatial Coverage	Good: data for all five regions.		
Temporal Coverage	2010-2020		
Temporal relevance to	High: underlying data likely to be maintained by IUCN and BirdLife		
Strategic Plan implementation	International.		
Development status			
Indicator category	B - require further development to be ready for use. Available for		
	1994-2004 based on method published in Butchart et al (2006), but		
	needs updating for 2010-2020 and expanding to cover other		
	taxonomic groups		
Organisations/institutions	BirdLife International, IUCN		
responsible			
For further information	Data from:		
	Birdlife International, 2014 IUCN Red List for Birds (Cambridge, UK,		
	2014) and the IUCN Red List		
	http://www.iucnredlist.org/about/publication/red-list-index		
Reason for indicator/dataset	Data are from the IUCN Red List which monitors the extinction risk		
development	of threatened species.		
Probability of continued	High: underlying data will be maintained.		
development			
Indicator/dataset description			

Butchart et al 2006 published this indicator for birds for the period 1994-2004, while the approach was extended by Hoffmann et al 2015. It needs updating to the period 2010-2020, and expanding to encompass all taxonomic groups that have been comprehensively assessed for the IUCN Red List.

The indicator shows the number of species extinctions prevented owing to conservation action, based on a counterfactual analysis using data on the population and range size/trends, threats and conservation actions for all species qualifying as Critically Endangered at the baseline time-point.

Butchart et al. 2006 How many bird extinctions have we prevented? Oryx 40: 266-278

Hoffmann et al. 2015 The difference conservation makes to extinction risk of the world's ungulates. Conservation Biology DOI: 10.1111/cobi.12519.

Scientific robustness (including peer review)

Methods published in the scientific literature. While all counterfactual analyses are necessarily hypothetical, Butchart et al 2006 and Hoffmann et al 2015 set out the methods for producing a robust assessment of the number of species for which conservation action in a specified period would have prevented their extinction.

# 3.2.11. Aichi Target 13 Element 1

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

Aichi Target 13 Element 1: The genetic diversity of cultivated plants is maintained

There are currently no active BIP indicators available for this Aichi Target Element. There is, however, an inactive BIP indicator, *Ex-situ crop collections*, which could be utilised to monitor progress towards this Aichi Target Element. The indicator is currently classed as inactive, as no organisation/institution is currently taking it forward and there is a lack of resources to support its further development. A summary of this indicator is provided in Table **3.18** below with indicator information being available from the BIP website: <a href="http://www.bipindicators.net/globalindicators">http://www.bipindicators.net/globalindicators</a>.

Table 3.18: Summary of the inactive BIP indicator for Aichi Biodiversity Target 13 Element 1 on the genetic diversity of	
cultivated plants.	

BIP Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
<b>Ex-situ crop collections</b> Currently inactive, this indicator monitored the addition of accessions to ex situ crop collections.	В	High	-	-

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

Two additional potential indicators for the Target Element were identified during this review and are summarised in Table **3.19** below. The *Trends in plant genetic diversity* indicator uses a dataset very similar to the dataset used by the *Ex-situ crop collections* indicator. In addition, the IUCN Conservation Genetics Specialist Group is currently working on the development of indicators that may address this Target Element. See section 3.6.5 for more information.

*Table 3.19:* Summary of the potential indicator for Aichi Biodiversity 13 Element 1 on the genetic diversity of cultivated plants.

Potential Indicator	Development category*	Alignment to Aichi Target	Temporal relevance to Strategic Plan	Spatial coverage
<b>13.1i: Threatened species</b> <b>cultivation</b> This indicator shows the number of threatened species in cultivation in botanic gardens	В	Medium	-	Good

around the world.				
13.1ii: Trends in plant genetic	В	High	High	Good
diversity				
This indicator shows trends in				
genetic diversity / global				
germplasm accessions in				
genebanks.				
		<b>.</b> .		

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

# Factsheets for potential indicators to fill the gap

13.1i: Threatened species cultiv	vation
Indicator /dataset summary	
This species shows the number	of threatened species in cultivation in botanic gardens around the
world.	
Relationship with Aichi Target	
Aichi Target	13
Aichi Target Element	The genetic diversity of cultivated plants is maintained.
Alignment to Aichi Element	Medium: cultivated plants conserved ex situ in botanic gardens but
	genetic diversity may be difficult to infer.
Indicator/dataset coverage	
Spatial Coverage	Good: 1,099 contributing institutions worldwide (5+ continents)
Temporal Coverage	Not enough information to assign temporal coverage; unclear when data was first collected, species data continues to be updated to
	present.
Temporal relevance to	Not enough information to assign temporal relevance; dataset is
Strategic Plan implementation	updated when new records are submitted to BGCI from member
	botanic gardens.
Development status	
Indicator category	B – Indicators/datasets requiring further development for use at
	the global level
Organisations/institutions responsible	Botanic Gardens Conservation International (BGCI)
For further information	https://www.bgci.org/plant_search.php
Reason for indicator/dataset	Dataset developed by BGCI to track progress to Global Strategy for
development	Plant Conservation Target 8
Probability of continued development	High: dataset is regularly updated and actively managed by BGCI
Indicator/dataset description	
BGCI maintains a database. Plar	tSearch (www.bgci.org/plant_search.php), which can locate plant
species in cultivation around the	e world. The database, presently including over 575,000 records, is
compiled from lists of living coll	ections submitted to BGCI by the world's botanic gardens. Dataset
includes information on the nur	nber of ex situ sites a species is conserved in worldwide.
Scientific robustness (including	peer review)
Data is submitted to BGCI from	botanic gardens and so difficult to assess scientific robustness of
each data provider. Dataset is r	eady for use but indicator needs to be developed to ensure relevance

to Target Element.

13.1ii: Trends in plant genetic diversity				
Indicator /dataset summary				
This indicator shows trends in g	enetic diversity / global germplasm accessions in genebanks.			
Relationship with Aichi Target				
Aichi Target	13			
Aichi Target Element	The genetic diversity of cultivated plants is maintained.			
Alignment to Aichi Element	High: although this indicator only looks at ex situ collections.			
Indicator/dataset coverage				
Spatial Coverage	Good: database pulled together from European, US and CGIAR			
	networks covering a third of global genetic diversity.			
Temporal Coverage	Unclear; likely global time series from 1895-current as with			
	previous BIP indicator which used some of the same datasets.			
Temporal relevance to	High: however data points are added regularly through different			
Strategic Plan implementation	data providers which can be used to track number of additional			
	accessions per year (for example).			
Development status				
Indicator category	B – Indicators/datasets requiring further development for use at			
	the global level.			
Organisations/institutions	Global Crop Diversity Trust (GCDT)			
responsible				
For further information	https://www.genesys-pgr.org/welcome			
Reason for indicator/dataset	The Genesys project was started in 2008 to form part of an efficient			
development	and effective global system for the conservation and use of plant			
	genetic resources for food and agriculture. Genesys aimed to be the			
	foundation for an inclusive system of data sharing by linking			
	national, regional and international genebank databases.			
Probability of continued	High; the new portal was launched in 2014 and there are intentions			
development	to increase coverage over time. Portal is being continually improved			
	for users and data providers.			
Indicator/dataset description				
Genesys is a global portal for inf	formation about Plant Genetic Resources for Food and Agriculture. It			
is a gateway from which germplasm accessions from genebanks around the world can be easily				
found and ordered. Data is from	h three major networks: the European Plant Genetic Resources			
Search Catalogue (EURISCO); CO	GIAR's System-wide Information Network for Genetic Resources			
(SINGER); the United States Department of Agriculture's Genetic Resources Information Network				
(GRIN). It thus provides access t	o an estimated one-third of genebank accessions held worldwide.			
Coverage is intended to increase	e over time. The latest version was launched in 2014			
Scientific robustness (including	peer review)			
Portal incorporates records from data providers worldwide into one interface, therefore difficult to				
assess scientific robustness of all data providers.				

Dataset is ready to use but development as an indicator may be need, e.g., Enrichment index as with previous BIP indicator, or Passport Data Completeness Index (<u>https://www.genesys-</u>pgr.org/content/passport-data-completeness-index), currently being incorporated into the dataset.

# 3.2.12. Aichi Target 13 Element 3

#### Aichi Target 13 Element 3: The genetic diversity of wild relatives is maintained

There are currently no active BIP indicators available for this Aichi Target Element. However, the inactive BIP indicator, *Ex-situ crop collections* (Table **3.18**) could be utilised to monitor progress towards this Aichi Target Element provided that the dataset it is based on contains a sufficient proportion of wild relatives. In addition, the Red List Index could be disaggregated to show trends in extinction risk for wild relatives of domesticated animals. Trends in this Red List Index show whether wild relatives are increasing or decreasing in extinction risk, which can be used as a proxy for whether genetic diversity is decreasing or increasing. Data are currently available for mammals and birds, with wild relatives of cultivated plant crops to be added in future. There is currently data for 1988 to 2012 and it will be updated periodically between now and 2020. This indicator is summarised in Table **3.20** below.

Table 3.20: Summary of t	the disaggregated BIP i	ndicator for Aichi Biodiversity	/ Target 13 Element 3 on wild relatives.
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BIP Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
<b>Red List Index (wild relatives)</b> The Red List Index could be disaggregated to show trends in extinction risk for wild relatives of	В	Medium	High	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

This review also identified a potential indicator that could be used to monitor progress towards this Element. In addition, the two potential indicators identified for Aichi Target 13 Element 1 could be utilised to monitor progress towards this Aichi Target Element. These indicators are summarised in Table **3.21** below. In addition, the IUCN Conservation Genetics Specialist Group is currently working on the development of indicators that may address this Target Element. See section 3.6.5 for more information.

Table 3.21: Summary of the potential indicator for Aichi Biodiversity 13 Element 3 on the genetic diversity of wild relatives.

Potential Indicator	Development category*	Alignment to Aichi Target	Temporal relevance to Strategic Plan	Spatial coverage
<b>13.3i: Crop wild relative occurrence</b> This indicator uses the Crop Wild Relative Global Occurrence Database that contains information on wild relative occurrence records and distribution.	В	Medium	High	Good
13.3ii: Threatened species cultivation	В	Medium	-	Good

This species shows the number of threatened species in cultivation in botanic gardens around the world.				
<b>13.3iii: Trends in plant genetic</b> <b>diversity</b> This indicator shows trends in genetic diversity/global germplasm accessions in genebanks.	В	High	High	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

#### Factsheets for potential indicators to fill the gap

13.3i: Crop wild relative occurrence		
Indicator /dataset summary		
This indicator uses the Crop Wild Relative Global Occurrence Database that contains information on		
wild relative occurrence record	s and distribution.	
Relationship with Aichi Target		
Aichi Target	13	
Aichi Target Element	The genetic diversity of wild relatives is maintained.	
Alignment to Aichi Element	Medium:	
Indicator/dataset coverage		
Spatial Coverage	Good: global dataset (96% of the world's countries)	
Temporal Coverage	Unclear; institutions and individuals approached 2011-2014 but	
	data does not necessarily come from this period.	
Temporal relevance to	High: dataset is post-2010 and updated when new records become	
Strategic Plan implementation	available.	
Development status		
Indicator category	B – Indicators/datasets requiring further development for use at	
	the global level	
Organisations/institutions	Global Crop Diversity Trust (GCDT)	
responsible		
For further information	http://www.cwrdiversity.org/	
Reason for indicator/dataset	Following inventory of Crop Wild Relatives (CWRs; Vincent et al.,	
development	2013), information was compiled for these taxa from multiple	
	sources to input to further research on wild genetic resources.	
Probability of continued	Medium: new data is added by querying new records available	
development	through GBIF and other datasets such as speciesLink, checking and	
	assigning coordinates and verifying taxonomy when necessary.	
Indicator/dataset description		

A global dataset containing over five million records of the distributions of crops and their wild relatives, including taxonomic and geographic information. CWRs identified through Vincent et al. (2013) inventory. Data is compiled from genebanks, herbaria, national programs, international agricultural research centre, online databases, scientific literature and individual scientists. Data is also available through GBIF and is updated using new GBIF occurrence records.

Scientific robustness (including peer review)

Used iterative process to detect errors in coordinates and entire dataset has been taxonomically verified. Dataset shows occurrence records and distribution but indicator needs further development to look at trends in species distributions and species ranges under protection.

### 13.3ii: Threatened species cultivation

Indicator /dataset summary

This species shows the number of threatened species in cultivation in botanic gardens around the world.

Relationship with Aichi Target			
Aichi Target	13		
Aichi Target Element	The genetic diversity of wild relatives is maintained.		
Alignment to Aichi Element	Medium: data on numbers of crop wild relatives conserved ex situ		
	in botanic gardens but genetic diversity may be difficult to infer.		
Indicator/dataset coverage			
Spatial Coverage	Good: 1,099 contributing institutions worldwide (5+ continents)		
Temporal Coverage	Not enough information to assign temporal coverage; unclear when		
	data was first collected, species data continues to be updated to		
	present.		
Temporal relevance to	Not enough information to assign temporal relevance; dataset is		
Strategic Plan implementation	updated when new records are submitted to BGCI from member		
	botanic gardens.		
Development status			
Indicator category	B – Indicators/datasets requiring further development for use at		
	the global level.		
Organisations/institutions	Botanic Gardens Conservation International (BGCI)		
responsible			
For further information	https://www.bgci.org/plant_search.php		
Reason for indicator/dataset	Dataset developed by BGCI to track progress to Global Strategy for		
development	Plant Conservation Target 8.		
Probability of continued	High: dataset is regularly updated and actively managed by BGCI.		
development			
Indicator/dataset description			
BGCI maintains a database, PlantSearch ( <u>www.bgci.org/plant_search.php</u> ), which can locate plant			
species in cultivation around the world. The database, presently including over 575,000 records, is			
compiled from lists of living collections submitted to BGCI by the world's botanic gardens. The			
dataset includes information on the number of ex situ sites a species is conserved in worldwide.			
Scientific robustness (including peer review)			
Data is submitted to BGCI from botanic gardens so difficult to assess scientific robustness of each			
data provider. Dataset is ready for use but indicator needs to be developed to ensure relevance to			
Target Element.			

13.3iii: Trends in plant genetic diversity		
Indicator /dataset summary		
This indicator shows trends in genetic diversity / global germplasm accessions in genebanks.		
Relationship with Aichi Target		
Aichi Target	13	

Aichi Target Element	The genetic diversity of wild relatives is maintained.
Alignment to Aichi Element	High: although this indicator only looks at ex situ collections
Indicator/dataset coverage	
Spatial Coverage	Good: database pulled together from European, US and CGIAR
	networks covering a third of global genetic diversity.
Temporal Coverage	Unclear; likely global time series from 1895-current as with
	previous BIP indicator which used some of the same datasets.
Temporal relevance to	High: however data points are added regularly through different
Strategic Plan implementation	data providers which can be used to track number of additional
	accessions per year (for example).
Development status	
Indicator category	B – Indicators/datasets requiring further development for use at
	the global level.
Organisations/institutions	Global Crop Diversity Trust (GCDT)
responsible	
For further information	https://www.genesys-pgr.org/welcome
Reason for indicator/dataset	The Genesys project was started in 2008 to form part of an efficient
development	and effective global system for the conservation and use of plant
	genetic resources for food and agriculture. Genesys aimed to be the
	foundation for an inclusive system of data sharing by linking
	national, regional and international genebank databases.
Probability of continued	High; the new portal was launched in 2014 and there are intentions
development	to increase coverage over time. Portal is being continually improved
	for users and data providers.
Indicator/dataset description	

Genesys is a global portal to information about Plant Genetic Resources for Food and Agriculture. It is a gateway from which germplasm accessions from genebanks around the world can be easily found and ordered. Data is from three major networks: the European Plant Genetic Resources Search Catalogue (EURISCO); CGIAR's System-wide Information Network for Genetic Resources (SINGER); the United States Department of Agriculture's Genetic Resources Information Network (GRIN). It thus provides access to an estimated one-third of genebank accessions held worldwide. Coverage is intended to increase over time. The latest version was launched in 2014.

Scientific robustness (including peer review)

Portal incorporates records from data providers worldwide into one interface, therefore difficult to assess scientific robustness of all data providers.

Dataset is ready to use but development as an indicator may be need, e.g., Enrichment index as with previous BIP indicator, or Passport Data Completeness Index (<u>https://www.genesys-</u>pgr.org/content/passport-data-completeness-index), currently being incorporated into the dataset.

# 3.2.13. Aichi Target 13 Element 4

Aichi Target 13 Element 4: The genetic diversity of socio-economically as well as culturally valuable species is maintained

There are currently no global indicators under the BIP for this Aichi Target Element and no suitable indicators were found during this review. However, suitable datasets and/or indicators may have been missed and if so, we welcome being made aware of these.

The IUCN Conservation Genetics Specialist Group is currently working on the development of indicators that may address this Target Element. See section 3.6.5 for more information.

# 3.2.14. Aichi Target 13 Element 5

Aichi Target 13 Element 5: Strategies have been developed and implemented for minimizing genetic erosion and safeguarding genetic diversity

There are currently no global indicators under the BIP for this Aichi Target Element and no suitable indicators were found during this review. However, suitable datasets and/or indicators may have been missed and if so, we welcome being made aware of these.

The IUCN Conservation Genetics Specialist Group is currently working on the development of indicators that may address this Target Element. See section 3.6.5 for more information.

### 3.2.15. Aichi Target 14 Element 2

Aichi 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.

Aichi Target 14 Element 2: ... taking into account the needs of women, indigenous and local communities, and the poor and vulnerable

There are currently no active BIP indicators available for this Aichi Target Element. There is however an inactive BIP indicator, the *Health and well-being of communities directly dependant on ecosystem goods and services*, which could be utilised to monitor progress towards this Aichi Target Element. The indicator is currently classed as inactive, as no organisation/institution is currently taking it forward and there is a lack of resources to support its further development. A summary of this indicator is provided in Table **3.22** below with indicator information being available from the BIP website: <u>http://www.bipindicators.net/globalindicators</u>.

**Table 3.22:** Summary of the inactive BIP indicator for Aichi Biodiversity Target 14 Element 2 on taking account the needs of women, indigenous and local communities, and the poor and vulnerable.

BIP Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
Health and well-being of communities directly dependant on ecosystem goods and services Currently inactive, this indicator showed poverty and isolation within critically threatened and vulnerable ecoregions.	C	14:2: Medium	-	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

One additional indicator has been identified which could be used to fill the gap for this Aichi Target Element. A summary of the development category, alignment, temporal relevance and spatial coverage is shown in Table **3.23** below.

*Table 3.23*: Summary of the potential indicators for Aichi Biodiversity Target 14 Element 2 on taking account the needs of women, indigenous and local communities, and the poor and vulnerable.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
14.2i: Inadequate access to food – average dietary energy supply adequacy Expresses the dietary energy supply by country as a percentage of the average dietary energy requirement.	A	Medium	High	Good
14.2ii. Local Biodiversity Intactness Index The index provides estimates of human impacts on the intactness of local biodiversity worldwide, and how this may change over time.	A	High	High	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

<b>Factsheets for</b>	potential	indicators	to f	ill the	gap

14.2i: Inadequate access to food – average dietary energy supply adequacy		
Indicator /dataset summary	/	
Expresses the dietary energe	y supply by country as a percentage of the average dietary energy	
requirement.		
Relationship with Aichi Targ	jet	
Aichi Target	14	
Aichi Target Element	taking into account the needs of women, indigenous and local	
	communities, and the poor and vulnerable	
Alignment to Aichi Target Element	Medium: provisioning of food is an essential ecosystem service, and an insufficient availability of food particularly impacts the poor and vulnerable. However, this indicator doesn't include information on the state of ecosystem services, or the restoration and safeguarding of particular ecosystems or biodiversity. Therefore this indicator would only be well aligned to the target if it was part of a suite of indicators that addressed those points. Data is at a national level and so doesn't take into account differences in availability of food for different communities within a country Data doesn't differentiate between sources of food - food produced from local ecosystems is treated in the same way as international imports.	
Indicator/dataset coverage		
Spatial Coverage	High: data points exist for 160 countries over five continents.	
Temporal Coverage	1992 to 2014 (the year refers to the final year of a three year average).	

Temporal relevance to	High: annually updated
Strategic Plan	
Development status	
Indicator category	A – Ready for use at the global level
Organisations/institutions	FAO, Statistics Division
responsible	
For further information	Indicator information and data (within FAO Statistical Yearbook)
	http://www.fao.org/economic/ess/ess-publications/ess-
	yearbook/en/#.VUTCuCFViko
	Indicator data (within FAOSTAT website)
	http://faostat.fao.org/site/609/DesktopDefault.aspx?PageID=609#an
	cor
Reason for	As an indicator of how food availability contributes to food security.
indicator/dataset	
development	
Probability of continued	High: key data collected by the FAO to inform decision makers with
development	regard to food security.
Indicator/dataset description	on

"The indicator expresses the Dietary Energy Supply (DES) as a percentage of the Average Dietary Energy Requirement (ADER) in the country.

Each country's or region's average supply of calories for food consumption is normalized by the average dietary energy requirement estimated for its population, to provide an index of adequacy of the food supply in terms of calories. Analysed together with the prevalence of undernourishment, it allows discerning whether undernourishment is mainly due to insufficiency of the food supply or to particularly bad distribution. The indicator is calculated as an average over three years to reduce the impact of possible errors in estimated DES, due to the difficulties in properly accounting of stock variations in major food. It thus provides an indicator of structural food supply adequacy."

Dietary Energy Supply is calculated as energy production in country, plus imports, less exports, and taking into account any changes in energy stocks held within the country.

Scientific robustness (including peer review)

Methods = "Data harvesting, direct web-based acquisition through APIs [Application Programme Interface] whenever possible, download plus minimum manual manipulation in other cases (data are extracted from FAOSTAT, UNICEF, WHO, UN, World Bank databases and in a few cases, data is further re-elaborated for consistency)."

# 14.2ii. Local Biodiversity Intactness Index

#### Indicator /dataset summary

The Local Biodiversity Intactness Index (LBII) is based on a purpose-built global database of local biodiversity surveys combined with high-resolution global land-use data. The index provides estimates of human impacts on the intactness of local biodiversity worldwide, and how this may change over time.

## Relationship with Aichi Targets

Relationship with Alen Pargets	
Aichi Target	14

Aichi Target Element	taking into account the needs of women, indigenous and local
	communities, and the poor and vulnerable.
Alignment to Aichi Target	High: This indicator is well aligned to the needs of Aichi Target 5,
	12 and 14: The LBII directly estimates the effects of human
	pressures on the intactness of local ecological assemblages
	worldwide. Because models are based on a wide and
	taxonomically-representative set of animal and plant species, the
	LBII reflects the status of overall terrestrial biodiversity better than
	is possible by focusing on any one taxon, e.g., vertebrates. Local
	communities' worldwide, especially poor and vulnerable ones,
	depend crucially on local (rather than global) biodiversity for their
	needs; LBII reports on the average intactness of local biodiversity
	within any area of interest.
Indicator/dataset coverage	
Spatial Coverage	Good: covers the entirety of the world's terrestrial area at a spatial
	resolution of 1km <sup>2</sup> .
Temporal Coverage	High: Uses the annual global land-use data being produced by
	CSIRO as part of the proposed Biodiversity Habitat Index (Target 5),
	which uses remotely-sensed data sets available from 2001 onwards
	(Hansen et al. 2013 Science 342: 850-853; Friedl et al. 2010 Remote
	Sensing of Environment 114: 168-182).
Temporal relevance to	High: Annual data points for 2011-2020 (assuming that the remote-
Strategic Plan implementation	sensing products used in land-use layers are updated annually), and
	projections possible given future scenarios of land use and related
	pressures (e.g., the Representative Concentration Pathways). The
	LBII has the additional attribute of being able to be projected into
	the future under different scenarios
Development status	
Indicator category	<ul> <li>A – This Index is ready for global use (requires no further</li> </ul>
	development)– the database and the model approach is published
	and there is funding and a partnership in place to continue making
	if required
Organisations/institutions	The PREDICTS project (Natural History Museum (London), UNEP-
responsible	WCMC, University of Sussex, University College London, Imperial
	College London and Swansea University) in collaboration with
	CSIRO.
For further information	Global models of net change in local species-richness and
	abundance were published in Nature (Newbold et al. 2015 Nature
	520:45-50) along with hindcasts, projections under the four
	Representative Concentration Pathways, and country-level analyses
	highlighting the risks to the poor and vulnerable of business as
	usual. Description of the underlying database has already been
	published (Hudson et al. <i>Ecology &amp; Evolution</i> 4:4701-4735); the first

	public release of the database will take place in late 2015/early
	2016. Land-use data are described in proposal for the Biodiversity
	Habitat Index (Target 5). An overview of PREDICTS can be seen at
	www.predicts.org.uk.
Reason for indicator/dataset	Existing indicators for these targets lack a broad biodiversity
development	perspective; in particular, they are heavily biased towards
	vertebrates, which make up only 0.5% of the world's species. The
	LBII can report on both species-richness and mean abundance, and
	is being developed further to also report on geographic range rarity
	(endemism). LBII is strongly complementary to the proposed
	Biodiversity Habitat Index (Target 5), which focuses on the overall
	diversity of a larger region rather than the average local diversity
	within the region. LBII was first proposed in 2005 (Scholes & Biggs
	2005 Nature 434:45-49) but the data needed to make it operational
	have only now been brought together.
Probability of continued	High: PREDICTS team have a new 3-year grant from a UK Research
development	Council to further develop the framework, and also have the
	capacity to expand the current database and analyses further.

#### Indicator/dataset description

The Local Biodiversity Intactness Index (LBII) estimates how much of a terrestrial site's original biodiversity remains in the face of human land use and related pressures. Because LBII relates to site-level biodiversity, it can be averaged and reported for any larger spatial scale (e.g., countries, biodiversity hotspots or biomes as well as globally) without additional assumptions, and related to socioeconomic data (e.g., Human Development Index). A purpose-collated taxonomically-representative global database of existing biodiversity survey data is analysed using mixed-effects statistical models to estimate effects of land use and related pressures on site-level biodiversity and compositional similarity to intact ecological assemblages. Model estimates are then applied to maps of land use and other pressures to estimate the spatial pattern of biotic intactness. With the advent of global, annual, fine-scale land-use data, LBII can report annually and at fine resolution. LBII is both cost-effective and scientifically rigorous.

#### Scientific robustness (including peer review)

The modelling, mapping and projection approaches at the core of the LBII were published as a peerreviewed Article in *Nature* in 2015 (Newbold et al. Nature 520:45-50) using coarse-scale (0.5 degree) land-use data. Models of land-use effects on compositional similarity are currently in review (Newbold et al. Ecography); LBII is estimated by combining these two kinds of model. Several other related papers are published (Newbold et al. 2014 Proc R Soc B 281:20141371), in press (De Palma et al. 2015 J Appl Ecol in press) or currently undergoing peer review. A peer-reviewed description of the database underpinning the analysis has already been published (Hudson et al. 2014 Ecol & Evol 4:4701-4735), and a full public release of the database is currently in preparation.

# 3.2.16. Aichi Target 16 Element 2

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

Aichi Target 16 Element 2: The Nagoya Protocol is operational, consistent with national legislation

This Aichi Target deals with the implementation of the Nagoya Protocol, possible indicators could originate from national level reporting to the CBD and as such the review did not investigate potential indicators for this Target Element.

# 3.2.17. Aichi Target 17 Element 2

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

Aichi Target 17 Element 2: NBSAPs adopted as effective policy instrument

This Aichi Target deals with the implementation of National Biodiversity Strategies and Action Plans (NBSAPs), possible indicators could originate from national level reporting to the CBD and as such the review did not investigate potential indicators for this Target Element.

# 3.2.18. Aichi Target 17 Element 3

Aichi Target 17 Element 3: NBSAPs are being implemented

This Aichi Target deals with the implementation of National Biodiversity Strategies and Action Plans (NBSAPs), possible indicators could originate from national level reporting to the CBD and as such the review did not investigate potential indicators for this Target Element.

# 3.2.19. Aichi Target 18 Element 1

Aichi 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.

Aichi Target 18 Element 1: Traditional knowledge, innovations and practices of indigenous and local communities are respected

There are currently no global indicators under the BIP for this Aichi Target Element and no suitable indicators were found during this review. However, suitable datasets and/or indicators may have been missed and if so, we welcome being made aware of these.

3.2.20. Aichi Target 18 Element 2

Aichi Target 18 Element 2: Traditional knowledge, innovations and practices of indigenous and local communities are respected

There are currently no global indicators under the BIP for this Aichi Target Element and no suitable indicators were found during this review. However, suitable datasets and/or indicators may have been missed and if so, we welcome being made aware of these.

## 3.2.21. Aichi Target 19 Element 2

Aichi 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.

Aichi Target 19 Element 2: Biodiversity knowledge, the science base and technologies are widely shared and transferred and applied

There are currently no global indicators under the BIP for this Aichi Target Element. This review identified two potential indicators to fill the gap for this Aichi Target Element. The potential indicators are summarised in Table **3.24** below.

**Table 3.24:** Summary of the potential indicators for Aichi Biodiversity Target 19 Element 2 on the transfer and application of biodiversity knowledge.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
<b>19.2i: Funds committed to</b> <b>environmental research</b> This indicator measures international financial flows committed to projects that support environmental research.	В	Low	High	Good
<b>19.2ii: Knowledge transfer</b> The Knowledge transfer (number of biodiversity papers published per year in the Web of Science) indicator reveals trends in scientific research and transference of scientific knowledge through an analysis of scientific publications on the topic of biodiversity.	A	High	High	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

#### Factsheets for potential indicators to fill the gap

19.2i: Funds committed to environmental research				
Indicator /dataset summary				
This indicator measures international financial flows committed to projects that support				
environmental research. This metric measures the funds committed from a range of multilateral				
agencies and bilateral donors outside the OECD Development Assistance Committee (DAC).				
Relationship with Aichi Target				

Aichi Target	19	
Aichi Target Element	Biodiversity knowledge, the science base and technologies are	
	widely shared and transferred and applied.	
Alignment to Aichi Element	Low: this indicator measures financial flows committed to projects	
	that support environmental research as a proxy for the sharing of	
	biodiversity knowledge.	
Indicator/dataset coverage		
Spatial Coverage	Good: all five regions, 20+ countries	
Temporal Coverage	1995 to 2010	
Temporal relevance to	High: data collected from OECD's CRS and donor agencies'	
Strategic Plan implementation	documents (e.g. annual reports, project documents and	
	spreadsheets).	
Development status		
Indicator category	B – Indicators/datasets requiring further development for use at	
	the global level.	
Organisations/institutions	AidData	
responsible		
For further information	http://aiddata.org/	
	Tierney, Michael J., Daniel L. Nielson, Darren G. Hawkins, J.	
	Timmons Roberts, Michael G. Findley, Ryan M. Powers, Bradley	
	Parks, Sven E. Wilson, and Robert L. Hicks. 2011. More Dollars than	
	Sense: Refining Our Knowledge of Development Finance Using	
	AidData. World Development 39 (11): 1891-1906.	
Reason for indicator/dataset	Indicator used in Tittensor et al. 2014. AidData is a research and	
development	innovation lab that seeks to improve development outcomes by	
	making development finance data more accessible and actionable.	
	Development projects are reviewed, their activities categorised and	
	collated into a database.	
Probability of continued	High: ongoing data collection, likely to have data up until at least	
development	2016 and possibly further.	
Indicator/dataset description		
AidData collects data on international development financing and categorises each project or flow		
into encolfic optivition or discuss	no. Data and presented in constant UC dellars (ast at 2000 lowels)	

into specific activities and sectors. Data are presented in constant US dollars (set at 2009 levels).

Scientific robustness (including peer review)

AidData activity codes allow users to identify projects not only according to their dominant purpose, but also by their specific components (i.e. activities). Thus, the granularity of the data allow for more fine-grained analysis of how international development financing is allocated.

The project descriptions sometimes brief and unclear as to the quantity of funds specifically earmarked for indicator activities. This may lead to an over-estimation of the funds that are specifically directed to environmental research.

Activity codes that identify projects with investment in environmental research are only currently
available for certain donors, largely consisting of multilateral agencies and bilateral donors outside of the OECD-DAC.

It may be possible to include funding for environmental research from OECD DAC members in the indicator through the Creditor Reporting System, looking at ODA to 'Environmental research' (CRS Code 41082).

This indicator, along with the other AidData financial indicators, do not include internal national spending.

# **19.2ii:** Knowledge transfer (number of biodiversity papers published per year)

Indicator /dataset summary

The Knowledge transfer (number of biodiversity papers published per year in the Web of Science) indicator reveals trends in scientific research and transference of scientific knowledge through an analysis of scientific publications on the topic of biodiversity. From Tittensor et al. (2014).

Aichi Target	19
Aichi Target Element	Biodiversity knowledge, the science base and technologies are
	widely shared and transferred
Alignment to Aichi Element	High: scientific papers are a major means of sharing biodiversity
	knowledge so the number of paper published is a good proxy for
	the sharing of biodiversity knowledge.
Indicator/dataset coverage	
Spatial Coverage	Good: the Web of Science index is a comprehensive archive of
	scientific biological publications in many different languages.
Temporal Coverage	1980 to 2015
Temporal relevance to	High: the Web of Science database is regularly updated as papers
Strategic Plan	are published.
implementation	
De ale constatates	
Development status	
Indicator category	A – Indicators/datasets considered ready for global use
Indicator category Organisations/institutions	A – Indicators/datasets considered ready for global use Thomson Reuters
Development status         Indicator category         Organisations/institutions         responsible	A – Indicators/datasets considered ready for global use Thomson Reuters
Indicator category Organisations/institutions responsible For further information	A – Indicators/datasets considered ready for global use Thomson Reuters https://apps.webofknowledge.com/UA_GeneralSearch_input.do?
Indicator category Organisations/institutions responsible For further information	A – Indicators/datasets considered ready for global use Thomson Reuters https://apps.webofknowledge.com/UA_GeneralSearch_input.do? product=UA&search_mode=GeneralSearch&SID=X1XsHBUJ64Xk4
Indicator category Organisations/institutions responsible For further information	A – Indicators/datasets considered ready for global use Thomson Reuters https://apps.webofknowledge.com/UA_GeneralSearch_input.do? product=UA&search_mode=GeneralSearch&SID=X1XsHBUJ64Xk4 qUynmv&preferencesSaved=
Indicator category Organisations/institutions responsible For further information	A – Indicators/datasets considered ready for global use Thomson Reuters https://apps.webofknowledge.com/UA_GeneralSearch_input.do? product=UA&search_mode=GeneralSearch&SID=X1XsHBUJ64Xk4 qUynmv&preferencesSaved=
Development status Indicator category Organisations/institutions responsible For further information	A – Indicators/datasets considered ready for global use Thomson Reuters https://apps.webofknowledge.com/UA_GeneralSearch_input.do? product=UA&search_mode=GeneralSearch&SID=X1XsHBUJ64Xk4 qUynmv&preferencesSaved= http://www.unep-wcmc.org/
Development status         Indicator category         Organisations/institutions         responsible         For further information         Reason for indicator/dataset	A – Indicators/datasets considered ready for global use Thomson Reuters https://apps.webofknowledge.com/UA_GeneralSearch_input.do? product=UA&search_mode=GeneralSearch&SID=X1XsHBUJ64Xk4 qUynmv&preferencesSaved= http://www.unep-wcmc.org/ The Web of Science index was developed to find, analyse, and
Development status Indicator category Organisations/institutions responsible For further information Reason for indicator/dataset development	A – Indicators/datasets considered ready for global use Thomson Reuters https://apps.webofknowledge.com/UA_GeneralSearch_input.do? product=UA&search_mode=GeneralSearch&SID=X1XsHBUJ64Xk4 qUynmv&preferencesSaved= http://www.unep-wcmc.org/ The Web of Science index was developed to find, analyse, and share high-quality, multidisciplinary scientific information quickly
Development status Indicator category Organisations/institutions responsible For further information Reason for indicator/dataset development	A – Indicators/datasets considered ready for global use Thomson Reuters https://apps.webofknowledge.com/UA_GeneralSearch_input.do? product=UA&search_mode=GeneralSearch&SID=X1XsHBUJ64Xk4 qUynmv&preferencesSaved= http://www.unep-wcmc.org/ The Web of Science index was developed to find, analyse, and share high-quality, multidisciplinary scientific information quickly and easily
Development status Indicator category Organisations/institutions responsible For further information Reason for indicator/dataset development Probability of continued	A – Indicators/datasets considered ready for global use Thomson Reuters https://apps.webofknowledge.com/UA_GeneralSearch_input.do? product=UA&search_mode=GeneralSearch&SID=X1XsHBUJ64Xk4 qUynmv&preferencesSaved= http://www.unep-wcmc.org/ The Web of Science index was developed to find, analyse, and share high-quality, multidisciplinary scientific information quickly and easily High: Web of Science database is regularly updated.
Development status Indicator category Organisations/institutions responsible For further information Reason for indicator/dataset development Probability of continued development	A – Indicators/datasets considered ready for global use Thomson Reuters https://apps.webofknowledge.com/UA_GeneralSearch_input.do? product=UA&search_mode=GeneralSearch&SID=X1XsHBUJ64Xk4 qUynmv&preferencesSaved= http://www.unep-wcmc.org/ The Web of Science index was developed to find, analyse, and share high-quality, multidisciplinary scientific information quickly and easily High: Web of Science database is regularly updated.

Data on the number of published papers with biodiversity in the title can be amalgamated using the Web of Science scientific citation indexing service. Searches for the word 'biodiversity' in the title of the publication can be undertaken through the Web of Science search engine to record the number of manuscripts published per year

Scientific robustness (including peer review)

The Web of Science index is a comprehensive archive of scientific biological publications. However, The effectiveness of this as a proxy for all biodiversity-focussed papers is unknown.

# 3.3. Aichi Target Alignment Gaps

# 3.3.1. Aichi Target 5 Element 3 alignment

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

Aichi Target 5 Element 3: Degradation and fragmentation are significantly reduced

There is currently one BIP indicator that aligns to Aichi Biodiversity Target 5 Element 3, the *Wild Bird Index for habitat specialists*. However, the indicator was scored as having low alignment with the Element. Another option for this Target Element is to disaggregate the *Living Planet Index* to habitat specialists (vertebrate) and the *Red List Index* to forest-specialist species. Both indicators would use species as proxies for habitat condition and have medium alignment because neither would explicitly monitor fragmentation (see Table **3.25** below).

There is however an inactive BIP indicator, the *River fragmentation and flow regulation*, which scored high alignment and could be utilised to monitor progress towards this Aichi Target Element. The indicator is currently classed as inactive as no organisation/institution is currently taking it forward and there is a lack of resources to support its further development. A summary of this indicator is provided in Table **3.25** below with indicator information being available from the BIP website: <a href="http://www.bipindicators.net/globalindicators">http://www.bipindicators.net/globalindicators</a>.

BIP Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
Living Planet Index (habitat specialists) This indicator would shows trends in different vertebrate habitat specialists.	A	Medium	High	Good
Red List Index (forest-specialist species) This indicator would show trends in extinction risk for forest specialist species.	A	Medium	High	Good

*Table 3.25:* Summary of disaggregated and inactive BIP indicators for Aichi Biodiversity Target 5 Element 3 on the degradation and fragmentation of habitats.

River fragmentation and flow	В	High	-	Good
regulation				
Currently inactive, the indicator				
could provide a snapshot of the				
condition of riverine ecosystems				
around the world.				

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

This review has identified a potential indicator with high alignment to this Target Element, the Forest Biodiversity Habitat Index. The indicator is summarised in Table 3.26 below.

Table 3.26. Summary of the potential indicators for Aichi Biodiversity Target 5 Element 3 on habitat degradation and fragmentation.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
<b>5.3i: Biodiversity Habitat Index</b> This indicator uses biologically-scaled environmental mapping and modelling to estimate potential impacts of remotely-sensed habitat loss, degradation and fragmentation on retention of biodiversity globally.	В	High	High	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

### Factsheets for potential indicators to fill the gap

5.3i: Biodiversity Habitat Index	
Indicator /dataset summary	
The Biodiversity Habitat Index u	ses biologically-scaled environmental mapping and modelling to
estimate potential impacts of ha	abitat loss, degradation and fragmentation on retention of terrestrial
biodiversity globally, from remo	tely-sensed forest change and land-cover change datasets.
Relationship with Aichi Target	
Aichi Target	5
Aichi Target Element	Degradation and fragmentation are significantly reduced.
Alignment to Aichi Target	High: the index directly assesses the implications of habitat loss,
	degradation and fragmentation for retention of biodiversity
	worldwide.
Indicator/dataset coverage	
Spatial Coverage	Good: covers the entire terrestrial area of all countries and
	continents, at 1km grid resolution.
Temporal Coverage	Utilises the full temporal coverage of Hansen et al's (2013, Science
	342: 850-853) Global Forest Change dataset, i.e. 2000 onwards; and
	NASA's (Friedl et al 2010, Remote Sensing of Environment 114: 168-

	182) MODIS Land Cover Change dataset, i.e. 2001 onwards.		
Temporal relevance to	High: ten annual data points, 2011-2020 (assuming ongoing annual		
Strategic Plan implementation	updating of the above two remote-sensing products).		
Development status			
Indicator category	B – Indicators/datasets requiring further development for use at		
	the global level.		
Organisations/institutions	CSIRO and GEO BON, in collaboration with the PREDICTS project		
responsible	(Natural History Museum et al). Map of Life (Yale University et al)		
	and GBIF.		
For further information	Manuscript in preparation, describing current implementation of		
	this methodology. For earlier proof-of-concept applications of the		
	general approach see: Ferrier et al (2004) BioScience 54: 1101-		
	1109; and Allnutt et al (2008) Conservation Letters 1: 173-181. For		
	information on the PREDICTS meta-analysis supporting this		
	methodology see: Newbold et al (2015) Nature 520: 45-50.		
Reason for indicator/dataset	To provide a rigorous, yet cost-effective, approach to estimating		
development	impacts of habitat loss, degradation and fragmentation on		
	biodiversity globally, by linking remotely-sensed forest change and		
	land-cover change datasets to recent advances in biodiversity		
	informatics, ecological meta-analysis, and macroecological		
	modelling.		
Probability of continued	High: active research program in CSIRO is continuing to refine		
development	underpinning analytical methodology. Ongoing application will		
	draw on continual improvements in quantity, quality and		
	availability of environmental and biological data worldwide.		
Indicator/dataset description			
Changes in habitat degradation	and fragmentation are estimated across all terrestrial biomes by		
translating remotely-sensed lan	d-cover change (NASA's MCD12Q1 dataset) into land-use change		
through statistical downscaling	of coarse-scale land-use mapping to 1km resolution, and using the		
PREDICTS meta-analysis to assig	n habitat-condition scores to resulting land-use classes. Mapping of		
habitat change in forest biomes	is further refined by incorporating Hansen et al.'s 30m-resolution		
Global Forest Change dataset. T	hese habitat-change layers are then integrated with global modelling		
of fine-scaled spatial variation in biodiversity composition (beta diversity), derived by scaling			
environmental and geographical gradients using >300 million location records for >400,000 plant,			
invertebrate and vertebrate species. The Biodiversity Habitat Index resulting from this integration			
estimates change in the proportion of collective biological (gamma) diversity expected to be			
retained within any specified spatial unit (e.g. an ecoregion, a country, or an entire biome) as a			
function of habitat loss, degradation and fragmentation across that unit.			
Scientific robustness (including	peer review)		
The analytical techniques under	pinning this index have all been subjected to extensive peer review		

in the scientific journal literature over the past 15 years.

## 3.3.2. Aichi Target 8 Element 2 alignment

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

Aichi Target 8 Element 2: Pollution from excess nutrients has been brought to levels that are not detrimental to ecosystem function and biodiversity

Whilst two indicators are available under the BIP for this Aichi Target Element, both were considered to have low alignment as they only focus on nitrogen and do not include an aspect on ecosystem function and biodiversity. This review did not identify any potential indicators that address these two points. In the future it may be possible to disaggregate the *Red List Index* to show trends for species that are threatened by nitrogen and phosphorus pollution, however, currently there is insufficient data to do so.

## 3.3.3. Aichi Target 14 Element 1 alignment

Aichi 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.

Aichi Target 14 Element 1: Ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded ...

Whilst three indicators are available under the BIP for this Aichi Target Element, all three have low alignment to the Aichi Target Element, and an alignment gap has been identified. The review has identified seven potential additional indicators for this Aichi Target Element, one of which scores highly for its alignment to the Aichi Target Element. Another two indicators have been scored as having medium alignment to this Aichi Target Element. These potential indicators are summarised in Table *3.27* below.

**Table 3.27:** Summary of the potential indicators for Aichi Biodiversity Target 14 Element 1 on restoration and safeguarding of ecosystems that provide essential services.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
<b>14.1i: Inadequate access to food –</b> <b>domestic food price volatility</b> Measure deviation from 5 year trends of the "Domestic Food Price Level Index"	В	Low	Low	Good
<b>14.1ii: Inadequate access to food –</b> <b>per capita food supply variability</b> The variability (deviations from the mean over a 5 year period) in food supply per person per day, as measured in kcal, calculated annually for each country.	A	Low	High	Good
<b>14.1iii: Harvested irrigated</b> <b>temporary/permanent crop area</b> Total harvested irrigated area, estimated at a national level separately for a variety of crops.	В	Low	Low	Good
<b>14.1iv: Population at risk – "droughts,</b> <b>floods, extreme temperatures"</b> The percentage of the population of each country affected by natural disasters.	В	High	Low	Good

<b>14.1v: Population at risk – UNHCR</b> <b>populations of concern</b> Total numbers of refugees and people in other 'populations of concern' residing in each country each year.	A	Low	High	Good
<b>14.1vi: Production of selected forestproducts</b> Annual production volumes of sevenforest products by country.	A	Medium	High	Good
<b>14.1vii: Proportion of total water</b> <b>resources used</b> An estimation of the proportion of total available freshwater withdrawn for human use, calculated at country level.	В	Medium	Low	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

# Factsheets for potential indicators to fill the gap

14.1i: Inadequate access to food – domestic food price volatility		
Indicator /dataset summary		
Measure deviation from 5 year trends of the "Domestic Food Price Level Index"		
Relationship with Aichi Target		
Aichi Target	14	
Aichi Target Element	Ecosystems that provide essential services, including services	
	related to water, and contribute to health, livelihoods and well-	
	being, are restored and safeguarded	
Alignment to Aichi Target	Low: food price volatility could be considered an indicator of	
Element	volatility in food production, but as there are many other factors	
	impacting price (e.g. global financial markets, conflict) it would be	
	difficult to derive any information about ecosystem services from	
	this.	
Indicator/dataset coverage		
Spatial Coverage	Good: Data exists for 132 countries across five regions.	
Temporal Coverage	2000 to 2011.	
Temporal relevance to	Low: It is not clear whether data will continue to be collected after	
Strategic Plan implementation	2011.	
Development status		
Indicator category	A – Ready for use at the global level	
Organisations/institutions	FAO Statistics Division	
responsible	Data owned by "ILO and World Bank ICP (International Comparison	
	Project)".	
For further information	Indicator information and data (within FAO Statistical Yearbook)	
	http://www.fao.org/economic/ess/ess-publications/ess-	
	yearbook/en/#.VUTCuCFViko	
Reason for indicator/dataset	"Fluctuations in food production, supply and prices also convey	

i i .		
development	important information about the vulnerability of countries and	
	their nonulations "	
Probability of continued	Not enough information to assign probability.	
development		
Indicator/dataset description		
"The Domestic Food Price Volatility is a measure of variation of the Domestic Food Price Level Index.		
It has been computed as the Standard Deviation (SD) of the deviations from the trend over the		

previous five years".

Scientific robustness (including peer review)

Lack of information on how the Domestic Food Price Level Index is calculated.

# 14.1ii: Inadequate access to food – Per capita food supply variability

Indicator /dataset summary

The variability (deviations from the mean over a five year period) in food supply per person per day, as measured in kcal, calculated annually for each country.

Relationship with Aichi Target	
Aichi Target	14
Aichi Target Element	Ecosystems that provide essential services, including services
	related to water, and contribute to health, livelihoods and well-
	being, are restored and safeguarded
Alignment to Aichi Target	Low: the production of food is an important provisioning
Element	ecosystem service, and fluctuations of production may give an
	indication of how well that ecosystem service is functioning.
	However, food supply also takes into account imports and exports
	and therefore many other factors also affect food supply as
	calculated here.
	Food production data may not take into account impacts
	unrelated to ecosystem services, such as changes in technology or
	use of fertiliser and pesticides.
	Additionally, food production data may not give any indication of
	the sustainability of that production, especially in the medium to
	long term.
Indicator/dataset coverage	
Spatial Coverage	Good: data exists for 186 countries across five regions.
Temporal Coverage	1961 to 2013.
Temporal relevance to	High: annually updated.
Strategic Plan	
implementation	
Development status	
Indicator category	A – Ready for use at the global level
Organisations/institutions	FAO Statistics Division (FAOSTAT)
responsible	
For further information	Indicator information and data (within FAO Statistical Yearbook)

	http://www.fao.org/economic/ess/ess-publications/ess-
	<u>yearbook/en/#.VUTCuCFViko</u>
	FAO food supply information and data
	http://faostat.fao.org/site/345/default.aspx
	FAO food balance sheet information and methodology
	http://www.fao.org/docrep/003/x9892e/x9892e01.htm
Reason for indicator/dataset	Food supply data is "the basis for estimation of global and
development	national undernourishment assessment".
	Food supply variability can be calculated from the food supply
	data, and helps build a picture of the vulnerability of countries
	and their populations.
Probability of continued	High: annually updated.
development	

Indicator/dataset description

Part of the FAO food balance sheets, which have existed since 1957.

Food supply = Production + imports - exports + changes in stocks (decrease or increase) "Food supply variability correspond to the variable food supply total in kcal/person/day as estimated by the FAO Statistic Division. The variability is obtained as the standard deviation over five years of the deviation from the trend of per capita food supply observed during the period 1990 to 2010."

Scientific robustness (including peer review)

Data is provided by countries and compiled from a variety of sources including national statistics and government estimates.

"The quality of the balance sheets and their coverage vary considerably among countries and commodities. Inaccuracies and errors may be introduced at each stage of a balance sheet's construction."

# 14.1iii: Harvested irrigated temporary/permanent crop area

Indicator /dataset summary

Total harvested irrigated area, estimated at a national level separately for a variety of crops. If the same area is cultivated and irrigated twice a year then it is counted twice.

Relationship with Aichi Target		
Aichi Target	14	
Aichi Target Element	Ecosystems that provide essential services, including services	
	related to water, and contribute to health, livelihoods and well-	
	being, are restored and safeguarded	
Alignment to Aichi Target	Low: the area of land irrigated for crops does not indicate the	
Element	volume of water required, or actually used, for irrigation. Nor	
	does it provide information on trends in crop yields. It is not clear	
	how trends in this dataset could be used as a proxy for the	
	restoration or safeguarding of ecosystem services.	
Indicator/dataset coverage		
Spatial Coverage	Good: data exists for 64 countries, over five continents	
Temporal Coverage	1958 to 2011. Varies by country.	

Temporal relevance to Strategic	Low: It is not clear whether data will continue to be collected	
Plan implementation	after 2011.	
Development status		
Indicator category	B – Could be used at the global level but would require further	
	development	
Organisations/institutions	FAO AQUASTAT	
responsible		
For further information	Indicator information for wheat (information for other crops can	
	be found using the dropdown box within the link)	
	http://www.fao.org/nr/water/aquastat/data/glossary/search.htm	
	I?submitBtn=-1&termId=4345	
	Indicator data for wheat (data for other crops can be found by	
	following a link included with the indicator information)	
	http://www.fao.org/nr/water/aquastat/data/query/results.html?	
	regionQuery=true&yearGrouping=SURVEY&yearRange.fromYear=	
	<u>1960&amp;yearRange.toYear=2015&amp;varGrpIds=4345&amp;regIds=9805,98</u>	
	06,9807,9808,9809&includeRegions=true&showValueYears=true	
	&categoryIds=-	
	<u>1&amp;XAxis=YEAR&amp;showSymbols=true&amp;showUnits=true&amp;hideEmpty</u>	
	RowsColoumns=true&_hideEmptyRowsColoumns=on⟨=en&q	
	<u>uery_type=glossary</u>	
Reason for indicator/dataset	Part of the FAO mandate to collect and disseminate global	
development	information on food and agriculture.	
Probability of continued	Not enough information to assign probability.	
development		
Indicator/dataset description		
Harvested irrigated temporary crop area for: wheat, barley, maize, millet, sorghum, other cereals,		
vegetables, soybeans, sesame, potatoes, sweet potatoes, cassava, other roots and tubers,		
leguminous crops, sugar beet, sugarcane, fodder, tobacco, and other crops.		
Harvested irrigated permanent crop area for: plantains, bananas, citrus, coconuts, and other crops.		
Unit of measurement = 1,000 hectares.		
Scientific robustness (including peer review)		
Data points are a mixture of: external data, AQUASTAT estimates, aggregate data, and modelled		
data.		

14.1iv: Population at risk – "droughts, floods, extreme temperatures"		
Indicator /dataset summary		
The percentage of the population of each country affected by natural disasters.		
Relationship with Aichi Target		
Aichi Target	14	
Aichi Target Element	Ecosystems that provide essential services, including services	

	related to water, and contribute to health, livelihoods and well-	
	being, are restored and safeguarded	
Alignment to Aichi Target	High: natural disasters could be considered a result of insufficient	
Element	regulating ecosystem services, therefore if data was available	
	showing trends in the percentage of the global population affected	
	by natural disaster it would be highly aligned to Aichi Target 14.	
	However, there is insufficient data to show trends, and it is not	
	clear whether it would be possible to meaningfully aggregate the	
	available data globally.	
Indicator/dataset coverage		
Spatial Coverage	Good: data exists for 168 countries, across five regions.	
Temporal Coverage	Long term annual average from 1990 to 2009.	
Temporal relevance to	Low: Single data point available for each country	
Strategic Plan implementation		
Development status		
Indicator category	B – Could be used at the global level but would require further	
	development	
Organisations/institutions	World Bank	
responsible		
For further information	Indicator information and data in FAO Statistical Yearbook 2013	
	http://www.fao.org/docrep/018/i3107e/i3107e00.htm	
	Indicator information and data from World Bank	
	http://data.worldbank.org/indicator/EN.CLC.MDAT.ZS?order=wbap	
	i_data_value_2009+wbapi_data_value+wbapi_data_value-	
	first&sort=asc&page=1	
Reason for indicator/dataset	Not enough information to identify reason for development.	
development		
Probability of continued	Low: Single data point calculated to date, with no temporal	
development	coverage since 2009	
Indicator/dataset description		
The percentage of the population	on of each country that is affected by natural disasters classified as	
either droughts, floods, or extreme temperature events. Population affected is the number of		
people injured, left homeless or requiring immediate assistance during a period of emergency		
resulting from a natural disaster; it can also include displaced or evacuated people.		
There is a single data point for each country, described as "average 1990-2009".		
Scientific robustness (including peer review)		

Not enough information to assess robustness.

# 14.1v: Population at risk – UNHCR populations of concern

Indicator /dataset summary

Total numbers of refugees and people in other 'populations of concern' residing in each country each year.

Relationship with Aichi Target

Aichi Target	14	
Aichi Target Element	Ecosystems that provide essential services, including services	
	related to water, and contribute to health, livelihoods and well-	
	being, are restored and safeguarded	
Alignment to Aichi Target	Low: data does not take into account the reason any population is	
Element	of concern, which could be as a result of, for example, natural	
	disaster or conflict. Therefore the indicator is not clearly aligned to	
	ecosystem services.	
Indicator/dataset coverage		
Spatial Coverage	High: data available for 196 countries over the five regions.	
Temporal Coverage	2000 to 2013.	
Temporal relevance to	High: annually updated.	
Strategic Plan implementation		
Development status	-	
Indicator category	A – Ready for use at the global level	
Organisations/institutions	United Nations High Commissioner for Refugees (UNHCR)	
responsible		
For further information	Indicator information and data in FAO Statistical Yearbook 2013	
	http://www.fao.org/docrep/018/i3107e/i3107e00.htm	
	Indicator information and methodology from UNHCR	
	http://www.unhcr.org/45c06c662.html	
	Indicator data from UNHCR (use headings to select layout of data)	
	http://popstats.unhcr.org/#_ga=1.201340753.1350084529.143135	
	<u>4715</u>	
Reason for indicator/dataset	To monitor levels of refugees and other populations at risk	
development		
Probability of continued	High: key data collected by UNHCR to inform decision makers with	
development	regard to refugees and other populations of concern	
Indicator/dataset description		
Numbers of refugees, asylum-seekers, returned refugees, internationally displaced persons (IDPs),		
returned IDPs, stateless persons and 'others of concern'		
Scientific robustness (including peer review)		
Data is provided by governmental agencies, UNHCR field offices and NGOs, using a combination of		
registers, surveys, registration processes and censuses.		
"Most industrialized countries lack a refugee register and are thus not in a position to provide		

accurate information on the number of refugees residing in their country." Data for these countries is estimated by UNHCR.

14.1vi: Production of selected forest products		
Indicator /dataset summary		
Annual production volumes of seven forest products by country. The products selected include timber products and wood fuel, but not food and medicine.		
Relationship with Aichi Target		
Aichi Target	14	
Aichi Target Element	Ecosystems that provide essential services, including services	
	related to water, and contribute to health, livelihoods and well-	

	being, are restored and safeguarded	
Alignment to Aichi Target	Medium: gives an indication of the wood-based provisioning	
Element	ecosystem services produced in each country, but no indication of	
	how sustainably the products are being harvested (i.e. whether	
	stocks are being adequately safeguarded), or which groups of	
	people are receiving the benefits.	
Indicator/dataset coverage		
Spatial Coverage	Good: data exists for 178 countries across five regions.	
Temporal Coverage	1961 to 2011 (varies slightly by country).	
Temporal relevance to Strategic	High: annually updated	
Plan implementation		
Development status		
Indicator category	A – Ready for use at the global level	
Organisations/institutions	FAO, Statistics Division (FAOSTAT)	
responsible		
For further information	Indicator information and data in FAO Statistical Yearbook 2013	
	http://www.fao.org/docrep/018/i3107e/i3107e00.htm	
	FAOSTAT data (under forestry subheading)	
	http://faostat3.fao.org/mes/methodology_list/E	
	Detailed definition of each forest product	
	http://faostat.fao.org/portals/_faostat/documents/forestproduct	
	<u>sdefinitions.htm</u>	
Reason for indicator/dataset	Included in FAO Statistical Yearbook	
development		
Probability of continued	High: annually updated as part of FAO Statistical Yearbook	
development		
Indicator/dataset description		
Estimates the volume of the follo	wing forest products produced annually for each country: industrial	
roundwood, woodfuel, roundwoo	od, sawnwood, wood-based panels, wood pulp and paper and	
paperboard.		
Scientific robustness (including peer review)		
In general, figures have been supplied by governments through national publications and FAO		
questionnaires (paper or electronic). To make the coverage of this data collection as complete as		
possible, official data have sometimes been supplemented with data from unofficial sources. Use		
has also been made of information supplied by other national or international agencies or		
organisations. Aggregate[s], may include official, semi-official, estimated or calculated data.		

14.1vii: Proportion of total water resources used		
Indicator /dataset summary		
An estimation of the proportion of total available freshwater withdrawn for human use, calculated		
at country level.		
Relationship with Aichi Target		
Aichi Target	14	
Aichi Target Element	Ecosystems that provide essential services, including services	

	related to water, and contribute to health, livelihoods and well-	
	being, are restored and safeguarded	
Alignment to Aichi Target	Medium: an indicator of the pressure a country is placing on its	
Element	freshwater resources, an essential ecosystem service. A high	
	proportion may be an indication that freshwater resources are	
	not being safeguarded.	
Indicator/dataset coverage		
Spatial Coverage	High: data exists for 171 countries, over five regions.	
Temporal Coverage	Dates vary by country, and are grouped into blocks of five years.	
Temporal relevance to Strategic	Low: data is collected from each country approximately once	
Plan implementation	every 10 years.	
Development status		
Indicator category	B – Could be used at the global level but would require further	
	development	
Organisations/institutions	FAO AQUASTAT country surveys	
responsible		
For further information	Indicator information (including details of the AQUASTAT	
	contact point)	
	http://unstats.un.org/UNSD/MDG/Metadata.aspx?IndicatorId=0	
	<u>&amp;SeriesId=768</u>	
	Indicator data	
	http://unstats.un.org/UNSD/MDG/SeriesDetail.aspx?srid=768	
	Indicator data source (FAO AQUASTAT database)	
	http://www.fao.org/nr/aquastat	
Reason for indicator/dataset	Used as a Millennium Development Goal Indicator (Goal 7,	
development	Target 7.A)	
Probability of continued	High: FAO have been collecting the data since 1992, and it is a	
development	Millennium Development Goal indicator	
Indicator/dataset description		
Water withdrawal from renewable	water sources is estimated for agriculture, municipalities and	
industries at a country level.		
Total renewable water resources	= internal renewable water resources + external renewable water	

resources.

**Internal renewable water resources** = average annual flow of rivers and recharge of groundwater... generated from endogenous precipitation

**External renewable water resources** = flows of water entering the country.

Data is collected through country surveys.

The Millennium Development Goal indicator assessment suggested that with some additional resources it would be "relatively easy" to collect data from each country once every five years. Scientific robustness (including peer review)

Data on water resources obtained from national sources are systematically reviewed to ensure consistency in definitions and between countries located in the same river basin. A methodology has been developed and rules established to compute the different Elements of national water balances.

# 3.3.4. Aichi Target 19 Element 1 alignment

Aichi 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.

Aichi Target 19 Element 1: Knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved

Whilst one indicator is available under the BIP for this Aichi Target Element, it was considered to have low alignment because it is a weak proxy for the Target Element. This review did not identify any potential indicators that would serve as a better proxy.

# 3.4. Spatial Coverage Gaps

# 3.4.1. Aichi Target 1 Element 1 spatial coverage

Aichi 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.

Aichi Target 1 Element 1: People are aware of the values of biodiversity

There is currently one indicator available for this Aichi Target Element under the BIP, the *Biodiversity Barometer*, the indicator currently only has data for ten countries giving it a poor spatial coverage rating. This review identified a potential indicator with good spatial coverage that could be used to cover the spatial coverage gap in this Target Element. The potential indicator is summarised in Table *3.28* below.

Table 3.28. Summary of the potential indicators for Aichi Biodiversity Target 1 Element 1 on the values of biodiversity.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
1.1i: Investment in environmental education Investment in environmental education measures international financial flows committed to projects that support environmental education and training.	В	Medium	High	Good
* Contraction of all the different of the different of	Part of the Providence of C			1 2011

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

### Factsheets for potential indicators to fill the gap

1.1i: Investment in environmental education		
Indicator /dataset summary		
Investment in environmental	education measures international financial flows committed to	
projects that support environmental education and training. This metric measures the funds		
committed from a range of multilateral agencies and bilateral donors outside the OECD		
Development Assistance Committee (DAC).		
Relationship with Aichi Target		
Aichi Target	1	
Aichi Target Element	People are aware of the values of biodiversity	

Alignment to Aichi Element	Medium: this metric measures financial flows committed to
	projects that support environmental education and training, which
	can be used as a proxy for awareness of biodiversity.
Indicator/dataset coverage	
Spatial Coverage	Good: data for 20+ countries and all five regions.
Temporal Coverage	2000 to 2010
Temporal relevance to	High: data regularly collected, likely to have data up until at least
Strategic Plan implementation	2016 and possibly further.
Development status	
Indicator category	B – Could be used at the global level but would require further
	development
Organisations/institutions	AidData
responsible	
For further information	http://aiddata.org/
	Tierney, Michael J., Daniel L. Nielson, Darren G. Hawkins, J.
	Timmons Roberts, Michael G. Findley, Ryan M. Powers, Bradley
	Parks, Sven E. Wilson, and Robert L. Hicks. 2011. More Dollars than
	Sense: Refining Our Knowledge of Development Finance Using
	AidData. World Development 39 (11): 1891-1906
Reason for indicator/dataset	Indicator used in Tittensor et al. 2014. AidData is a research and
development	innovation lab that seeks to improve development outcomes by
	making development finance data more accessible and actionable.
	Development projects are reviewed, their activities categorised and
	collated into a database.
Probability of continued	High: ongoing data collection.
development	
Indicator/dataset description	
	it is a finite set of the set of

AidData collects data on international development financing and categorises each project or flow into specific activities and sectors. Data are presented in constant US dollars (set at 2009 levels). Scientific Robustness (including peer review)

AidData activity codes allow users to identify projects not only according to their dominant purpose, but also by their specific components (i.e. activities). Thus, the granularity of the data allow for more fine-grained analysis of how international development financing is allocated.

The project descriptions sometimes brief and unclear as to the quantity of funds specifically earmarked for indicator activities. This may lead to an over-estimation of the funds that are specifically directed to investment in environmental education.

Activity codes that identify projects with investment in environmental education are only currently available for certain donors, largely consisting of multilateral agencies and bilateral donors outside of the OECD-DAC.

It may be possible to include funding for environmental education from OECD DAC in the indicator

through the Creditor Reporting System, looking at ODA to 'Environmental education/training' (CRS Code 41081).

This indicator, along with the other AidData financial indicators, do not include internal national spending.

# 3.4.2. Aichi Target 5 Element 3 spatial coverage

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

Aichi Target 5 Element 3: Degradation and fragmentation are significantly reduced

Although there is an indicator available under the BIP for this Target Element, the *Wild Bird Index for habitat specialists*, it scored poorly in relation to its spatial coverage because it only has data for North America and Europe. See section 3.3.1 for information on the potential indicator identified with good spatial coverage for this Aichi Target Element.

### 3.4.3. Aichi Target 7 Element 1 spatial coverage

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

Aichi Target 7 Element 1: Areas under agriculture are managed sustainably, ensuring conservation of biodiversity

Although there is an indicator available under the BIP for this Target Element, the *Wild Bird Index for farmland birds*, it scored poor in relation to its spatial coverage because it only has data for Europe. However, it is currently being expanded to include data from North America (available since 1970) and from a number of countries in Africa. In this review, no additional indicator with greater spatial coverage was identified.

A possible option to fill this gap is to disaggregate the Living Planet Index to farmland specialists. In addition, populations that occur in areas where agriculture is the dominant land use could be identified and their trends presented. This indicator is summarised in Table **3.29** below.

BIP Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
Living Planet Index (farmland specialists) Living Planet Index can be disaggregated to different vertebrate farmland specialists and those that occur in areas of agriculture.	A	Medium	High	Good

Table 3.29: Summary of the inactive BIP indicators for Aichi Biodiversity Target7 Element 1 on sustainable agriculture.

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

# 3.5. Temporal Relevance Gaps

# 3.5.1. Aichi Target 5 Element 1 temporal relevance

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

Aichi Target 5 Element 1: The rate of loss of forests is at least halved and where feasible brought close to zero

Although there is an indicator available under the BIP for this Target Element, the *Extent of forests and forest types*, it scored low in relation to its temporal relevance because it is updated every five years. In 2020 it is expected to therefore have three data points: 2010, 2015 and 2020. While this provides sufficient information to monitor progress towards this Target Element, the five year time gap reduces the sensitivity of the indicator. A dataset that could be used to develop an indicator with greater frequency of data points is Hansen et al.'s (2013) Global Forest Change. This dataset and possible indicator is summarised in Table *3.36* below and the following factsheet.

 Table 3.30.
 Summary of the potential indicators for Aichi Biodiversity Target 5 Element 1 on forest loss.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
Hansen forest data	В	High	High	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

#### Factsheets for potential indicators to fill the gap

5.1i: Global forest loss	
Indicator /dataset summary	
This indicator uses the result fro	om the Global Forest Change project published by Hansen et al.
(2013) which shows global fores	st loss from 2000 to 2013.
Relationship with Aichi Target	
Aichi Target	5
Aichi Target Element	The rate of loss of all habitats is at least halved and where feasible
	brought close to zero.
Alignment to Aichi Element	High: The annual amount of tree cover loss can be determined
	globally and compared to the 2000 baseline of global tree cover.
Indicator/dataset coverage	
Spatial Coverage	Good: global, all five regions and more than 20 countries total

Temporal Coverage	2000 to 2013
Temporal relevance to	High: will be annually updated
Strategic Plan implementation	
Development status	
Indicator category	B – Could be used at the global level but would require further
	development
Organisations/institutions	University of Maryland and the World Resources Institute
responsible	
For further information	http://earthenginepartners.appspot.com/science-2013-global-
	forest
	Hansen, M. C., Potapov, P. V., Moore, R., Hancher, M., Turubanova,
	S. A., Tyukavina, A., Townshend, J. R. G. (2013). High-resolution
	global maps of 21st-century forest cover change. Science,
	342(6160), 850–853. doi:10.1126/science.1244693
Reason for indicator/dataset	To globally map and monitor forest loss on an annual basis from
development	Earth Observation satellite data.
Probability of continued	High: WRI are committed to annual updates and Landsat will
development	continue to provide the data.
Indicator/dataset description	

The results are generated from time-series analysis of Landsat images characterizing forest extent and change at 30m spatial resolution. Trees are defined as vegetation taller than 5m in height and are expressed as a percentage per output grid cell as '2000 Percent Tree Cover'. 'Forest Cover Loss' is defined as a stand-replacement disturbance, or a change from a forest to non-forest state, during the period 2000–2013.

Scientific Robustness (including peer review)

There has been some debate about the accuracy of the annual forest loss estimates of Hansen et al. compared to those of the 5-yearly FAO FRA. They report that intensive forestry practiced within subtropical forests resulted in the highest rates of forest change globally over the reference time period but these data mix forest plantations with natural forest types and are therefore not a true indicator of 'natural' habitat extent. It maybe that the Hansen et al. data require a further level of screening before they are turned into an indicator of natural forest loss. Currently forest loss and gain estimates are inconsistent with those of the FAO FRA as they include plantation forests while the FAO definition excludes these forest land uses. Indeed the Hansen et al. team stress that forest cover loss is not synonymous with deforestation, and that it should not be extrapolated as such. In fact, there is no reference to natural forest or forest land use in the dataset's definitions. See this link for more discussion on this topic:

http://www.epi.yale.edu/the-metric/calling-forest-another-name-may-result-different-statistics

## 3.5.2. Aichi Target 8 Element 2 temporal relevance

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

Aichi Target 8 Element 2: Pollution from excess nutrients has been brought to levels that are not detrimental to ecosystem function and biodiversity

Although there are indicators available under the BIP to monitor progress towards this Target, questions over the amount of data points that would be produced during the period of the Strategic Plan resulting in low scores for their temporal relevance. However, the disaggregated *Red List Index* would be considered to have high temporal relevance. This indicator is summarised in Table **3.11**. In addition to a temporal relevance gap, there was also an alignment gap for this Aichi Target Element. See section 3.3.2 for information on the potential indicators identified for this Aichi Target Element.

### 3.5.3. Aichi Target 10 Element 2 temporal relevance

Aichi 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.

Aichi Target 10 Element 2: Multiple anthropogenic pressures on other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning

Although there is an indicator available under the BIP for this Target Element, it scored low in relation to its temporal relevance because it is not being updated frequently. A possible option to fill this temporal relevance gap is to disaggregate two existing BIP Indicators: the *Living Planet Index* and the *Red List Index*.

The *Living Planet Index* can be disaggregated to show trends in species that occur in ecosystems considered vulnerable. The *Red List Index* can be disaggregated to show trends in those Red List category changes driven by climate change and severe weather or successful adaptation responses to climate change, i.e. species uplisted to higher categories of extinction risk owing to the negative impacts of climate change and severe weather or species downlisted to lower categories of extinction risk owing to effective adaptation interventions. Currently there is data for 1988 to 2012, but it will be updated periodically between now and 2020. These indicators are summarised in Table **3.31** below.

BIP Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
Living Planet Index (vulnerable ecosystems) The Living Planet Index could be disaggregated to show trends in species that occur in vulnerable ecosystems.	A	Medium	High	Good
Red List Index (impacts of climate change) The Red List Index could be disaggregated to show trends category changes driven by climate change and severe weather or successful adaptation responses to climate change.	В	Medium	High	Good

**Table 3.31:** Summary of the disaggregated BIP indicator for Aichi Biodiversity Target 10 Element 2 on vulnerable ecosystems.

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

An additional indicator that would be estimated to have greater temporal relevance is the *Climate Change Impact on Biodiversity Index*. This indicator is summarised in Table *3.32* below and in the following factsheet.

**Table 3.32** Summary of the potential indicator for Aichi Biodiversity Target 10 Element 2 on minimizing anthropogenic pressures on vulnerable ecosystems.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
Climate Change Impact on Biodiversity Index This indicator reflects shifts in the composition of biological communities associated with changing temperature conditions.	В	High	High/medium	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

#### Factsheets for potential indicator

10.1i: Climate Change Impacts	10.1i: Climate Change Impacts on Biodiversity (CCIB) Index		
Indicator /dataset summary			
The Climate Change Impacts on Biodiversity (CCIB) Index reflects shifts in the composition of biological communities associated with changing temperature conditions. It will provide the first global indicator of climate change impacts on biodiversity and covers both terrestrial and marine biodiversity.			
Relationship with Aichi Target			
Aichi Target	10		
Aichi Target Element	Multiple anthropogenic pressures on other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.		
Alignment to Aichi Element	High: tracks biological communities' compositional shifts in response to climate change, providing a measure of adaptation.		
Indicator/dataset coverage			
Spatial Coverage	Good: global coverage		
Temporal Coverage	1975 to present		
Temporal relevance to Strategic Plan implementation	High/medium: some groups (e.g. birds, mammals, marine fishes) will have sufficient data for ≥5 data points for 2011-2020; less- studied groups (e.g. reptiles, invertebrates) will have fewer.		
Development status			
Indicator category	B – Indicators/datasets requiring further development for use at the global level		
Organisations/institutions responsible	IUCN, GBIF		

For further information	Devictor V., van Swaay C., Brereton T., Brotons L., Chamberlain D., Heliölä J., Herrando S., Julliard R., Kuussaari M., Lindström Å., Reif J., Roy D.B., Schweiger O., Settele J., Stefanescu C., Van Strien A., Van Turnhout C., Vermouzek Z., WallisDeVries M., Wynhoff I., & Jiguet F. (2012) Differences in the climatic debts of birds and butterflies at a continental scale. <i>Nature Climate Change</i> , <b>2</b> , 121–124.
Reason for indicator/dataset development	In 2012, Devictor et al. published an indicator tracking shifts in European bird and butterfly communities in response to regional warming. The CCIB is a global extension of this work.
Probability of continued development	High: mechanisms for data maintenance and updates are in place through IUCN and GBIF
Indicator / data ant decorrigation	

Indicator/dataset description

Extension of a 2012 indicator published by Devictor et al. that tracked shifts in European bird and butterfly communities in response to regional warming. Extension of the indictor to global scale is based on use of existing GBIF and IUCN species distribution information, including data from citizen science initiatives. To serve policy needs, the index can be aggregated by region and, where data are sufficient, by country. The extent of climate change impacts will be compared between latitudinal zones (e.g. polar vs. temperate vs. tropical zones), ecosystems (e.g. wetlands vs. coral reefs vs. deserts) and taxonomic groups (e.g., amphibians vs. birds vs. marine fishes) and mapped index changes will show spatial patterns of impact across the world.

As well as filling an important gap for Target 10, the CCIB helps to address Target 15, for which no indicators exist, by providing a measure of climate change adaptation and hence long term persistence of conserved and restored ecosystems serving as carbon stocks.

Scientific robustness (including peer review)

For each species in a community of interest (e.g. marine fishes), the average temperature across its historical range, namely its Species Temperature Index (STI), is calculated. The CTI is simply the average of all STIs for the focal species occurring in an area of interest. As climates in an area warm, cool-adapted species (with lower STIs) are likely to either migrate to cooler areas or become extinct, while warm-adapted species (with higher STIs) arrive. Over time, communities in areas experiencing warming will include greater proportions of warm-adapted species, reflected by rising CTIs. An area's CTI change can then be compared to the temperature increase (or decrease) observed there, providing a measure of how closely species are tracking these changes and hence of the lag in adaptation responses to climate change.

# 3.6. Additional indicators

During the course of this review a number of additional indicators were provided to the BIP for Aichi Biodiversity Targets which weren't considered to have gaps. The details of these indicators have been included here, as although not directly responding to an identified gap, there use could enhance the information available for the Aichi Biodiversity Targets.

# 3.6.1. Aichi Target 5 Element 1

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

Aichi Target 7 Element 1: The rate of loss of forests is at least halved and where feasible brought close to zero

Efforts are ongoing to develop the Global Forest Watch (GFW) platform into two new indicators: the *Forest Status Index* and a *Forest Biodiversity Index*. Collectively, the two indices will present data on the status and trends of forests and their biodiversity through simple, accessible metrics that are flexible, sufficiently robust, and scalable from province to region to the world. The indicators will form part of a new platform, GFW Biodiversity, which is being developed through a new collaboration of biodiversity experts from key organizations, including UNEP-WCMC, Birdlife International, the World Resources Institute, and RESOLVE.

### 3.6.2. Aichi Target 7 Element 3

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

Aichi Target 7 Element 3: Areas under forestry are managed sustainably, ensuring conservation of biodiversity

The *Living Planet Index* can be disaggregated to show trends in forest-dependent species (vertebrates) in those areas where forests are managed. This indicator could be used to show the impact of the areas management on biodiversity. This disaggregated indicator is summarised in Table **3.33** below.

Table 3.33: Summary of the disaggregated BIP indicator for Aichi Biodiversity Target 7 Element 3 on sustainable forestry.

BIP Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
Living Planet Index (forest- dependent species) Living Planet Index can be disaggregated to different vertebrate forest specialists that occur in areas of managed forests.	A	High	High	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

## 3.6.3. Aichi Target 11

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

Aichi Target 11 Element 2: Areas of particular importance for biodiversity and ecosystem services conserved and conserved areas are ecologically representative.

Aichi Target 11 Element 3: Conserved areas are effectively and equitably managed.

During the course of this review additional indicators for Aichi Biodiversity Target 11 were identified that may complement the existing indicators. The indicator, the *Species Protection Index*, could be used to monitor progress to Target 11 Element 2. Because there is no indicator gap for this Target Element the indicator was not included in the analysis but is summarised in Table *3.34* below. The PARC Index could also be used for this Target Element (Factsheet 11.4i).

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
11.1i: Species Protection Index	В	High	High	Good

**Table 3.34**: Summary of the potential indicators for Aichi Biodiversity Target 11 Element 2 on the conservation of important areas for biodiversity and ecosystem services that are also ecologically representative.

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

In addition, the Living Planet Index could be disaggregated to species that occur in conserved areas. The indicator could then be used to monitor the effectiveness of the conserved areas under Target 11 Element 3. The indicator is summarised in Table 3.34 below.

Although there are currently no recognised indicators of equitable management per se, a number of conceptual frameworks have been/are being developed that could assist in identifying specific criteria against which progress could be tracked. A number of people and organisations are working to develop indicators and datasets that could provide information on equitable management of protected areas and be used for reporting progress at the global an indicator on equitable management. To support this process, UNEP-WCMC propose to identify success criteria for 'equitable management of protected areas' and look at what tools, indicators and datasets countries and organisations already use that could provide information on equitable management of

protected areas and be used for tracking and reporting progress. However, at the time of review concepts were in the very early stages of development so a factsheet has not been included.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
11.2i: Equitable management of protected areas	В	-	-	-
<b>11.2ii: Living Planet Index</b> (conserved areas) This indicator would show trends in species that occur in conserved areas.	A	Medium	High	Good

**Table 3.35** Summary of disaggregated BIP indicator for Aichi Biodiversity Target 11 Element 3 on the effectiveness of conserved areas.

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

#### **Factsheets for potential indicator**

11.1i: Species Protection Index	
Indicator /dataset summary	
The Species Protection Index as	sesses species representation in protected areas and potential
changes to it over time using int	tegrated distribution, habitat suitability, and remote sensing
information and local species ol	oservations for validation and statistical uncertainty capture.
Relationship with Aichi Target	
Aichi Target	11
Aichi Target Element	Areas of particular importance for biodiversity and ecosystem
	services, are conserved. Conserved areas are ecologically
	representative.
Alignment to Aichi Target	High: the Index covers a large and geographically highly
	representative number of species worldwide that will grow over
	time
Indicator/dataset coverage	
Spatial Coverage	Good: all countries and all five regions. All WDPA reserves included.
Temporal Coverage	2001 to 2014 and beyond
Temporal relevance to	High: updates annually going forward to 2020 and beyond
Strategic Plan implementation	
Development status	
Indicator category	B – Could be used at the global level but would require further
	development
Organisations/institutions	Map of Life / GEO BON / Future Earth, in collaboration with GBIF.
responsible	
For further information	http://species.mol.org/pa for basic implementation using only
	binary habitat models. Manuscript in preparation.

Reason for indicator/dataset	To create a scientifically sound indicator that captures how well the
development	current protected area network represents biodiversity by
	addressing the constraints on spatial data reliability through
	careful, transparent, and replicable modelling.
Probability of continued	High: Data collection is ongoing and the informatics infrastructure
development	for continued metric calculation and reporting is developed.
Indicator/dataset description	

The Species Protection Index quantifies how well in different parts of the world existing reserves and different reserve categories represent species, i.e. reliably capture a minimum portion of their global distribution. The index is based on model-based quantifications that are performed on a per-reserve and per-species basis for all WDPA recognised reserves and a broadly representative set of thousands of species, including vertebrates, select tree species, and other groups that will be added in the coming years. It uses 1km and 30m resolution global-extent MODIS and Landsat remote sensing products, updated annually. The index is ready for different WDPA categories and different taxa. While legacy reporting will be maintained, number of species and modelling detail will steadily increase.

Scientific robustness (including peer review)

The index is developed using a combination of different species distribution data types, literaturesourced habitat suitability information, and ongoing global-scale remote sensing. It is based on thousands of species with statistically reliable information. It can be disaggregated from the global to the national scale to single reserves and species. Calculations are fully transparent, accessible and replicable through the Map of Life web-interface. A large and geographically representative number of species are be included in the index, as well as all WDPA reserve, ensure global representation.

## 3.6.4. Aichi Target 12

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

During the course of this review an additional indicators for Aichi Biodiversity Target 12 were identified. The indicators, the *Species Habitat Change Index* and the *Local Biodiversity Intactness Index*, could be used to monitor progress to Target 12 Element 2, 'the conservation status of those species most in decline has been improved and sustained'. Because there is no indicator gap for this Target Element, these indicators were not included in the analysis but is summarised in Table *3.36* below. These indicators can be used across Aichi Targets and were also identified as a potential indicator for Aichi Target Element gaps 5.2 and 14.2 (see sections 3.2.3 and 3.2.15).

**Table 3.36:** Summary of the potential indicators for Aichi Biodiversity Target 12 Element 2 on improving the conservation status of species in decline.

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
<b>12.2i: Species Habitat Change Index</b> The Species Habitat Change Index assesses for thousands of species worldwide trends in suitable habitats within their range, combining remote sensing and local species observations.	В	Medium	High	Good
<b>12.2.ii Local Biodiversity Intactness</b> <b>Index</b> The index provides estimates of human impacts on the intactness of local biodiversity worldwide, and how this may change over time.	A	High	High	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

#### Factsheets for potential indicator

12.2i: Species Habitat Change Index		
Indicator /dataset summary		
The Species Habitat Change Index assesses for thousands of species worldwide trends in suitable		
habitats within their range, combining remote sensing and local species observations.		
Relationship with Aichi Target		
Aichi Target	12	
Aichi Target Element	The conservation status those species most in decline has been	
	improved and sustained.	

Alignment to Aichi Target	Medium: the Index covers a large and geographically highly	
	representative number of species worldwide.	
Indicator/dataset coverage		
Spatial Coverage	Good: all countries and all five regions.	
Temporal Coverage	2001 to 2014 and beyond.	
Temporal relevance to	High: Data for thousands of species annually going forward to	
Strategic Plan	2020 and beyond.	
implementation		
Development status		
Indicator category	B – Could be used at the global level but would require further	
	development.	
Organisations/institutions	Map of Life / GEO BON / Future Earth, in collaboration with GBIF.	
responsible		
For further information	Manuscript in preparation. For example of single species detail	
	see <u>http://species-</u>	
	beta.mol.org/species/habitat/Taphozous_hildegardeae	
Reason for indicator/dataset	To create an indicator that captures in a globally representative,	
development	transparent and replicable way how their suitable habitats are	
	lost.	
Probability of continued	High: Landsat and MODIS data collection is ongoing and	
development	informatics infrastructure for continued metric calculation and	
	reporting is developed.	
Indicator/dataset description		
The Species Habitat Change Index quantifies the rate of change in suitable habitat for species		

The Species Habitat Change Index quantifies the rate of change in suitable habitat for species, globally. Using remotely sensed information from Landsat and MODIS satellites, it tracks how within a species range the area of its required habitat is altered due to direct human encroachment or other changes. It validates estimates and captures their uncertainty using local species observations.

Scientific Robustness (including peer review)

Data can be disaggregated from the global to the national scale and to single species. Calculations are fully transparent, accessible and replicable through the Map of Life web-interface. Uncertainty of estimates will continuously decrease as further species observations are mobilised.

# 12.2.ii Local Biodiversity Intactness Index

Indicator /dataset summary

The Local Biodiversity Intactness Index (LBII) is based on a purpose-built global database of local biodiversity surveys combined with high-resolution global land-use data. The index provides estimates of human impacts on the intactness of local biodiversity worldwide, and how this may change over time.

Relationship with Aichi Targets	
Aichi Target	12
Aichi Target Element	The conservation status those species most in decline has been
	improved and sustained.

Alignment to Aichi Target	This indicator is well aligned to the needs of Aichi Target 5, 12 and
	14: The LBII directly estimates the effects of human pressures on
	the intactness of local ecological assemblages worldwide. Because
	models are based on a wide and taxonomically-representative set
	of animal and plant species, the LBII reflects the status of overall
	terrestrial biodiversity better than is possible by focusing on any
	one taxon, e.g., vertebrates. Local communities' worldwide,
	especially poor and vulnerable ones, depend crucially on local
	(rather than global) biodiversity for their needs; LBII reports on the
	average intactness of local biodiversity within any area of interest.
Indicator/dataset coverage	
Spatial Coverage	Good: covers the entirety of the world's terrestrial area at a spatial
	resolution of 1km <sup>2</sup> .
Temporal Coverage	High: Uses the annual global land-use data being produced by
	CSIRO as part of the proposed Biodiversity Habitat Index (Target 5),
	which uses remotely-sensed data sets available from 2001 onwards
	(Hansen et al. 2013 Science 342: 850-853; Friedl et al. 2010 Remote
	Sensing of Environment 114: 168-182).
Temporal relevance to	High: Annual data points for 2011-2020 (assuming that the remote-
Strategic Plan implementation	sensing products used in land-use layers are updated annually), and
	projections possible given future scenarios of land use and related
	pressures (e.g., the Representative Concentration Pathways). The
	LBII has the additional attribute of being able to be projected into
	LBII has the additional attribute of being able to be projected into the future under different scenarios
Development status	LBII has the additional attribute of being able to be projected into the future under different scenarios
Development status Indicator category	<ul> <li>LBII has the additional attribute of being able to be projected into the future under different scenarios</li> <li>A – This Index is ready for global use (requires no further</li> </ul>
Development status Indicator category	<ul> <li>LBII has the additional attribute of being able to be projected into the future under different scenarios</li> <li>A – This Index is ready for global use (requires no further development)– the database and the model approach is published</li> </ul>
Development status Indicator category	<ul> <li>LBII has the additional attribute of being able to be projected into the future under different scenarios</li> <li>A – This Index is ready for global use (requires no further development)– the database and the model approach is published and there is funding and a partnership in place to continue making the index into the future on annual time steps and with projections.</li> </ul>
Development status Indicator category	<ul> <li>LBII has the additional attribute of being able to be projected into the future under different scenarios</li> <li>A – This Index is ready for global use (requires no further development) – the database and the model approach is published and there is funding and a partnership in place to continue making the index into the future on annual time steps and with projections if required.</li> </ul>
Development status Indicator category	<ul> <li>LBII has the additional attribute of being able to be projected into the future under different scenarios</li> <li>A – This Index is ready for global use (requires no further development)– the database and the model approach is published and there is funding and a partnership in place to continue making the index into the future on annual time steps and with projections if required.</li> </ul>
Development status Indicator category Organisations/institutions	<ul> <li>LBII has the additional attribute of being able to be projected into the future under different scenarios</li> <li>A – This Index is ready for global use (requires no further development)– the database and the model approach is published and there is funding and a partnership in place to continue making the index into the future on annual time steps and with projections if required.</li> <li>The PREDICTS project (Natural History Museum (London), UNEP-</li> </ul>
Development status Indicator category Organisations/institutions responsible	<ul> <li>LBII has the additional attribute of being able to be projected into the future under different scenarios</li> <li>A – This Index is ready for global use (requires no further development)– the database and the model approach is published and there is funding and a partnership in place to continue making the index into the future on annual time steps and with projections if required.</li> <li>The PREDICTS project (Natural History Museum (London), UNEP-WCMC, University of Sussex, University College London, Imperial</li> </ul>
Development status Indicator category Organisations/institutions responsible	<ul> <li>LBII has the additional attribute of being able to be projected into the future under different scenarios</li> <li>A – This Index is ready for global use (requires no further development)– the database and the model approach is published and there is funding and a partnership in place to continue making the index into the future on annual time steps and with projections if required.</li> <li>The PREDICTS project (Natural History Museum (London), UNEP-WCMC, University of Sussex, University College London, Imperial College London and Swansea University) in collaboration with</li> </ul>
Development status Indicator category Organisations/institutions responsible	<ul> <li>LBII has the additional attribute of being able to be projected into the future under different scenarios</li> <li>A – This Index is ready for global use (requires no further development)– the database and the model approach is published and there is funding and a partnership in place to continue making the index into the future on annual time steps and with projections if required.</li> <li>The PREDICTS project (Natural History Museum (London), UNEP-WCMC, University of Sussex, University College London, Imperial College London and Swansea University) in collaboration with CSIRO.</li> </ul>
Development status Indicator category Organisations/institutions responsible For further information	<ul> <li>LBII has the additional attribute of being able to be projected into the future under different scenarios</li> <li>A – This Index is ready for global use (requires no further development)– the database and the model approach is published and there is funding and a partnership in place to continue making the index into the future on annual time steps and with projections if required.</li> <li>The PREDICTS project (Natural History Museum (London), UNEP-WCMC, University of Sussex, University College London, Imperial College London and Swansea University) in collaboration with CSIRO.</li> <li>Global models of net change in local species-richness and</li> </ul>
Development status Indicator category Organisations/institutions responsible For further information	<ul> <li>LBII has the additional attribute of being able to be projected into the future under different scenarios</li> <li>A – This Index is ready for global use (requires no further development)– the database and the model approach is published and there is funding and a partnership in place to continue making the index into the future on annual time steps and with projections if required.</li> <li>The PREDICTS project (Natural History Museum (London), UNEP-WCMC, University of Sussex, University College London, Imperial College London and Swansea University) in collaboration with CSIRO.</li> <li>Global models of net change in local species-richness and abundance were published in <i>Nature</i> (Newbold et al. 2015 <i>Nature</i></li> </ul>
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Development status Indicator category Organisations/institutions responsible For further information	LBII has the additional attribute of being able to be projected into the future under different scenarios <ul> <li>A – This Index is ready for global use (requires no further development)– the database and the model approach is published and there is funding and a partnership in place to continue making the index into the future on annual time steps and with projections if required.</li> <li>The PREDICTS project (Natural History Museum (London), UNEP- WCMC, University of Sussex, University College London, Imperial College London and Swansea University) in collaboration with CSIRO.</li> <li>Global models of net change in local species-richness and abundance were published in <i>Nature</i> (Newbold et al. 2015 <i>Nature</i> 520:45-50) along with hindcasts, projections under the four Representative Concentration Pathways, and country-level analyses highlighting the risks to the poor and vulnerable of business as</li> </ul>
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Development status         Indicator category         Organisations/institutions         responsible         For further information	LBII has the additional attribute of being able to be projected into the future under different scenarios <ul> <li>A – This Index is ready for global use (requires no further development)– the database and the model approach is published and there is funding and a partnership in place to continue making the index into the future on annual time steps and with projections if required.</li> <li>The PREDICTS project (Natural History Museum (London), UNEP- WCMC, University of Sussex, University College London, Imperial College London and Swansea University) in collaboration with CSIRO.</li> <li>Global models of net change in local species-richness and abundance were published in <i>Nature</i> (Newbold et al. 2015 <i>Nature</i> 520:45-50) along with hindcasts, projections under the four Representative Concentration Pathways, and country-level analyses highlighting the risks to the poor and vulnerable of business as usual. Description of the underlying database has already been published (Hudson et al. <i>Ecology &amp; Evolution</i> 4:4701-4735); the first public release of the database will take place in late 2015/early</li> </ul>
Development status         Indicator category         Organisations/institutions         responsible         For further information	LBII has the additional attribute of being able to be projected into the future under different scenarios <ul> <li>A – This Index is ready for global use (requires no further development)– the database and the model approach is published and there is funding and a partnership in place to continue making the index into the future on annual time steps and with projections if required.</li> <li>The PREDICTS project (Natural History Museum (London), UNEP- WCMC, University of Sussex, University College London, Imperial College London and Swansea University) in collaboration with CSIRO.</li> <li>Global models of net change in local species-richness and abundance were published in <i>Nature</i> (Newbold et al. 2015 <i>Nature</i> 520:45-50) along with hindcasts, projections under the four Representative Concentration Pathways, and country-level analyses highlighting the risks to the poor and vulnerable of business as usual. Description of the underlying database has already been published (Hudson et al. <i>Ecology &amp; Evolution</i> 4:4701-4735); the first public release of the database will take place in late 2015/early 2016. Land-use data are described in proposal for the Biodiversity</li> </ul>

	www.predicts.org.uk.
Reason for indicator/dataset	Existing indicators for these targets lack a broad biodiversity
development	perspective; in particular, they are heavily biased towards
	vertebrates, which make up only 0.5% of the world's species. The
	LBII can report on both species-richness and mean abundance, and
	is being developed further to also report on geographic range rarity
	(endemism). LBII is strongly complementary to the proposed
	Biodiversity Habitat Index (Target 5), which focuses on the overall
	diversity of a larger region rather than the average local diversity
	within the region. LBII was first proposed in 2005 (Scholes & Biggs
	2005 Nature 434:45-49) but the data needed to make it operational
	have only now been brought together.
Probability of continued	High: PREDICTS team have a new 3-year grant from a UK Research
development	Council to further develop the framework, and also have the
	capacity to expand the current database and analyses further.

### Indicator/dataset description

The Local Biodiversity Intactness Index (LBII) estimates how much of a terrestrial site's original biodiversity remains in the face of human land use and related pressures. Because LBII relates to site-level biodiversity, it can be averaged and reported for any larger spatial scale (e.g., countries, biodiversity hotspots or biomes as well as globally) without additional assumptions, and related to socioeconomic data (e.g., Human Development Index). A purpose-collated taxonomically-representative global database of existing biodiversity survey data is analysed using mixed-effects statistical models to estimate effects of land use and related pressures on site-level biodiversity and compositional similarity to intact ecological assemblages. Model estimates are then applied to maps of land use and other pressures to estimate the spatial pattern of biotic intactness. With the advent of global, annual, fine-scale land-use data, LBII can report annually and at fine resolution. LBII is both cost-effective and scientifically rigorous.

### Scientific robustness (including peer review)

The modelling, mapping and projection approaches at the core of the LBII were published as a peerreviewed Article in *Nature* in 2015 (Newbold et al. Nature 520:45-50) using coarse-scale (0.5 degree) land-use data. Models of land-use effects on compositional similarity are currently in review (Newbold et al. Ecography); LBII is estimated by combining these two kinds of model. Several other related papers are published (Newbold et al. 2014 Proc R Soc B 281:20141371), in press (De Palma et al. 2015 J Appl Ecol in press) or currently undergoing peer review. A peer-reviewed description of the database underpinning the analysis has already been published (Hudson et al. 2014 Ecol & Evol 4:4701-4735), and a full public release of the database is currently in preparation.
### 3.6.5. Aichi Target 13

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

In addition to the potential indicators listed in 3.2.11, 3.2.12 and 3.2.13, efforts are ongoing with the IUCN Conservation Genetics Specialist Group (CGSG) and the EU-Funded ConGRESS project to develop indicators for monitoring genetic erosion using widely used molecular data (e.g. Hoban et al 2014, doi: 10.1111/eva.12197). The aim is to identify a robust and easily applied indicator that can nevertheless be used to measure changes in genetic diversity over short timescales yet that is sensitive enough to detect demographic declines and other forms of erosion with modest sample sizes. Such an indicator can be applied to all species mentioned in the text of Target 13. CGSG will seek to assess candidate indicators in the coming and make recommendations for application to current and future molecular datasets.

# 4. Conclusions

## 4.1. Overview of the gaps identified

## 4.1.1. Aichi Biodiversity Target Gaps

The review and analysis of the global indicators brought together under the BIP identified a number of gaps in relation to the Aichi Targets and their corresponding Elements. At the Aichi Target level there are three Targets (2, 3 and 15) for which there are currently no indicators available. Reasons for the lack of indicators for these Targets to date, include:

- 1) There were no indicators developed under the pre-2010 BIP that could be taken forward to monitor progress towards these Targets.
- 2) Few resources have been made available for identifying and developing new global indicators for these Aichi Targets.
- 3) In some cases these Targets deal with:
  - a. Relatively new and emerging biodiversity-related subjects (resilience).
  - b. Subjects for which there is ongoing debate around classification and definition. For example, what exactly is meant by the incorporation of biodiversity values?
  - c. Monitoring implementation through Strategies, planning processes and reporting (Target 2). In many cases the reporting processes or actions are still under development (i.e. national accounting systems) and/or not currently undertaken across all Parties to the CBD.
- 4) Potential data for indicators is collected outside the typical biodiversity sector or is normally collected at the sub-global level (subsidies).
- 5) The need for global indicators for these biodiversity-related subjects has not been well communicated to organisations/institutions that could potentially produce global indicators, particularly across different sectors.

### 4.1.2. Gaps at finer resolution

The review of the current indicators brought together under the BIP at the Aichi Target Element level revealed that there are no indicators available for more than half of the individual Elements (29 of the 54). In addition, if low scoring indicators are disregarded then five additional gaps would arise due to low alignment, three due to low temporal relevance and three due to low spatial coverage. It is important to note that whilst the global indicators available under the BIP for an Aichi Target Element may score low for alignment, temporal relevance and spatial coverage, these indicators are still useful in monitoring progress towards the Target. The identification of alignment gaps clearly indicates the need to identify additional indicators that can be brought into the suite of global indicators to provide a more complete story of progress towards the Aichi Target/Target Element.

In instances where gaps have been identified in temporal relevance or spatial coverage, efforts should be focussed on identifying opportunities to improve the temporal or spatial coverage of the indicators as sometimes these low scores are the result of limited resources. However, if opportunities do not exist to support improvements to the spatial and temporal coverage of these indicators, then additional indicators should be identified that can be used in conjunction with these indicators in order to better monitor progress towards achievement of the Aichi Target Elements.

# 4.2. Issues for consideration by the AHTEG

In all, the indicators brought together under the BIP provide a good framework from which to monitor progress towards the Strategic Plan for Biodiversity 2011-2020. There is at least one global indicator available for 17 of the 20 Aichi Biodiversity Targets at present. This review, through its analysis of indicator gaps and review of potential indicators to fill these gaps, has highlighted the following issues for consideration by the Ad Hoc Technical Expert Group on Indicators for the Strategic Plan for Biodiversity 2011-2020.

# It is important to ensure the continued production and enhancement of the indicators brought together under the BIP

The existing indicators brought together under the BIP have proved extremely useful in monitoring global progress towards the Strategic Plan for Biodiversity 2011-2020. However, very few of the indicators have sufficient long-term resourcing mechanisms in place. Lack of resources are acting to restrict the spatial coverage or number of planned data points for a number of the indicators. This was clearly highlighted where the existing indicators scored low for their spatial coverage and temporal relevance to the Strategic Plan in this review (see Table **2.4**). There are also 12 BIP indicators which are currently classified as inactive, meaning they were not been updated for use in GBO-4 or the 2014 Aichi Passport.

As demonstrated in this review, a number of the indicators can be disaggregated to monitor trends towards multiple Aichi Biodiversity Targets, notably the *Red List Index* and the *Living Planet Index*. Efforts should be invested in ensuring all indicators under the BIP are utilised to their full potential for monitoring across Aichi Biodiversity Targets.

There needs to be a sustained effort to ensure adequate resources are available for the going maintenance and enhancement of the existing indicator set to ensure it is continued to be utilised to its full potential for monitoring progress towards the Strategic Plan for Biodiversity.

### There should be a focus on identifying indicators for Aichi Biodiversity Targets 2, 3 and 15

In decision XI/3, Parties to the CBD made the request to 'further develop global indicators identified in annex I ... with a view to ensuring that each Aichi Biodiversity Target can be monitored by at least one global indicator by 2014, taking into account indicators that are already in use by, or relevant to, other conventions, regional agreements and processes.' For this request to be met, is important that emphasis is placed on identifying indicators for Aichi Biodiversity Targets 2, 3 and 15.

As part of this review potential indicators were identified to fill gaps. It is important to note that these potential indicators, identified under resources available, serve as a starting point in identifying indicators to fill gaps. Subject to AHTEG recommendations, further emphasis could be placed on liaising with the expert communities operating in these biodiversity areas to identify more existing indicators/datasets or to examine opportunities for developing new indicators that have high alignment to these Aichi Biodiversity Targets.

The following potential indicators were identified through this review for these Aichi Target Gaps:

### Aichi Target 2

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Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
<b>2i: Integration of biodiversity in</b> <b>Poverty Reduction Strategy Papers</b> Analysing the extent to which biodiversity and ecosystem services are contemplated in Poverty Reduction Strategy Papers (PRSPs) provides insights about their integration into development and poverty reduction strategies.	В	2.1: High	Low	Good
<b>2ii: Investment in Environmental</b> <b>Impact Assessments (EIAs)</b> Measuring investment in EIA from international donors can be used as a proxy for the wider application of EIAs.	A	2.2: Low	High	Good
<b>2iii: Number of research studies</b> <b>involving economic evaluation</b> This indicator represents the efforts of the scientific community to measure the economic value of biodiversity.	В	2.4: Low	High	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

### Aichi Target 3

Potential Indicator	Development category*	Alignment to Aichi Target Element	Temporal relevance to Strategic Plan	Spatial coverage
<b>3i: Government financial transfers</b> <b>to fisheries</b> This indicator shows the financial support paid to the fisheries sector by government.	В	3.1: Low	High	Moderate
<b>3ii: Financing reported for REDD+</b> This indicator measures the total finance reported for REDD+, a positive incentive for conservation and sustainable use.	В	3.2: High	High	Good
<b>3iii: Funding towards institutional</b> <b>capacity building in fisheries</b> This indicator measures international financial flows committed to projects that support institutional capacity building in fisheries.	A	3.2: Low	High	Good

<b>3iv: Instruments used for</b>	В	3.2: High	High	Good
environmental policy and natural				
resource management				
This database contains information				
on environmental policy instruments				
and could be used to show trends in				
biodiversity related instruments.				
<b>3v: OECD support to agriculture</b>	В	3.2: Low	High	Good
(produced and consumer support				
estimates)				
This database measures support to				
agriculture.				
<b>3vi: Tax expenditures for fossil fuels</b>	В	3.2: Medium		
This database measures government				
support for the production and				
consumption of fossil fuels.				
<b>3vii: World Trade Organisation</b>	В	3.2: Medium	High	Good
'green box' agricultural subsidies				
This indicator focuses on the				
permitted subsidies that are				
expected to be the least harmful or				
beneficial to biodiversity while				
allowing the financial development				
of developing countries.				
* Catagorias autlined in the indicative l	ist of indicators fo	"the Ctreterie D	an far Diadiuara	

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

### Aichi Target 15

Potential Indicator	Development category*	Alignment to Aichi Target	Temporal relevance to Strategic Plan	Spatial coverage
<ul> <li>15i: Area of restoration projects</li> <li>in the Global Restoration</li> <li>Network Database</li> <li>This indicator measures the area</li> <li>of active restoration projects</li> <li>included in The Global Restoration</li> <li>Network (GRN) Database.</li> </ul>	В	15.2: Low	-	Good

\* Categories outlined in the indicative list of indicators for the Strategic Plan for Biodiversity 2011-2020 (decision XI/3).

Only one potential indicator was identified for Aichi Target 15. Particular challenges were experienced in identifying potential indicators for this Aichi Target; these include the difficulty of measuring improvements in ecosystem resilience and the geographic variability in what is considered a 'degraded' ecosystem.

### Opportunities exist for enhancing the global indicator suite more generally

Through this review, potential indicators where identified to fill gaps for Aichi Targets 2, 3 and 15 and for gaps identified at a finer resolution: Aichi Target Element Gaps and instances where indicators are available but alignment, temporal relevance or spatial coverage gaps exist.

This review identified 50 potential new indicators, six inactive BIP indicators and 11 disaggregated BIP indicators. 21 of these indicators were categorised as ready for global use. 14 of these indicators were used in the GBO-4 extrapolation analysis (Tittensor et al. 2014) to supplement the indicators available across the Aichi Targets.

As these indicators require no further development, there is the opportunity to incorporate these identified 'Category A' indicators into the BIP, enhancing the suite of indicators available for monitoring progress across the Strategic Plan for Biodiversity 2011-2020. Under this potential 'low cost' option the number of Aichi Target Elements with no global indicators would drop from 29 to 20 (Figure 4.1).

This potential 'quick win' option would require some resources to technically review the additional indicators, ensuring they complement existing indicators and do not present conflicting messages. Resources would also be required to formulate Partnership agreements and ensure the institutions/organisations responsible for the indicators/datasets who would be willing to contribute these indicators and regular indicator updates in line with the 'Guidance for new BIP indicators': <a href="http://www.bipindicators.net/LinkClick.aspx?fileticket=48KdsYjZFaw%3d&tabid=158&mid=1575">http://www.bipindicators.net/LinkClick.aspx?fileticket=48KdsYjZFaw%3d&tabid=158&mid=1575</a>



*Figure 4.1*: The number of indicators by Aichi Target Element if potential indicators from Category A are used together with the BIP indicator suite.