Key Knowledge for Successful Biodiversity Indicators

- IAS were primary drive of category change
- U.S. Forest Specialists (96)
- U.S. Grassland Specialists (24)
- U.S. Aridland Specialists (17)
- Europe Forest Specialists (29)
- Europe Farmland Specialists (36)
- All Specialists (202)

- Critical
- Critical-maintained
- Endangered
- Endangered-maintained
- Extinct
- Not at risk
- Unknown

- 7%
- 1%
- 10%
- 3%
- 9%
- 34%
- 36%
- 5%
- 1%
- 8%
- 2%
- 11%
- 38%
- 35%
- 12%
- 1%
- 16%
- 4%
- 40%

www.bipindicators.net
This document is designed as a quick reference guide for the development of successful biodiversity indicators. It complements the document ‘Guidance for National Biodiversity Indicator Development and Use’ which provides more detailed information and examples.

This has been produced as a product of the Biodiversity Indicators Partnership (BIP) and as a contribution to the NBSAP Forum, building on the capacity development experience of UNEP-WCMC.

Further information
This document is a product of the Biodiversity Indicators Partnership and a contribution to the NBSAP Forum.

For more information, resources and assistance for developing biodiversity indicators visit www.bipindicators.net or contact support@bipindicators.net.

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Top tips for developing successful biodiversity indicators

Indicators should be chosen to meet the needs of specific users. Stakeholders can differ widely in their priorities, interests, awareness and understanding, and may want answers to different questions for different reasons.

Since indicators are purpose-dependent, their development or selection should start with identifying the issue or decision-making need that the indicator will address. Describing this need in the form of a ‘key question’ helps to guide indicator selection and communication.

When selecting and presenting indicators think about the ‘story’ or narrative that you want to tell the user about the subject. Creative thinking combined with scientific rigour may help identify possible indicators in order to use, present and combine data sets in novel ways, while ensuring their scientific validity and appropriateness.

It is important to understand your data - their strengths, their limitations, and where they have come from. Transparency of methodologies is crucial for scientific credibility and to ensure the indicator can be produced consistently.

There may be relevant objectives and targets, that have already been agreed, which could be scattered across a wide variety of sectors.

A conceptual model can help to clarify the subject being addressed and aids in the selection and communication of indicators.

Indicators are part of a process and should lead on to informed decisions - they are not ends in themselves. Indicators always need some analysis and interpretation of what they are indicating. Communication must be appropriate to the target audience, their reason for interest and their familiarity with the subject.

An indicator fact sheet can be a useful tool to guide the development of an indicator and helps others to continue its production in the future.

There are almost always some relevant data available to start producing biodiversity indicators. The same data can be used in an indicator for multiple purposes. Consistency is essential between datasets, and also between years in the same dataset, to make valid comparisons between different points in time.

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Biodiversity Indicators Partnership

What is a biodiversity indicator?

The term ‘biodiversity indicator’, as used in this document and by the Convention on Biological Diversity (CBD), covers more than direct measures of biodiversity itself, such as species populations and extent of ecosystems. It also covers actions to ensure biodiversity conservation and sustainable use, such as the creation of protected areas and regulation of the harvesting of species, and pressures or threats to biodiversity such as habitat loss.

What is the difference between a target and an indicator?

A target can be defined as a specified value or level of performance of something that is to be achieved or maintained. It may be for a predetermined point in time (i.e. achieve ‘x’ by ‘y’ date). An indicator is a measure based on verifiable data that conveys information about more than itself. It might be used to track progress towards a target. Some useful definitions are given in the box to the right.

A key distinction between targets and indicators is that, unlike targets, indicators are not SMART. Indicators are not time-bound, nor should they include a specific value to be achieved.

For example:
An example of a national target might be to increase terrestrial protected area coverage from 5% of the country to 15% by 2020.

Four indicator names have been suggested for this target:
1. 15% terrestrial protected area coverage
2. Increase in protected area coverage
3. Protected area coverage
4. Percentage protected area coverage

Indicator name 1 is not an indicator, because it includes a value (15%) and so this has been confused with the target. Indicator name 2 is not a good indicator because it defines that the value of the indicator should increase, and again has been confused with the target. Indicator name 3 is an acceptable indicator, but indicator name 4 could be considered a better indicator because it includes the units of measurement.

Important Definitions:

A measure: a standard unit used to express size, amount or degree
An indicator: a measure based on verifiable data that conveys information about more than itself
An index: a numerical scale used to compare variables with one another or with some reference number

Who develops biodiversity indicators – and why?

Who develops indicators?
Indicators may be developed by government agencies, NGOs, consultancies, universities, research institutions or a combination of these.

Who uses biodiversity indicators?
Indicators can be used by national and regional government agencies, the media, NGOs, universities, research institutions, and even commercial consultancies.

Uses of indicators:

● to help understand the current and past status of biodiversity, and why it may be changing
● to help decide on the most appropriate goals, policies and actions to address an issue
● to raise awareness about an issue through different communication channels and means
● to put the issue and responses into context
● to help assess the progress, success and effectiveness of policy decisions and actions taken to address an issue as part of adaptive management
● to track progress towards global, regional and national targets
What is a successful indicator?

- Scientifically valid -
  a) there is an accepted theory of the relationship between the indicator and its purpose, with agreement that change in the indicator does indicate change in the issue of concern;
  b) the data used is reliable and verifiable.
- Based on available data – so that the indicator can be produced regularly over time.
- Responsive to change in the issue of interest.
- Easily understandable –
  a) conceptually, how the measure relates to the purpose,
  b) in its presentation, and
  c) the interpretation of the data.
- Relevant to users’ needs.
- “Championed” by an institution responsible for the indicator’s continued production and communication.
- Used - for measuring progress, early-warning of problems, understanding an issue, reporting, awareness-raising, etc.
The Biodiversity Indicator Development Framework

The Biodiversity Indicator Development Framework is intended to be used as a guide to understand what is involved in producing biodiversity indicators and to help plan the most appropriate development process for each situation.

The framework is divided into three themes:

**Purpose** – actions needed for selecting successful indicators

**Production** – essential to generate indicators

**Permanence** – mechanisms for ensuring indicator continuity and sustainability

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**Identify & consult stakeholders/audience**

**Identify management objectives & targets**

**Determine key questions & indicator use**

**Develop conceptual model**

**Identify possible indicators**

**Gather & review data**

**Calculate indicators**

**Communicate & interpret indicators**

**Test & refine indicators with stakeholders**

**Develop monitoring & reporting systems**
Key knowledge in the steps of the Biodiversity Indicator Development Framework

1. Identify and consult stakeholders and the target audience

This step is important to ensure the indicator best meets stakeholders’ needs, to determine the purpose of the indicator and its audience, to define how simple or complicated the indicator can be and the most appropriate ways of communicating and interpreting it. Different stakeholders can differ hugely in their priorities, interests, awareness and understanding, and may want answers to different questions for different reasons.

Stakeholders should be consulted as early in the indicator development process as possible, and at every appropriate subsequent opportunity. They may have very varying expectations of their level of involvement and from the overall process, so these need to be carefully managed through consultations.

Stakeholders may be direct users of the indicator, those with a broader interest in the issues surrounding it, and those holding relevant data. For example, obvious stakeholders include conservation NGOs, relevant research/university departments, and government agencies responsible for conservation. However, some less obvious stakeholders include government agencies responsible for agriculture, planning or rural development, indigenous groups, and organisations or companies with an important impact on biodiversity such as road construction or energy.

2. Identify management objectives and targets

When biodiversity indicators are developed to support decision making and management, the definition of the purpose and users of such indicators should start with identifying already agreed objectives and targets, which will likely be scattered across a wide variety of sectors. They may be contained in National Biodiversity Strategies and Action Plans (NBSAPs), protected areas system plans, endangered species legislation, forest plans, fisheries policies, water policies, land-use plans and environmental impact legislation. If this step has not identified relevant management objectives and targets then it may need to be combined with the step “Identify and consult stakeholders/audience” to obtain more information to define the purpose of the indicator(s).
3. Determine key questions and indicator use

Indicators are best designed and communicated to help answer users’ key questions. A key question describes what the user or audience for the indicator wants to know about the subject. It helps to define the purpose of the indicator, and since indicators are purpose dependent this is very important and makes the subsequent steps of developing indicators easier. Questions can be very general, but a more specific question gives further guidance for the selection and communication of suitable indicators. One question may require several data sets or indicators. Defining key questions should ideally be an iterative process of consultations with the stakeholders and audience for the indicator(s).

4. Develop a conceptual model

A conceptual model is basically a diagram that represents the main issues of concern and how they are related to each other.

A conceptual model helps to clarify the subject being addressed for all involved and aids in the selection of appropriate and successful indicators. A conceptual model can also guide the communication of the issue and the meaning of the indicators.

The starting point in the production of a conceptual model is the identified key question(s). It may be appropriate to discuss the model with various stakeholders.

5. Identify possible indicators

Both new and existing indicators can help to answer a key question. Their feasibility and sustainability need to be assessed.

Identifying possible new indicators may require a combination of creative thinking and scientific rigour, in order to use, present and combine data sets in novel ways, while ensuring their scientific validity and appropriateness. Data availability and suitability will limit the number of feasible indicators.

It is important to consider indicator presentation and how they can explain and communicate the ‘story’. One indicator will never tell you all you want to know, as it is just indicating another, often more complex, issue.

Indicators should be selected primarily according to countries’ needs, but it is worth considering using tried and tested methodologies, and using indicators that are already produced at a regional or global level.

6. Gather and review data

Data searches will be guided by the key questions and possible indicators. Each potentially useful dataset will need to be reviewed to determine their suitability and relation to the key question(s), and standardised if necessary. Consistency is essential, not only between datasets, but between years in the same dataset, so that valid comparisons can be made between different points in time.

Relevant data may be found in many forms, and in many places – including other sectors. The likelihood of data collection to continue into the future, and the frequency of collection, is important to determine. Collaborations and agreements to support data collection and indicator development can be very useful, but it is very important to ensure that these are clear and, if necessary, formalised.
7. Calculate indicators

Indicator calculation is an iterative process. It is very important to understand the data, such as their strengths, their limitations, and where they have come from. Different indicator calculation methods are likely to vary in their validity as a scientifically-based indicator of the issue of concern, as well as the statistical validity of the use of the data. It is also important to ensure that methodologies used are transparent and clearly recorded, so the indicator can be produced consistently in the future.

8. Communicate and interpret indicators

Indicators are communication tools and need investment in their presentation and explanation. Usually some text accompanies the presentation of an indicator, which may be index-based (e.g. a graph) or spatial (a map). Overall, it is recommended that the communication of indicators be designed in the form of a ‘story’ or narrative about the subject, in response to the key question(s). Exact communication will depend on the target audience, their reason for interest and their familiarity with the subject. Creative thinking is helpful for presenting data to non-specialists or those outside the immediate subject field of the indicator, as it is often necessary to simplify information in order to convey useful messages to a wide audience without losing scientific credibility.

9. Test and refine the indicators with stakeholders

Presenting draft or preliminary indicators allows stakeholders to see how the indicator is progressing, whether it answers their questions, whether it is clearly understood and how it might be used in decision making. Those producing and presenting the indicators should be ready to make changes in response to this feedback. The opinions, or needs, of stakeholder organisations may differ and there are practical limits to the extent to which indicator developers can make changes to accommodate all their needs.

10. Develop monitoring and reporting systems

If valuable biodiversity indicators are identified and chosen for use over time then an investment is required in the monitoring to produce consistent, trustworthy and accessible data, and in a reporting system to enable regular production of the indicator(s). This requires establishing the institutional and technical capacity for this work, and ensuring clear institutional responsibility for its production. An indicator fact sheet can also be a powerful way to guide and support all stages of indicator development and its ongoing production. The more an indicator meets a real decision-making need and is effectively communicated then the greater the likelihood that resources will be found for its continued production.
Questions to answer for successful biodiversity indicator development

Who are the relevant stakeholders, and do they all need to be consulted?

What are the existing biodiversity-relevant management objectives and targets in our country?

What level of data is required for the conceptual model?

Which are the most important or overarching key questions that can be examined with the aid of a conceptual model?

Who should be involved in the definition of the conceptual model?

How will the stakeholders want to use the indicator(s)? E.g. for decision-making, for reporting, for education.

How will the indicator be used?

Who will be using the indicator?

Who is the target audience? Is there more than one? Why are they being targeted? How familiar are they with the subject?

Is there a clear institutional responsibility for the continued production and reporting of the indicator?

Do data collection and monitoring systems or agreements need to be strengthened?

Are the necessary agreements in place to allow the data to be collected and used?

Which are the most important or overarching key questions that can be examined with the aid of a conceptual model?

What are the existing biodiversity-relevant management objectives and targets in our country?

Who wants to know about progress in reaching these objectives and targets?

Who is the target audience? Is there more than one? Why are they being targeted? How familiar are they with the subject?

What other information is available for the indicator subject?

What medium will be used to communicate the indicator? Will there be a printed report, a document on a website, a static or interactive web-page, or a short summary within a larger chapter or report?

What are the key questions that the intended user or audience have about the biodiversity issue?

Can the key questions be made more specific or focused?

How will the indicator be used?

Who will be using the indicator?

What levels of education and familiarity with the subject does the intended audience have?

What are the key questions that the intended user or audience have about the biodiversity issue?

Can the key questions be made more specific or focused?

How will the indicator be used?

Who will be using the indicator?

What levels of education and familiarity with the subject does the intended audience have?

Are there existing indicators that can help to answer the key question(s)?

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How well does each of the potential indicators help to answer the key question(s)?

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Is the relationship between the measure used as an indicator and the indicator’s purpose scientifically supported and easy for the user to understand?

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Are potential reasons for change in the value of the indicator well understood?

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How easily will it be understood by the intended users?

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Are there existing indicators that can help to answer the key question(s)?

Are the methods of data collection and analysis scientifically valid and defensible (considering the conceptual model)?

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Have all the steps for calculating the indicator been documented so that someone without prior experience of the indicator can follow them?

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Who are the relevant stakeholders, and do they all need to be consulted?

What key questions need to be answered?

What level of data is required for the conceptual model?

Which are the most important or overarching key questions that can be examined with the aid of a conceptual model?

What are the existing biodiversity-relevant management objectives and targets in our country?

Who wants to know about progress in reaching these objectives and targets?

Who is the target audience? Is there more than one? Why are they being targeted? How familiar are they with the subject?

What other information is available for the indicator subject?

What medium will be used to communicate the indicator? Will there be a printed report, a document on a website, a static or interactive web-page, or a short summary within a larger chapter or report?

Does the indicator answer the users’ key question(s)?

Is the indicator fit for purpose?

Is the indicator understood in the intended manner by the users?

What improvements could be made to the indicator and its presentation?

Identify & consult stakeholders/audience

Determine key questions & indicator use

Develop conceptual model

Identify management objectives & targets

Identify possible indicators

Gather & review data

Calculate indicators

Communicate & interpret indicators

Test & refine indicators with stakeholders

Develop monitoring & reporting systems

Who are the relevant stakeholders, and do they all need to be consulted?

What questions do the stakeholders want answers to regarding the biodiversity issue of concern?

How will the stakeholders want to use the indicator(s)? E.g. for decision-making, for reporting, for education.

Have the inputs, expectations and outputs of the indicator development process been clearly defined for the stakeholders?

How much ownership and decision-making power are different stakeholders going to have over the choice of indicators?

Which are the most important or overarching key questions that can be examined with the aid of a conceptual model?

What level of data is required for the conceptual model?

Who should be involved in the definition of the conceptual model?

What are the existing biodiversity-relevant management objectives and targets in our country?

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Key Knowledge for Successful Biodiversity Indicators
Key messages for developing and using biodiversity indicators:

Indicators are purpose-dependent – the interpretation or meaning given to the data depends on the purpose or issue of concern.

When selecting and presenting indicators think about the ‘story’ or narrative that you want to tell to the user about the subject.

Their development or selection should start with identifying the issue or decision-making need that the indicator will address. Describing this need in the form of a ‘key question’ helps to guide indicator selection and communication.

An indicator fact sheet helps to guide the development of an indicator and helps others to continue its production in the future.

There are almost always some relevant data available to start producing biodiversity indicators.

Indicators are part of a process and should lead on to informed decisions – they are not ends in themselves.

Understand your data – their strengths, their limitations, and where they have come from.

Presentation of indicators should not be limited to graphs – it could involve maps or a combination of different methods.

The same data can be used in an indicator for multiple purposes.

Indicators always need some analysis and interpretation of what they are indicating.