Framework for biodiversity inclusive impact assessment

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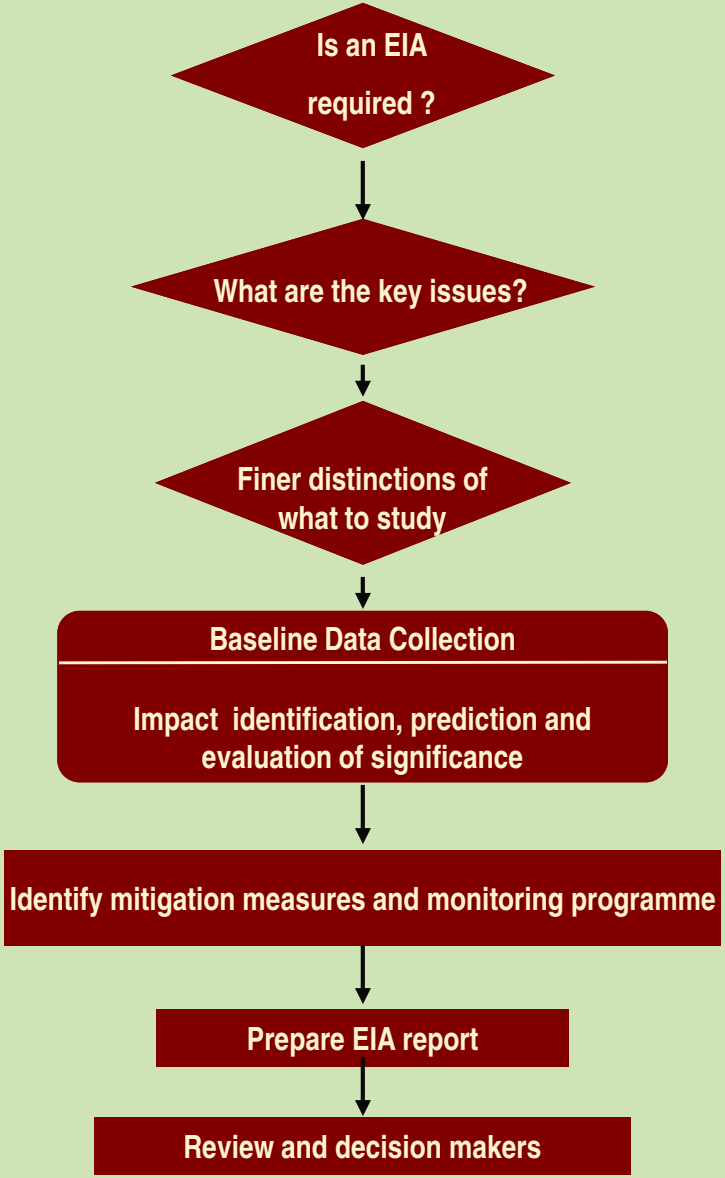
EIA framework



Screening

Scoping

Focusing

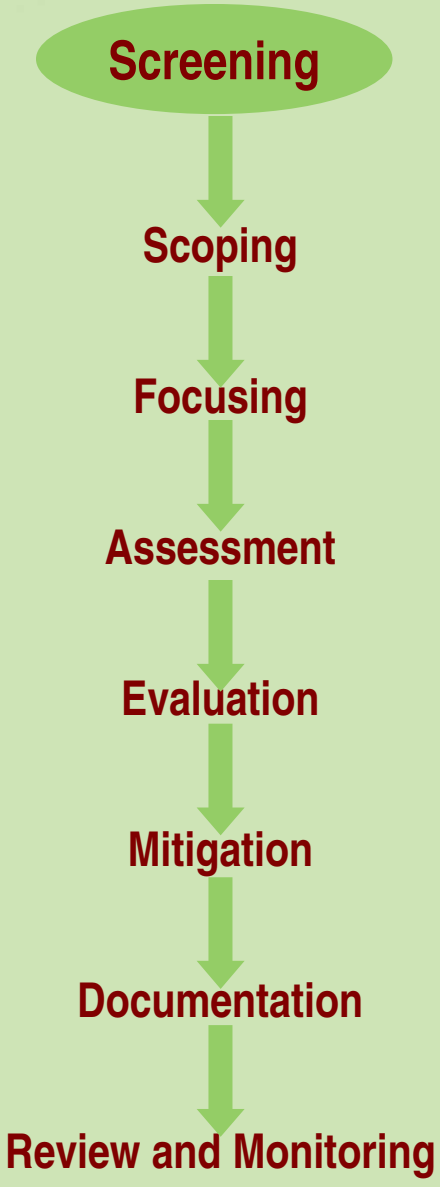
Assessment

Evaluation

Mitigation

Documentation

Review and Monitoring



Is an EIA needed?

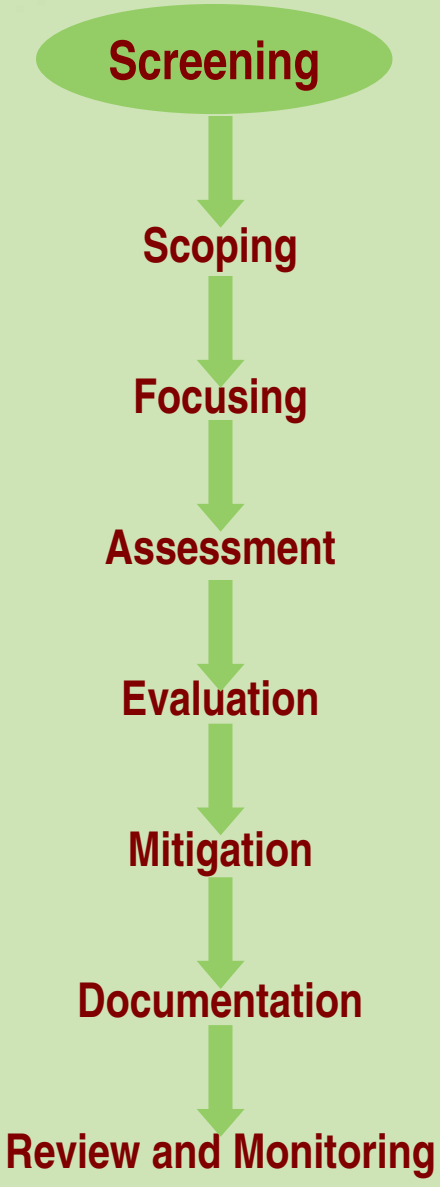
Are there important environmental concerns that require environmental impact assessment ?

Does the project involve making trade-offs of ecosystem benefits

Does the development pose negative impacts for human welfare

Many projects may have no significant environmental effects

A screening mechanism seeks to identify those projects with potentially significant adverse impacts on ecosystems functions



Methods

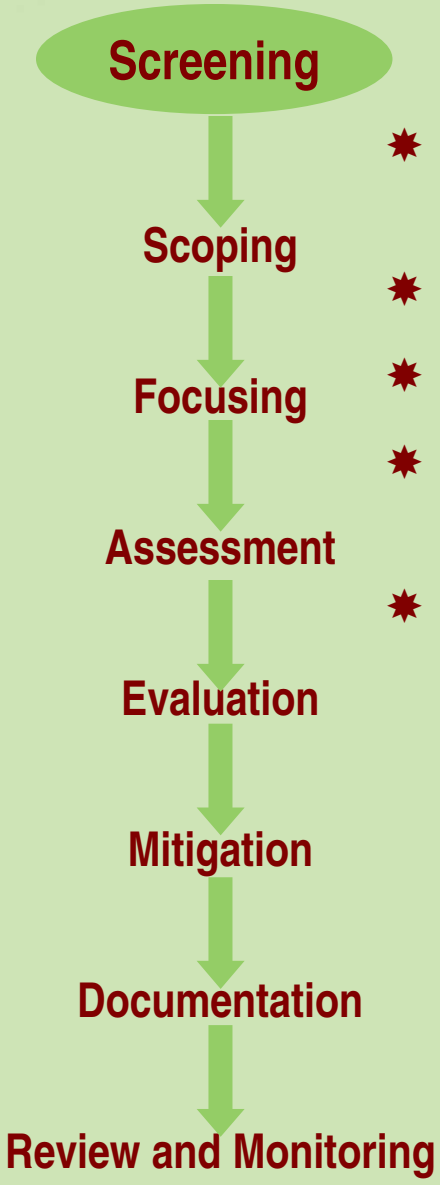
- Decision-makers' discretion
- Initial environmental examination
- Evolved sensitivity criteria (location, impact receptors and duration)
- Legislative provisions for inclusion and exclusion lists

Category 1 – project not expected to result in any significant adverse impact on biodiversity resources and ecosystem functions

Category 2 – projects which likely to cause significant adverse impacts unless appropriate mitigation taken

Category 3 – projects likely to cause a range of significant adverse impacts with unknown magnitude demanding a detailed study

Guidance on screening



- Information about the proposal and its potential impacts
- Level of confidence in impacts
- Characteristics of the **environment**
- Planning, environmental management and decision-making framework
- Degree of public interest

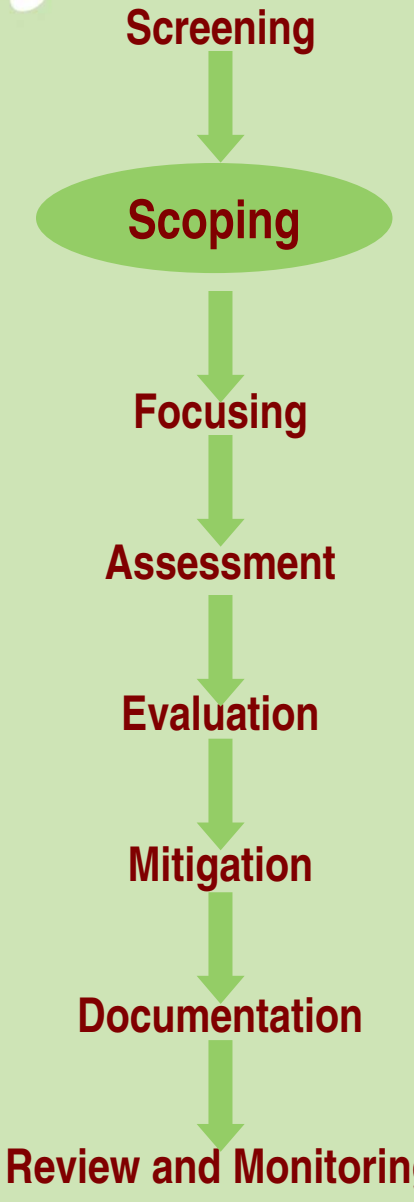
Characteristics of the biological environment, current levels of threats and endangerment of species and changes in ecosystem values%

"Triggers" for biodiversity inclusive impact assessment

Potential impacts on PAs and area supporting protected species

Areas under important biodiversity

Areas that provide important ecosystem services (e.g. shelter, resources, wetlands, breeding grounds, flood storage areas and ground water re-charge areas)



EIAs can not be encyclopedic

Scoping stage defines key issues which should be included in Environmental Assessment and determines the scope, depth and terms of reference

Who should be involved in scoping ?

Scoping is carried out in discussions between the developer, the competent authority, relevant agencies and, ideally, the public

Key agencies

- National government ministries (Mining, Agriculture, Health & Welfare, Water Resource, Forest & Environment, Industry etc.)
- Local government bodies
- Private sector organisation
- NGOs public
- EIA experts
- Ecological economist
- Local people

For biodiversity inclusive EIA, scoping should involve biodiversity experts and people dependent on biodiversity resources in the project site and good source of traditional knowledge

Qualitative assessment of ecosystem services and economic valuation

Scoping for biodiversity inclusive EIA

- Impact on an established protected area
- Impact on resources important for the biodiversity conservation
- Impact on attempts to protect ecosystems or promote the recovery of threatened species
- Release of living modified organisms
- Introduce alien species which threaten ecosystems
- Impact on the knowledge, innovations, and practices of indigenous and local communities
- Impact on attempts to conserve components of biodiversity in an ex situ context
- Impact on measures being taken for the recovery and rehabilitation of threatened species
- Impact on availability of ecosystem goods and quality of services

Key functional attributes and ecosystem processes for consideration in EIA

- **Nutrient cycles** (can effect system productivity and species composition)
- **Energy flow** (affects ability of systems to 'support' component species)
- **Productivity** (affects ecosystem function and species composition)
- **Eutrophication** (a form of increased productivity with implications for species composition)
- **Succession** (knowledge of patterns of succession is important for predicting community change over time)
- **Colonization** (can be a key in maintaining populations)
- **Dispersal** (can be key in maintaining populations and is also important with respect to ability to recover following impact)
- **Competition** (altered competition has implications for species composition and patterns of succession)
- **Assimilative capacity** (can affect ability of a system to absorb or recover from pollution)
- **Population processes** (breeding, migration)

(Source: Treweek, 1999)

This stage provides the '<u>baseline</u>' against which future impacts can be assessed and allows to explore <u>alternative</u> of location, design, scales, technology and timing for project implementation.

- The baseline study should anticipate the future state of the environment assuming the project is not undertaken - the 'no action alternative'
- Baseline studies should be undertaken for each alternative site so that the relative severity of the impacts for each alternative can be assessed
- New field based data is necessary (e.g. biodiversity survey) if the secondary information is not available, or is old and not relevant for the needs of the assessment

Although, many EIAs fail to consider alternatives, alternatives are really at the 'heart' of the EIA. Many EIA professionals consider them as essential 'raw material' of good EIA.

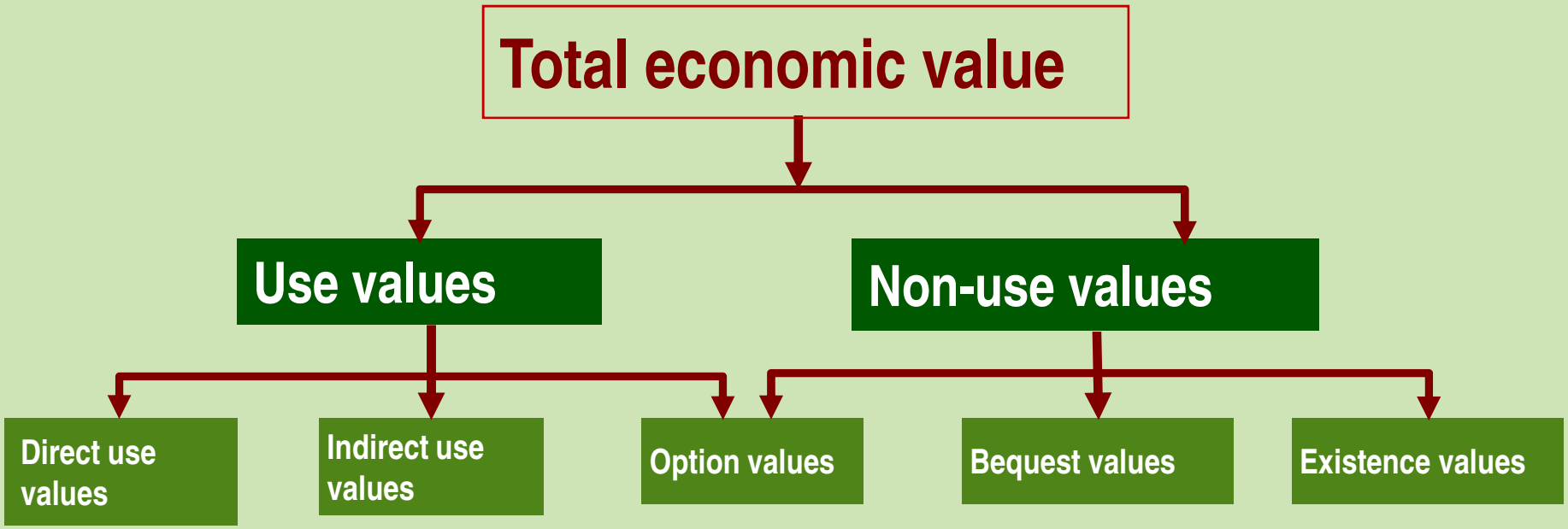
Guidance for biodiversity inclusive EIA

- Focused on VEC, likely to be stressed by proposed development
- Use of select indicators and parameters that are measurable and standardized
- Appropriate in scale
- Have a natural variability that is understood
- Part of an existing data series
- Diagnostic as opposed to descriptive

Assessment of the existing trends in ecosystem service generation

- How does proposed project affect service production, and how does service delivery relate to the condition of an ecosystem?
- How does production of one service interact with production of others?
- Who uses and produces ecosystem services?
- What is the spatial relationship between ecosystem service supply and consumption?
- How well can technology substitute for ecosystem services?

Valuing Total Economic Value of ecosystems through TEV framework



A step in EIA involving evaluation of magnitude, extent and significance of environmental impacts

- Significance can be determined through professional judgement, reference to regulations and criteria evolved
- The conclusions of the impact assessment can ultimately be used by decision-makers when determining the fate of the project application

Impacts can vary in nature, magnitude, extent, timing, duration and reversibility

Broad categories of ecological impacts

Direct impacts

- Habitat loss or destruction (e.g.vegetation clearing)
- Altered abiotic/site factors (e.g. soil removal and compaction)
- Mortality of individuals (e.g. through collision)
- Loss of individuals through emigration (e.g. following loss of habitat)
- Habitat fragmentation (e.g. barrier effect of road and pipeline)
- Disturbance (physiological and behavioural)

contd. ...

Indirect impacts

- Mortality of individuals due to better access
- Reduced population (due to reduced habitat, size and quality)
- Altered population dynamics (due to altered resource availability)
- Increased competition (due to shrinking resources)
- Altered species composition and habitat changes (due to fragmentation)
- Reduced gene flow (due to restricted migration)
- Habitat isolation
- Reduced breeding success
- Altered prey-predator relationships

contd. ...

Cumulative impacts (time- and space-crowded effect)

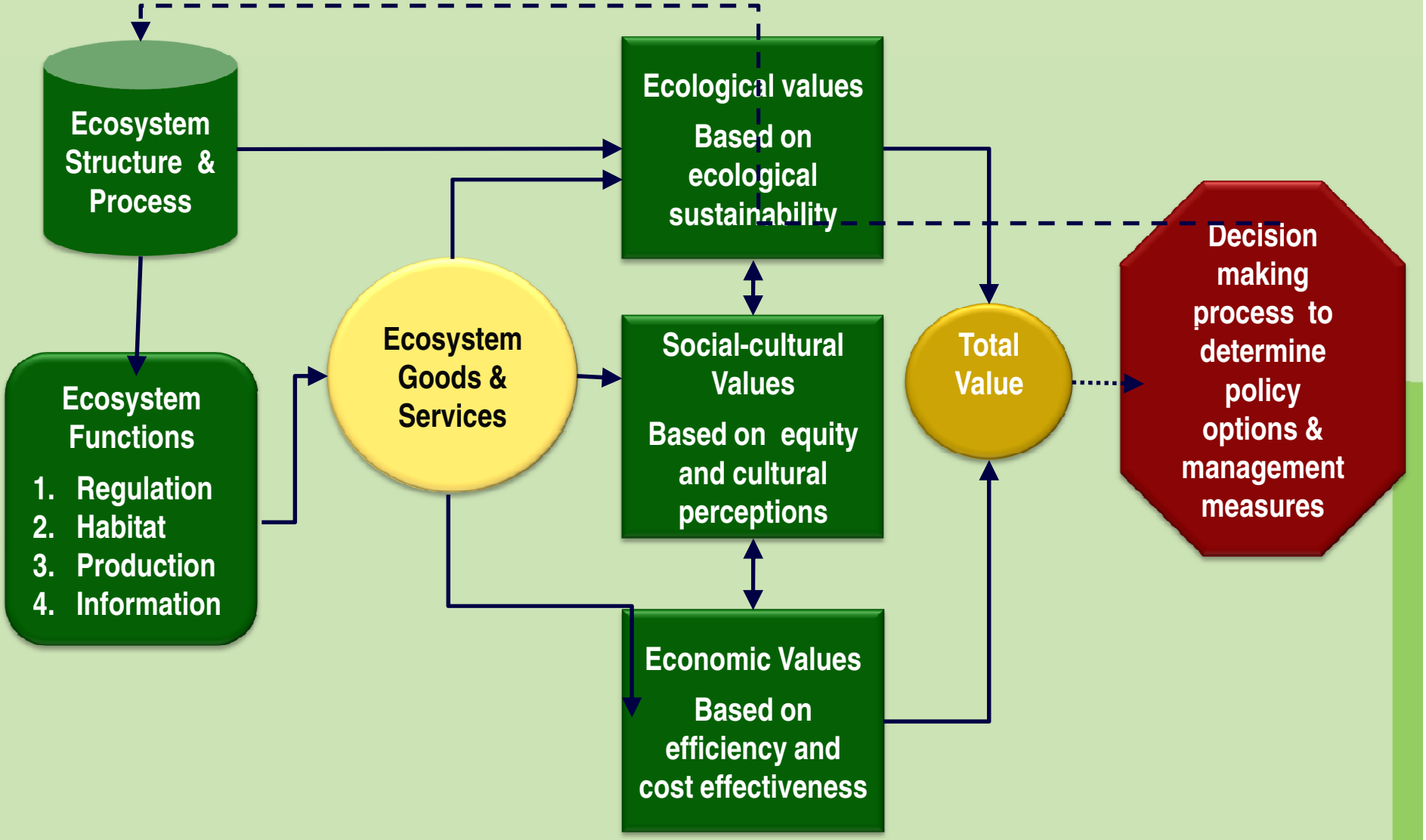
- Habitat 'nibbling' (progressive loss and fragmentation throughout an area)
- Reduced habitat diversity, e.g. at the landscape level (associated with reduced biological diversity at other levels in organizational hierarchy)
- Habitat fragmentation over time, resulting in progressive isolation and reduced gene flow
- Reduced genetic diversity can result in loss of resilience to environmental change and increased risk of extinction
- Irreversible loss of biological diversity (e.g. through destruction of unique population units)

contd. ...

Evaluation phase of the study should be able to provide answers to biodiversity concerns

- What impact will the project have on the genetic composition of each species?
- Do major systemic or population changes appear to be taking place?
- How will the proposal affect ecosystem processes? Is this proposal likely to make the ecosystem more vulnerable or susceptible to change?
- Does the proposal set a precedent for conversion to a more intensive level of use of the area?
- Is the biological resource in question at the limit of its range?
- Does the species demonstrate adaptability?
- What level of confidence or uncertainty can be assigned to interpretations of the effects?

Framework for integrated assessment and valuation of ecosystem functions, goods and services



Impact Assessment

Project Characteristics

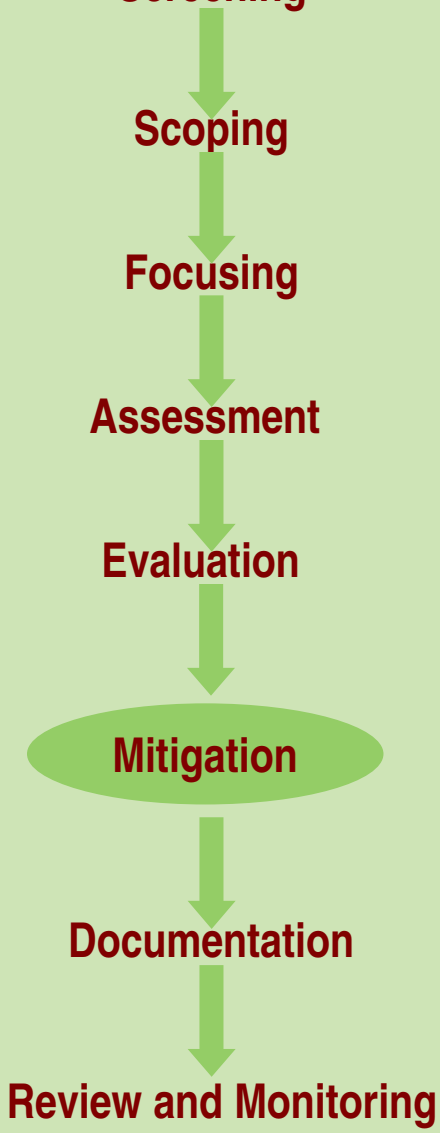
- Location and size
- Schedule of construction and operation
- Potential sources of impact
- Nature of emissions
- Receiving environment for emissions
- Extent, magnitude and duration of disturbance
- Alternatives for site and design
- Past, current and future proposals
- Associated developments

Characteristics of Ecosystem Components

- Naturalness and integrity
- Habitat quality
- Population viability
- Rarity
- Endangerment
- Extinction risk
- Genetic diversity
- Alteration in home ranges
- Resilience
- Fragility
- Stability
- Conservation significance
- Uniqueness

Impact evaluation

(*Prediction of ecological outcomes relative to baseline taking into account the the range and magnitude of the impacts*)



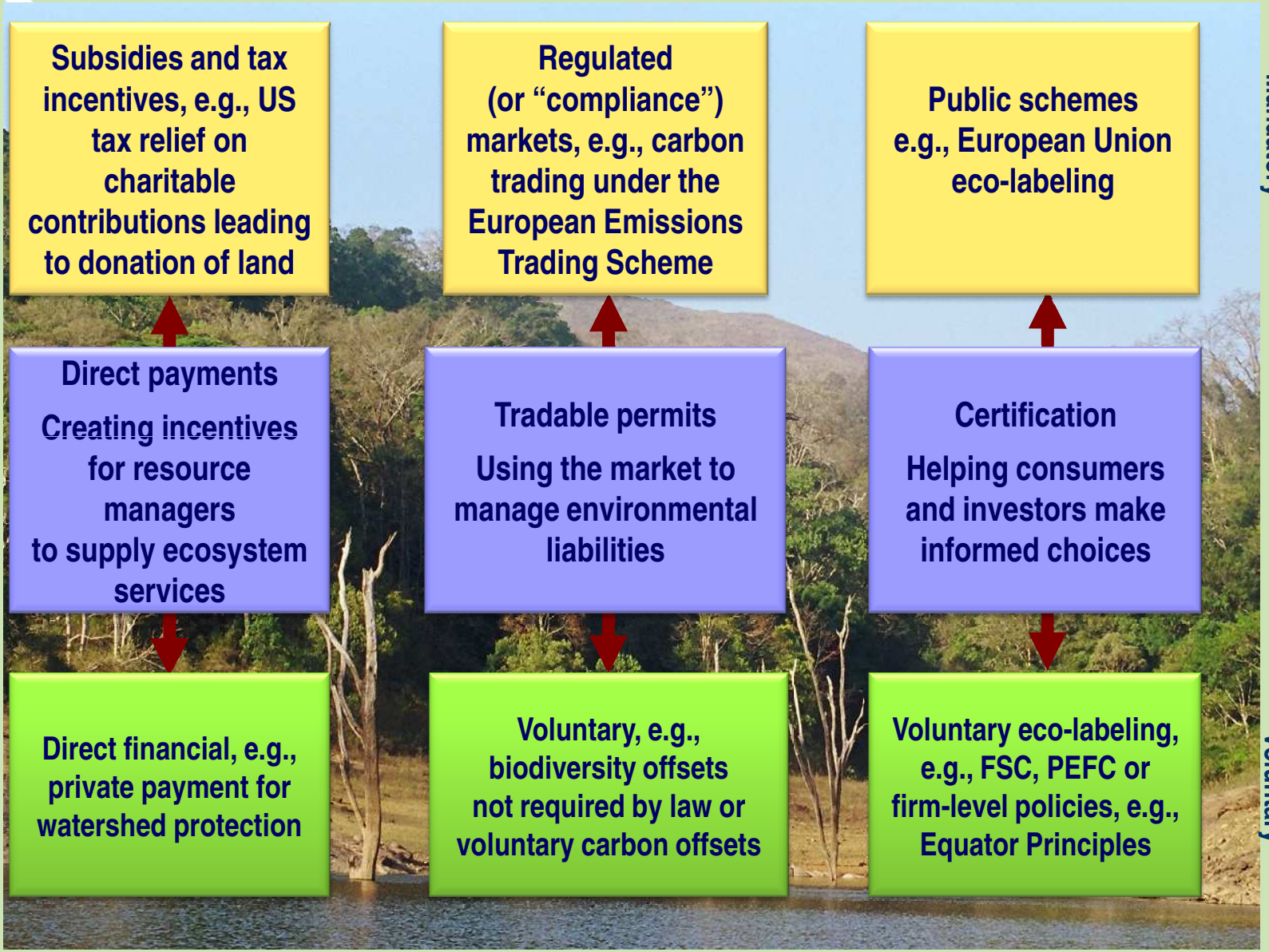
Problem solving step that helps in seeking -

- better ways of doing things
- minimizing the severity of negative impacts
- enhancing the project benefits

Involves developing strategies and options to adopt the mitigation hierarchy: Avoid - Reduce - Remedy - Compensate - Enhance

Impacts remaining after mitigation are known as residual impacts

Alternative market mechanisms for ecosystem services



Documentation of the Results

Different names for EIA document

- Environmental Impact Assessment report (EIA report)
- Environmental Impact Statement (EIS)
- Environmental Assessment report (EA report)
- Environmental Review
- Environmental Effects Statement (EES)
- Local usage

EIA is an on-going process of review, negotiation and incremental decision-making, culminating in the essentially political action of making a final decision about whether or not the proposal is to proceed and under what conditions.

The step in the EIA process that determines whether the EIA report is an adequate assessment of the project impacts related impacts and is of sufficient relevance and quality for decision-making.

Review of biodiversity inclusive EIA

- Did impacts on biodiversity happen as predicted
- Were the suggested alternatives, , mitigation strategies appropriate, adequate and effective
- Did the EIA incorporate views of all concerned
- Presentation of information to the public
- Presentation of information to decision-makers
- Sufficiency of information for decision making

Steps in reviewing an EIA report

- Set the scale of the review
- Select reviewer(s)
- Use public input
- Identify review criteria
- Carry out the review
- Determine remedial options
- Publish the review report

Range of review methods

- General checklists
- Project specific checklists
- Ad hoc processes
- Expert opinion, accredited reviewers
- Public review
- Panels of inquiry, independent commissions
- Legal approaches

Purpose of monitoring

Predictive

- Identifies a disorder/disturbance and source
- Provides early detection of trends.
- Determine the effect and magnitude of environmental change.
- Assist in the cumulative assessments.

Regulatory

- Assess the utility/futility of steps and control procedures to prevent or minimise the likely change/impact.
- Tests compliance with regulations.
- Aids in decision-making process.

Challenges in integrating biodiversity in EIA

- Lack of regional biodiversity data and resource status.
- Lack of clearing defined ToRs.
- Inconsistent and insufficient mechanisms for evaluating compliance.
- Weak enforcement of legislation.
- Lack of adequate budgets for EIA.
- Short time lines.
- Failure to address cumulative affects of development
- Failure to integrate ecosystem service approach in biodiversity inclusive impact assessment

Thank you…