Guidelines on biodiversity-inclusive Environmental Impact Assessment (EIA)

Abbreviations

CBD	:	Convention on Biological Diversity
EIA	:	Environmental Impact Assessment
EIS	:	Environmental Impact Statement (also EIA report)
EMP	:	Environmental Management Plan
IAIA	:	International Association for Impact assessment
NBSAP	:	National Biodiversity Strategy and Action Plan

Points of departure and purpose these guidelines:

- This document is structured according to the internationally accepted sequence of procedural steps characterizing good practice EIA (e.g. IAIA's principles of EIA best practice – www.iaia.org). This document aims at a better integration of biodiversity-related considerations into the EIA process.
- EIA systems are regularly being evaluated and revised; these guidelines are intended to assist in better incorporating biodiversity-related considerations during such a revision, at which a significant enhancement of the EIA system can be made. This also implies that further elaboration of practical guidelines is needed to reflect the ecological, socio-economic, cultural and institutional conditions for which the EIA system is designed.
- The target audience of this document are those involved in the revision of the EIA system. These are typically national authorities but can also include regional authorities or international agencies applying their own EIA systems.
- The focus of the document is on how to guarantee a biodiversity-inclusive EIA process; it does not provide a technical manual on how to do a biodiversity-inclusive assessment study.
- Screening and scoping are considered critical stages in the EIA process and consequently receive most attention. Screening provides the trigger to start an EIA process; this document pays significant attention on how to integrate biodiversity considerations into the screening process. During scoping relevant impacts are identified resulting in the Terms of Reference for the actual impact study. The scoping stage is considered critical in the process as it defines the issues to be studied and it provides the reference information on which the review of the study results will be based. Scoping and review usually are linked to some form of public information, consultation or participation. During scoping promising alternatives can be identified that may significantly reduce or entirely prevent adverse impacts on biodiversity.

1.1 Stages in the process

For the purpose of these guidelines, the following definition is used for environmental impact assessment (Decision VI/7A):

Environmental impact assessment (EIA) is a process of evaluating the likely environmental impacts of a proposed project or development[1], taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse. Although legislation and practice vary around the world, the fundamental components of an EIA would necessarily involve the following stages:

a. Screening to determine which projects or developments require a full or partial impact assessment study;

[1] The terms project, activity and development are used interchangeably; there is no intended distinction between them.

b. Scoping to identify which potential impacts are relevant to assess (based on legislative requirements, international conventions, expert knowledge and public involvement), to identify alternative solutions that avoid, mitigate or compensate adverse impacts on biodiversity (including the option of not proceeding with the development, finding alternative designs or sites which avoid the impacts, incorporating safeguards in the design of the project, or providing compensation for adverse impacts), and finally to derive terms of reference for the impact assessment;

c. Assessment and evaluation of impacts and development of alternatives, to predict and identify the likely environmental impacts of a proposed project or development, including the detailed elaboration of alternatives;

d. Reporting: the environmental impact statement (EIS) or EIA report, including an environmental management plan (EMP), and a non-technical summary for the general audience.

e. Review of the Environmental Impact Statement (EIS), based on the terms of reference (scoping) and public (including authority) participation.

f. Decision-making on whether to approve the project or not, and under what conditions; and

g. Monitoring, compliance, enforcement and environmental auditing. Monitor whether the predicted impacts and proposed mitigation measures occur as defined in the EMP. Verify the compliance of proponent with the EMP, to ensure that unpredicted impacts or failed mitigation measures are identified and addressed in a timely fashion.

1.2 Biodiversity issues at different stages of environmental impact assessment

(a) Screening

Screening is used to determine which proposals should be subject to EIA, to exclude those unlikely to have harmful environmental impacts and to indicate the level of assessment required. Screening criteria have to include biodiversity measures, or else there is a risk that proposals with potentially significant impacts on biodiversity will be screened out. The outcome of the screening process is a screening decision.

Since legal requirements for EIA may not guarantee that biodiversity will be taken into account, consideration should be given to incorporating biodiversity criteria into existing, or the development of new, screening criteria. Important information for developing screening criteria can be found in National Biodiversity Strategy and Action Plans (NBSAPs). These strategies provide detailed information on conservation priorities and on types and conservation status of ecosystems. Furthermore they describe trends and threats at ecosystem as well as species level and provide an overview of planned conservation activities.

Pertinent questions from a biodiversity perspective. Taking into account the three objectives of the Convention, fundamental questions which need to be answered in an EIA study include:

a. Would the intended activity affect the biophysical environment directly or indirectly in such a manner or cause such biological changes that it will increase risks of extinction of genotypes, cultivars, varieties, populations of species, or the chance of loss of habitats or ecosystems?

b. Would the intended activity surpass the maximum sustainable yield, the carrying capacity of a habitat/ecosystem or the maximum allowable disturbance level of a resource, population, or ecosystem, taking into account the full spectrum of values of that resource, population or ecosystem?

c. Would the intended activity result in changes to the access to, and / or rights over biological resources?

To facilitate the development of screening criteria, the questions above have been reformulated for the three levels of diversity, reproduced in table 1 below.

Table 1 Questions pertinent to screening on biodiversity impacts

Level of diversity	*Conservation of biodiversity*	*Sustainable use of biodiversity*
Genetic diversity	Would the intended activity result in extinction of a population of a localized endemic species of scientific, ecological, or cultural value?	Does the intended activity cause a local loss of varieties/cultivars/breeds of cultivated plants and/or domesticated animals and their relatives, genes or genomes of social, scientific and economic importance?
Species diversity (1)	Would the intended activity cause a direct or indirect loss of a population of a species?	Would the intended activity affect sustainable use of a population of a species?
Ecosystem diversity (1)	Would the intended activity lead, either directly or indirectly, to serious damage or total loss of (an) ecosystem(s), or land-use type(s), thus leading to a loss of ecosystem services of scientific / ecological value, or of cultural value?	Does the intended activity affect the sustainable human exploitation of (an) ecosystem(s) or land-use type(s) in such manner that the exploitation becomes destructive or non-sustainable (i.e. the loss of ecosystem services of social and/or economic value)?

(1) The level at which "population" is to be defined depends on the screening criteria used by a country. For example, the conservation status of species can be assessed within the boundaries of a country (for legal protection), or can be assessed globally (IUCN Red Lists). Similarly, the scale at which ecosystems are defined depends on the definition of criteria in a country, and should take into account the principles of the ecosystem approach.

Types of existing screening mechanisms include:

- Positive lists identifying projects requiring EIA (inclusion lists). A disadvantage of this approach is that the significance of impacts of projects varies substantially depending on the nature of the receiving environment, which is not taken into account. A few countries use (or have used) negative lists, identifying those projects not subject to EIA (exclusion lists). Both types of lists should be reassessed to evaluate their inclusion of biodiversity aspects;
- Lists identifying those geographical areas where important biodiversity is found, in which projects would require EIA. The advantage of this approach is that the emphasis is on the sensitivity of the receiving environment rather than on the type of project;
- Expert judgement (with or without a limited study, sometimes referred to as *initial environmental examination* or *preliminary environmental assessment*). Biodiversity expertise should be included in expert teams; and
- A combination of a list plus expert judgement to determine the need for an EIA.

A screening decision defines the appropriate **level of assessment**. The result of a screening decision can be that:

- The proposed project is 'fatally flawed' in that it would be inconsistent with international or national conventions, policies or laws. It is advisable not to pursue the proposed project. Should the proponent wish to proceed at his/her risk, an EIA would be required;
- An EIA is required (often referred to as category A projects);

- A limited environmental study is sufficient because only limited environmental impacts are expected; the screening decision is based on a set of criteria with quantitative norms or threshold values (often referred to as category B projects);
- There is still uncertainty whether an EIA is required and an initial environmental examination has to be conducted to determine whether a project requires EIA or not; or
- The project does not require an EIA.

Biodiversity-inclusive screening criteria set out circumstances in which EIA is justified on the basis of biodiversity considerations. They may relate to:

- categories of activities known to cause biodiversity impacts, including thresholds referring to size of the intervention area and/or magnitude, duration and frequency of the activity;
- the magnitude of biophysical change that is caused by the activity; or
- maps indicating areas important for biodiversity, often with their legal status.

A suggested approach to the development of biodiversity-inclusive screening criteria, combining the above types of criteria, includes the following steps: (i) design a biodiversity screening map indicating areas in which EIA is required; (ii) define activities for which EIA is required; (iii) define threshold values to distinguish between full, limited/undecided or no EIA (see appendix 1 for a generic set of screening criteria). The suggested approach takes account of biodiversity values (including valued ecosystem services) and activities that might impact drivers of change of biodiversity.

If possible, biodiversity-inclusive screening criteria should be integrated with the development (or revision) of a National Biodiversity Strategy and Action Plan. This process can generate valuable information such as a national spatial biodiversity assessment, including conservation priorities and targets, which can guide the further development of EIA screening criteria.

Step 1: According to the principles of the ecosystem approach, a biodiversity screening map is designed, indicating important ecosystem services (replacing the concept of sensitive areas – see appendix 2). The map is based on expert judgement and has to be formally approved.

Suggested categories of geographically defined areas, related to important ecosystem services, are:

- *Areas with **important regulating services in terms of maintaining biodiversity**:*
    1. Protected areas: depending on the legal provisions in a country these may be defined as areas in which no human intervention is allowed, or as areas where impact assessment at an appropriate level of detail is always required;
    2. Areas containing threatened ecosystems outside of formally protected areas, where certain classes of activities (see step 2) would always require an impact assessment at an appropriate level of detail;
    3. Areas identified as being important for the maintenance of key ecological or evolutionary processes, where certain classes of activities (see step 2) would always require an impact assessment at an appropriate level of detail;
    4. Areas known to be habitat for threatened species, which would always require an impact assessment at an appropriate level of detail.
- Areas with ***important regulating services for maintaining natural processes with regard to soil, water, or air***, where impact assessment at an appropriate level of detail is always required. Examples can be wetlands, highly erodable or mobile soils protected by vegetation (e.g. steep slopes, dunefields), forested areas, coastal or offshore buffer areas, etc.
- Areas with ***important provisioning services,*** where impact assessment at an appropriate level of detail is always required. Examples can be extractive reserves, lands and waters

traditionally occupied or used by indigenous and local communities, fish breeding grounds, etc.

- Areas with ***important cultural services***, where impact assessment at an appropriate level of detail is always required. Examples can be scenic landscapes, heritage sites, sacred sites, etc.
- Areas with ***other relevant ecosystem services*** (such as flood storage areas, groundwater recharge areas, catchment areas, areas with valued landscape quality, etc.); the need for impact assessment and/or the level of assessment is to be determined (depending on the screening system in place).
- All other areas: no impact assessment required from a biodiversity perspective (an EIA may still be required for other reasons).

Step 2: Define activities for which impact assessment may be required from a biodiversity perspective. The activities are characterized by the following direct drivers of change:

- Change of land-use or land cover, and underground extraction: above a defined area affected, EIA always required, regardless of the location of the activity - define thresholds for level of assessment in terms of surface (or underground) area affected.
- Fragmentation, usually related to linear infrastructure. Above a defined length, EIA always required, regardless of the location of the activity – define thresholds for level of assessment in terms of the length of the proposed infrastructural works.
- Emissions, effluents or other chemical, thermal, radiation or noise emissions - relate level of assessment to the ecosystem services map.
- Introduction or removal of species, changes to ecosystem composition, ecosystem structure, or key ecosystem processes responsible for the maintenance of ecosystems and ecosystem services (see appendix 3 for an indicative listing) - relate level of assessment to ecosystem services map.

It should be noted that these criteria only relate to biodiversity and serve as an add-on in situations where biodiversity has not been fully covered by the existing screening criteria.

Determining norms or threshold values for screening is partly a technical and partly a political process the outcome of which may vary between countries and ecosystems. The technical process should at least provide a description of:

(a) Categories of activities that create direct drivers of change (extraction, harvest or removal of species, change in land-use or cover, fragmentation and isolation, external inputs such as emissions, effluents, or other chemical, radiation, thermal or noise emissions, introduction of alien, invasive or genetically modified organisms, or change in ecosystem composition, structure or key processes), taking into account characteristics such as: type or nature of activity, magnitude, extent/location, timing, duration, reversibility/irreversibility, irreplaceability, likelihood, and significance; possibility of interaction with other activities or impacts;

(b) Where and when: the area of influence of these direct drivers of change can be modelled or predicted; the timing and duration of influence can be similarly defined;

(c) A map of valued ecosystem services (including maintenance of biodiversity itself) on the basis of which decision makers can define levels of protection or conservation measures for each defined area. This map is the experts' input into the definition of categories on the biodiversity screening map referred to above under step 1.

(b) Scoping

Scoping is used to define the focus of the impact assessment study and to identify key issues, which should be studied in more detail. It is used to derive terms of reference (sometimes referred to as guidelines) for the EIA study and to set out the proposed approach and methodology. Scoping also enables the competent authority (or EIA professionals in countries where scoping is voluntary) to:

(a) Guide study teams on significant issues and alternatives to be assessed, clarify how they should be examined (methods of prediction and analysis, depth of analysis), and according to which guidelines and criteria;

(b) Provide an opportunity for stakeholders to have their interests taken into account in the EIA;

(c) Ensure that the resulting environmental impact statement is useful to the decision maker and is understandable to the public.

During the scoping phase, promising alternatives can be identified for in-depth consideration during the EIA study.

Consideration of mitigation and/or enhancement measures: The purpose of mitigation in EIA is to look for ways to achieve the project objectives while avoiding negative impacts or reducing them to acceptable levels. The purpose of enhancement is to look for ways of optimizing environmental benefits. Both mitigation and enhancement of impacts should strive to ensure that the public or individuals do not bear costs, which are greater than the benefits that accrue to them.

Remedial action can take several forms, i.e. ***avoidance*** (or prevention), ***mitigation*** (by considering changes to the scale, design, location, siting, process, sequencing, phasing, management and/or monitoring of the proposed activity, as well as restoration or rehabilitation of sites), and ***compensation*** (often associated with residual impacts after prevention and mitigation). A 'positive planning approach' should be used, where avoidance has priority and compensation is used as a last resort measure. One should acknowledge that compensation will not always be possible: there are cases where it is appropriate to reject a development proposal on grounds of irreversible damage to, or irreplaceable loss of, biodiversity.

Practical evidence with respect to mitigation suggests that:

(a) Timely and ample attention to mitigation and compensation, as well as the interaction with society, will largely reduce the risk of negative publicity, public opposition and delays, including associated costs. Specialist input on biodiversity can take place prior to initiating the legally required EIA process, as a component of the project proposal. This approach improves and streamlines the formal EIA process by identifying and avoiding, preventing or mitigating biodiversity impacts at the earliest possible stage of planning;

(b) Mitigation requires a joint effort of the proponent, planners, engineers, ecologists and other specialists, to arrive at the best practicable environmental option;

(c) Potential mitigation or compensation measures have to be included in an impact study in order to assess their feasibility; consequently they are best identified during the scoping stage;

(d) In project planning, it has to be kept in mind that it may take time for effects to become apparent.

The following sequence of questions provides an example of the kind of information that should be requested in the terms of reference of an impact study if the project screening suggests that the proposed activity is likely to have adverse impacts on biodiversity. It should be noted that this list of steps represents an iterative process. Scoping and impact study are two formal rounds of iteration; during the study further iterative rounds may be needed, for example when alternatives to the proposed project design have to be defined and assessed.

(a) Describe the type of project, and define each project activity in terms of its nature, magnitude, location, timing, duration and frequency;

(b) Define possible alternatives, including "no net biodiversity loss" or "biodiversity restoration" alternatives (such alternatives may not be readily identifiable at the outset of impact study, and one would need to go through the impact study to determine such alternatives). Alternatives include location alternatives, scale alternatives, siting or layout alternatives, and/or technology alternatives;

(c) Describe expected biophysical changes (in soil, water, air, flora, fauna) resulting from proposed activities or induced by any socio-economic changes caused by the activity;

(d) Determine the spatial and temporal scale of influence of each biophysical change, identifying effects on connectivity between ecosystems, and potential cumulative effects;

(e) Describe ecosystems and land-use types lying within the range of influence of biophysical changes;

(f) Determine, for each of these ecosystems or land-use types, if biophysical changes are likely to have adverse impacts on biodiversity in terms of composition, structure (spatial and temporal), and key processes. Give confidence levels in predictions, and take into account mitigation measures. Highlight any irreversible impacts and any irreplaceable loss;

(g) For the affected areas, collect available information on baseline conditions and any anticipated trends in biodiversity in the absence of the proposal;

(h) Identify, in consultation with stakeholders, the current and potential ecosystem services provided by the affected ecosystems or land-use types and determine the values these functions represent for society (see Box 1). Give an indication of the main beneficiaries and those adversely affected from an ecosystem services perspective, focusing on vulnerable stakeholders;

(i) Determine which of these services will be significantly affected by the proposed project, giving confidence levels in predictions, and taking into account mitigation measures. Highlight any irreversible impacts and any irreplaceable loss;

(j) Define possible measures to avoid, minimize or compensate for significant damage to, or loss of, biodiversity and/or ecosystem services; define possibilities to enhance biodiversity. Make reference to any legal requirements;

(k) Evaluate the significance of residual impacts, i.e. in consultation with stakeholders define the importance of expected impacts for the alternatives considered. Relate the importance of expected impacts to a reference situation, which may be the existing situation, a historical situation, a probable future situation (e.g. the 'without project' or 'autonomous development' situation), or an external reference situation. When determining importance (weight), consider geographic importance of each residual impact (e.g. impact of local/regional/national/continental/global importance) and indicate its temporal dimension.

(l) Identify necessary surveys to gather information required to support decision making. Identify important gaps in knowledge;

(m) Provide details on required methodology and timescale.

One should bear in mind that not implementing a project may in some cases also have adverse effects on biodiversity. In rare cases the adverse effects may be more significant than the impacts of a proposed activity (e.g. projects counteracting degradation processes).

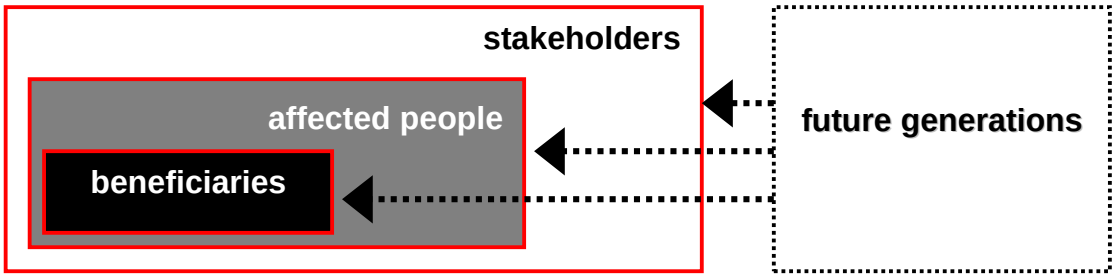
BOX 1: STAKEHOLDERS & PARTICIPATION

Impact assessment is concerned with (i) information, (ii) participation and (iii) transparency of decision making. Public involvement consequently is a prerequisite for effective EIA and can take place at different levels: informing (one-way flow of information), consulting (two-way flow of information), or

"real" participation (shared analysis and assessment). In all stages of EIA public participation is relevant. The legal requirements for and the level of participation differ among countries, but it is generally accepted that public consultation at the scoping and review stage are essential; participation during the assessment study is generally acknowledged to enhance the quality of the process.

With respect to biodiversity, relevant stakeholders in the process are:

- Beneficiaries of the project - target groups making use of, or putting a value to, known ecosystem services which are purposefully enhanced by the project;
- Affected people – i.e. those people that experience, as a result of the project, intended or unintended changes in ecosystem services that they value;
- General stakeholders – i.e. formal or informal institutions and groups representing either affected people or biodiversity itself.
- Future generations - 'absent stakeholders', i.e. those stakeholders of future generations, who may rely on biodiversity around which decisions are presently taken.



There is a number of potential constraints to effective public participation. These include:

- Deficient identification of relevant stakeholders may make public involvement ineffective;
- Poverty: involvement requires time spent away from income-producing tasks;
- Rural settings: increasing distance makes communication more difficult and expensive;
- Illiteracy: or lack of command of non-local languages, can inhibit representative involvement if print media are used;
- Local values/culture: behavioural norms or cultural practice can inhibit involvement of some groups, who may not feel free to disagree publicly with dominant groups;
- Languages: in some areas a number of different languages or dialects may be spoken, making communication difficult;
- Legal systems: may be in conflict with traditional systems, and cause confusion about rights and responsibilities for resources;
- Interest groups: may have conflicting or divergent views, and vested interests;
- Confidentiality: can be important for the proponent, who may be against early involvement and consideration of alternatives.

An analysis of current impact assessment practice[2] has provided a number of practical recommendations when addressing biodiversity-related issues:

(a) Beyond the focus on protected species and protected areas, further attention needs to be given to (i) sustainable use of ecosystem services; (ii) ecosystem level diversity; (iii) non-protected biodiversity; and (iv) ecological processes and their spatial scale.

(b) The terms of reference should be unambiguous, specific and compatible with the ecosystem approach; too often the terms of reference are too general and impractical;

(c) In order to provide a sound basis for assessing the significance of impacts, baseline conditions must be defined and understood and quantified where possible. Baseline conditions are dynamic, implying that present and expected future developments if the proposed project is not implemented (autonomous development) need to be included;

[2] See document UNEP/CBD/SBSTTA/9/INF/18

(d) Field surveys, quantitative data, meaningful analyses, and a broad, long-term perspective enabling cause-effect chains to be tracked in time and space are important elements when assessing biodiversity impacts. Potential indirect and cumulative impacts should be better assessed.

(e) Alternatives and/or mitigation measures must be identified and described in detail, including an analysis of their likely success and realistic potential to offset adverse project impacts.

(f) Guidance for scoping on biodiversity issues in EIA needs to be developed at country-level, but should, where appropriate, also consider regional aspects to prevent transboundary impacts.

(g) Guidance for determining levels of acceptable change to biodiversity needs to be developed at country level to facilitate decision-making.

(h) Guidance on assessing and evaluating impacts on ecosystem processes, rather than on composition or structure, need to be developed at country level. The conservation of ecosystem processes, which support composition and structure, requires a significantly larger proportion of the landscape than is required to represent biodiversity composition and structure.

(i) Capacity development is needed to effectively represent biodiversity issues in the scoping stage; this will result in better guidelines for the EIA study.

(c) Assessment and evaluation of impacts, and development of alternatives

EIA should be an iterative process of assessing impacts, re-designing alternatives and comparison. The main tasks of impact analysis and assessment are:

(a) Refinement of the understanding of the nature of the potential impacts identified during screening and scoping and described in the terms of reference. This includes the identification of indirect and cumulative impacts, and of the likely cause–effect chains.

(b) Identification and description of relevant criteria for decision-making can be an essential element of this stage;

(c) Review and redesign of alternatives; consideration of mitigation and enhancement measures, as well as compensation of residual impacts; planning of impact management; evaluation of impacts; and comparison of the alternatives; and

(d) Reporting of study results in an environmental impact statement (EIS) or EIA Report.

Assessing impacts usually involves a detailed analysis of their nature, magnitude, extent and duration, and a judgement of their significance, i.e., whether the impacts are acceptable to stakeholders and society as a whole, require mitigation and/or compensation, or are unacceptable.

Available biodiversity information is usually limited and descriptive, and cannot be used as a basis for numerical predictions. There is a need to develop biodiversity criteria for impact evaluation and measurable standards or objectives against which the significance of individual impacts can be evaluated. The priorities and targets set in the National Biodiversity Strategy and Action Plan process can provide guidance for developing these criteria. Tools will need to be developed to deal with uncertainty, including criteria on using risk assessment techniques, precautionary approach and adaptive management.

A number of practical lessons with respect to the study process have emerged:

(a) Allow for enough survey time to take seasonal features into account, where confidence levels in predicting the significance of impacts are low without such survey.

(b) Focus on processes and services which are critical to human wellbeing and the integrity of ecosystems. Explain the main risks and opportunities for biodiversity.

(c) Take an ecosystem approach and actively seek information from relevant stakeholders and indigenous and local communities. Address any request from stakeholders for further information and/or investigation adequately. This does not necessarily imply that all requests need to be honoured; however, clear reasons should be provided where requests are not honoured.

(d) Consider the full range of factors affecting biodiversity. These include direct drivers of change associated with a proposal (e.g. land conversion, vegetation removal, emissions, disturbance, introduction of invasive alien species or genetically modified organisms, etc.) and, to the extent possible, indirect drivers of change, including demographic, economic, socio-political, cultural and technological processes or interventions.

(e) Evaluate impacts of alternatives with reference to the baseline situation. Compare against legal standards, thresholds, targets and/or objectives for biodiversity. Use NBSAPs and other relevant documents for information and objectives. The vision, objectives and targets for the conservation and sustainable use of biodiversity contained in local plans, policies and strategies, as well as levels of public concern about, dependence on, or interest in, biodiversity provide useful indicators of acceptable change.

(f) Take account of cumulative threats and impacts resulting either from repeated impacts of projects of the same or different nature over space and time, and/or from proposed plans, programmes or policies.

(g) Biodiversity is influenced by cultural, social, economic and biophysical factors. Cooperation between different specialists in the team is thus essential, as is the integration of findings, which have bearing on biodiversity.

(h) Provide insight into cause – effect chains. Also explain why certain chains do not need to be studied.

(i) If possible, quantify the changes in biodiversity composition, structure and key processes, as well as ecosystem services. Explain the expected consequences of the loss of biodiversity associated with the proposal, including the costs of replacing ecosystem services if they will be adversely affected by a proposal.

(j) Indicate the legal provisions that guide decision-making. List all types of potential impacts identified during screening and scoping and described in the terms of reference and identify applicable legal provisions. Ensure that potential impacts to which no legal provision applies are taken into account during decision-making.

(d) Reporting: the environmental impact statement (EIS)

The environmental impact statement consist of a (i) technical report with annexes, (ii) an environmental management plan, providing detailed information on how measures to avoid, mitigate or compensate expected impacts are to be implemented, managed and monitored, and (iii) a non-technical summary.

The environmental impact statement is designed to assist:

(a) The proponent to plan, design and implement the proposal in a way that eliminates or minimizes the negative effect on the biophysical and socio-economic environments and maximizes the benefits to all parties in the most cost-effective manner;

(b) The Government or responsible authority to decide whether a proposal should be approved and the terms and conditions that should be applied; and

(c) The public to understand the proposal and its impacts on the community and environment, and provide an opportunity for comments on the proposed action for consideration by decision makers. Some adverse impacts may be wide ranging and have effects beyond the limits of particular habitats/ecosystems or national boundaries. Therefore, environmental management plans and strategies contained in the environmental impact statement should consider regional and transboundary impacts, taking into account the ecosystem approach. The inclusion of a non-technical summary of the EIA, understandable to the interested general audience, is strongly recommended.

(e) Review of the environmental impact statement

The purpose of the review of the environmental impact statement is to ensure that the information for decision makers is sufficient, focused on the key issues, and is scientifically and technically accurate. In addition, the review should evaluate whether:

(a) the likely impacts would be acceptable from an environmental viewpoint;

(b) the design complies with relevant standards and policies, or standards of good practice where official standards do not exist;

(c) all of the relevant impacts, including indirect and cumulative impacts, of a proposed activity have been identified and adequately addressed in the EIA. To this end, biodiversity specialists should be called upon for the review and information on official standards and/or standards for good practice to be compiled and disseminated.

Public involvement, including the full and effective participation of indigenous and local communities, is important in various stages of the process and particularly at this stage. The concerns and comments of all stakeholders are adequately considered and included in the final report presented to decision makers. The process establishes local ownership of the proposal and promotes a better understanding of relevant issues and concerns.

Review should also guarantee that the information provided in the environmental impact statement is sufficient for a decision maker to determine whether the project is compliant with or contradictory to the objectives of the CBD.

The effectiveness of the review process depends on the quality of the terms of reference defining the issues to be included in the study. Scoping and review are therefore complementary stages.

Reviewers should as far as possible be independent and different from the persons/organizations who prepare the environmental impact statement.

(f) Decision-making

Decision-making takes place throughout the process of EIA in an incremental way from the screening and scoping stages to decisions during data-collecting and analysis, and impact prediction, to making choices between alternatives and mitigation measures, and finally the decision to either refuse or authorize the project.

Biodiversity issues should play a part in decision-making throughout. The final decision is essentially a political choice about whether or not the proposal is to proceed, and under what conditions. If rejected, the project can be redesigned and resubmitted. It is desirable that the proponent and the decision-making body are two different entities.

It is important that there are clear criteria for taking biodiversity into account in decision-making, and to guide trade-offs between social, economic and environmental issues including biodiversity. These criteria draw on principles, objectives, targets and standards for biodiversity and ecosystem services contained in international and national, regional and local laws, policies, plans and strategies.

The precautionary approach should be applied in decision-making in cases of scientific uncertainty when there is a risk of significant harm to biodiversity. Higher risks and/or greater potential harm to biodiversity require greater reliability and certainty of information. The reverse implies that the

precautionary approach should not be pursued to the extreme; in case of minimal risk, a greater level of uncertainty can be accepted.

Instead of weighing conservation goals against development goals, the decision should seek to strike a balance between conservation and sustainable use for economically viable, and socially and ecologically sustainable solutions.

(g) Monitoring, compliance, enforcement and environmental auditing

Monitoring and auditing are used to compare the actual outcomes after project implementation has started with those anticipated before implementation. It also serves to verify that the proponent is compliant with the environmental management plan (EMP). The EMP can be a separate document, but is considered part of the environmental impact statement. An EMP usually is required to obtain a permission to implement the project. In a number of countries an EMP is not a legal requirement.

Management plans, programmes and systems, including clear management targets, responsibilities and appropriate monitoring, should be established to ensure that mitigation is effectively implemented, unforeseen negative effects or trends are detected and addressed, and expected benefits (or positive developments) are achieved as the project proceeds. Sound baseline information and/or pre-implementation monitoring is essential to provide a reliable benchmark against which changes caused by the project can be measured. Provision should be made for emergency response measures and/or contingency plans where unforeseen events or accidents could threaten biodiversity. The EMP should define responsibilities, budgets and any necessary training for monitoring and impact management, and describe how results will be reported and to whom.

Monitoring focuses on those components of biodiversity most likely to change as a result of the project. The use of indicator organisms or ecosystems that are most sensitive to the predicted impacts is thus appropriate, to provide the earliest possible indication of undesirable change. Since monitoring often has to consider natural fluxes as well as human-induced effects, complementary indicators may be appropriate in monitoring. Indicators should be specific, measurable, achievable, relevant and timely. Where possible, the choice of indicators should be aligned with existing indicator processes.

The results of monitoring provide information for periodic review and alteration of environmental management plans, and for optimizing environmental protection through good, adaptive management at all stages of the project. Biodiversity data generated by EIA should be made accessible and useable by others and should be linked to biodiversity assessment processes being designed and carried out at the national and global levels.

Provision is made for regular auditing in order to verify the proponent’s compliance with the EMP, and to assess the need for adaptation of the EMP (usually including the proponent’s license). An environmental audit is an independent examination and assessment of a project's (past) performance. It is part of the evaluation of the environmental management plan and contributes to the enforcement of EIA approval decisions.

Implementation of activities described in the EMP and formally regulated in the proponent’s environmental license in practice depends on the enforcement of formal procedures. It is commonly found that a lack of enforcement leads to reduced compliance and inadequate implementation of EMPs. Competent authorities are responsible for enforcing pertinent impact assessment regulations, when formal regulations are in place.

APPENDIX 1: SCREENING CRITERIA FOR BIODIVERSITY INCLUSIVE EIA

This is an indicative set of screening criteria to be further elaborated at country level. It only pertains to biodiversity criteria and should therefore be applied as an add-on to existing screening criteria.

Category A: Environmental impact assessment mandatory for:

- Activities in protected areas (define type and level of protection);
- Activities in threatened ecosystems outside protected areas;
- Activities in ecological corridors identified as being important for ecological or evolutionary processes;
- Activities in areas known to provide important ecosystem services;
- Activities in areas known to be habitat for threatened species;
- Extractive activities or activities leading to a change of land-use occupying or directly influencing an area of at minimum a certain threshold size (land or water, above or underground - threshold to be defined);
- Creation of linear infrastructure that leads to fragmentation of habitats over a minimum length (threshold to be defined);
- Activities resulting in emissions, effluents, and/or other means of chemical, radiation, thermal or noise emissions in areas providing key ecosystem services (areas to be defined)[3];
- Activities leading to changes in ecosystem composition, ecosystem structure or key processes[4] responsible for the maintenance of ecosystems and ecosystem services in areas providing key ecosystem services (areas to be defined).

Category B: The need for, or the level of environmental impact assessment, is to be determined for:

- Activities resulting in emissions, effluents and/or other chemical, thermal, radiation or noise emissions in areas providing other relevant ecosystem services (areas to be defined);
- Activities leading to changes in ecosystem composition, ecosystem structure, or ecosystem functions responsible for the maintenance of ecosystems and ecosystem services in areas providing other relevant ecosystem services (areas to be defined);
- Extractive activities, activities leading to a change of land-use, and creation of linear infrastructure below the Category A threshold, in areas providing key and other relevant ecosystem services (areas to be defined)

[3] For a non-exhaustive list of ecosystem services, see appendix 2
[4] For examples of these aspect of biodiversity, see appendix 3

APPENDIX 2: INDICATIVE LIST OF ECOSYSTEM SERVICES

Regulating services responsible for maintaining natural processes and dynamics

Biodiversity-related regulating services
- maintenance of genetic, species and ecosystem composition
- maintenance of ecosystem structure
- maintenance of key ecosystem processes for creating or maintaining biodiversity

Land-based regulating services
- decomposition of organic material
- natural desalinization of soils
- development / prevention of acid sulphate soils
- biological control mechanisms
- pollination of crops
- seasonal cleansing of soils
- soil water storage capacity
- coastal protection against floods
- coastal stabilization (against accretion / erosion)
- soil protection
- suitability for human settlement
- suitability for leisure and tourism activities
- suitability for nature conservation
- suitability for infrastructure

Water related regulating services
- water filtering
- dilution of pollutants
- discharge of pollutants
- flushing / cleansing
- bio-chemical/physical purification of water
- storage of pollutants
- flow regulation for flood control
- river base flow regulation
- water storage capacity
- ground water recharge capacity
- regulation of water balance
- sedimentation / retention capacity
- protection against water erosion
- protection against wave action
- prevention of saline groundwater intrusion
- prevention of saline surface-water intrusion
- transmission of diseases
- suitability for navigation
- suitability for leisure and tourism activities
- suitability for nature conservation

Air-related regulating services
- filtering of air
- carry off by air to other areas
- photo-chemical air processing (smog)
- wind breaks
- transmission of diseases
- carbon sequestration

Provisioning services: harvestable goods

Natural production:
- timber
- firewood
- grasses (construction and artisanal use)
- fodder & manure
- harvestable peat
- secondary (minor) products
- harvestable bush meat
- fish and shellfish
- drinking water supply
- supply of water for irrigation and industry
- water supply for hydroelectricity
- supply of surface water for other landscapes
- supply of groundwater for other landscapes
- genetic material

Nature-based human production
- crop productivity
- tree plantations productivity
- managed forest productivity
- rangeland/livestock productivity
- aquaculture productivity (freshwater)
- mariculture productivity (brackish/saltwater)

Cultural services providing a source of artistic, aesthetic, spiritual, religious, recreational or scientific enrichment, or nonmaterial benefits.

Supporting services necessary for the production of all other ecosystem services
- soil formation,
- nutrients cycling
- primary production.
- evolutionary processes

APPENDIX 3: ASPECT OF BIODIVERSITY: COMPOSITION, STRUCTURE AND KEY PROCESSES

Composition	**Influenced by:**
Minimal viable population of: (a) legally protected varieties/cultivars/breeds of cultivated plants and/or domesticated animals and their relatives, genes or genomes of social, scientific and economic importance; (b) legally protected species; (c) migratory birds, migratory fish, species protected by CITES; (d) non-legally protected, but threatened species; species which are important in local livelihoods and cultures.	- selective removal of one or a few species by fisheries, forestry, hunting, collecting of plants (including living botanical and zoological resources); - fragmentation of their habitats leading to reproductive isolation; - introducing living modified organisms that may transfer transgenes to varieties / cultivars / breeds of cultivated plants and/or domesticated animals and their relatives; - disturbance or pollution; - habitat alteration or reduction; - introduction of (non-endemic) predators, competitors or parasites of protected species.
Structure	**Influenced by:**
<u>Changes in spatial or temporal structure</u>, at the scale of relevant areas, such as: (a) legally protected areas; (b) areas providing important ecosystem services, such as (i) maintaining high diversity (hot spots), large numbers of endemic or threatened species, required by migratory species; (ii) services of social, economic, cultural or scientific importance; (iii) or supporting services associated with key evolutionary or other biological processes.	Effects of human activities that work on a similar (or larger) scale as the area under consideration. For example, by emissions into the area, diversion of surface water that flows through the area, extraction of groundwater in a shared aquifer, disturbance by noise or lights, pollution through air, etc.
<u>Foodweb structure and interactions</u>. Species or groups of species perform certain roles in the foodweb (functional groups); changes in species composition may not necessarily lead to changes in the foodweb as long as roles are taken over by other species.	All influences mentioned with *composition* may lead to changes in the foodweb, but only when an entire role (or functional group) is affected. Specialised ecological knowledge is required.
<u>Presence of keystone species</u>: these are often species that singularly represent a given functional type (or role) in the foodweb.	All influences mentioned with composition that work directly on keystone species. This is a relatively new, but rapidly developing field of ecological knowledge. Examples are: - sea otters and kelp forest - elephants and African savannah - starfish in intertidal zones - salmon in temperate rainforest - tiger shark in some marine ecosystems - beaver in some freshwater habitats - black-tailed prairie dogs and prairie

Key processes (selected examples only)	**Influenced by**
Sedimentation patterns (sediment transport, sedimentation, and accretion) in intertidal systems (mangroves, mudflats, seagrass beds)	- reduced sediment supply by damming of rivers; interruption of littoral drift by seaward structures
Plant-animal dependency for pollination, seed dispersal, nutrient cycling in tropical rainforests	- selective removal of species by logging, collecting or hunting
Soil surface stability and soil processes in montane forests	- imprudent logging leads to increased erosion and loss of top soil
Nutrient cycling by invertebrates and fungi in deciduous forests	- soil and groundwater acidity by use of agrochemicals.
Plant available moisture in non-forested, steeply sloping mountains	- overgrazing and soil compaction lead to reduced available soil moisture
Grazing by herbivorous mammals in savannahs	- cattle ranching practises
Succession after fire, and dependence on fire for completion of life-cycles in savannahs	-exclusion of fire leads to loss of species diversity
Available nutrients and sunlight penetration in freshwater lakes	- inflow of fertilizers and activities leading to increased turbidity of water (dredging, emissions)
Hydrological regime in floodplains, flooded forests and tidal wetlands	- changes in river hydrology or tidal rhythm by hydraulic infrastructure or water diversions
Permanently waterlogged conditions in peat swamps and acid-sulphate soils	- drainage leads to destruction of vegetation (and peat formation process), oxidisation of peat layers and subsequent soil subsidence; acid sulphate soils rapidly degrade when oxidised
Evaporation surplus in saline / alkaline lakes	- outfall of drainage water into these lakes changes the water balance
Tidal prism and salt/freshwater balance in estuaries	- infrastructure creating blockages to tidal influence; changes in river hydrology change the salt balance in estuaries.
Hydrological processes like vertical convection, currents and drifts, and the transverse circulation in coastal seas	- coastal infrastructure, dredging.
Population dynamics	-reduction in habitat leads to dramatic drop in population size, leading to extinction

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