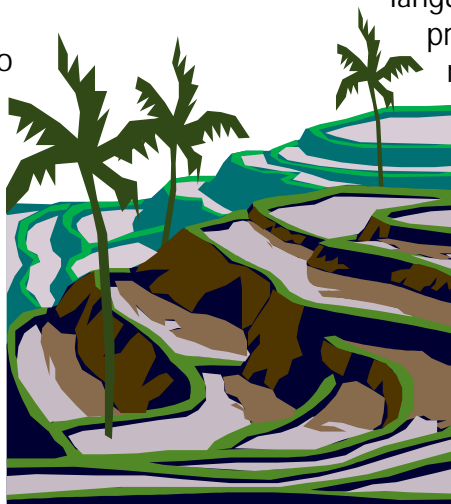


METHODOLOGY AND TECHNIQUES

STRATEGIC ENVIRONMENTAL ASSESSMENT METHODOLOGY

The planning and implementation of a strategic environmental assessment (SEA) involves the consideration of a number of issues. 'Good practice' regarding SEA should incorporate the following items within the utilized framework:

1. Apply a simple screening procedure to initiate SEA or exempt proposals from further consideration, depending on the expected severity of their environmental impacts. Several methods can be used: categorical lists, case-by-case tests for significance, pre-screening questions, or some combination of these methods.
2. Use scoping to identify important issues, draft terms of reference where necessary for SEA, determine the approach to be followed, and establish other alternatives for consideration.
3. Specify, evaluate and compare alternatives, including the no-action option. The aim is to clarify the trade-offs at stake, showing what is gained or lost. Where possible, the best practicable environmental option should be identified.
4. Conduct a policy appraisal or impact analysis to the extent necessary to



examine environmental issues and cumulative effects, compare the alternatives, and identify any necessary mitigation or offset measures for residual concerns.

5. Report the findings of the SEA, with supporting advice and recommendations, to decision makers in clear and concise language. Depending on the proposal, the documentation may range from a few pages to full report.
6. Review the quality of the SEA to ensure the information is sufficient and relevant to requirements of decision making. Depending on the process, this activity can range from a quick check to an independent review.
7. Establish necessary follow-up provisions for monitoring effects, checking that environmental conditions for approval are being implemented, and, where necessary, tracking arrangements for related project-level environmental impact assessment (EIA). For policies, plans, and programs (PPPs) that initiate projects, tiering EIA to the SEA can significantly improve process effectiveness and efficiency.

Detailed consideration is not always given to each issue related to planning a SEA. Rather, particular attention will be given to indicators, alternatives, and mitigation measures.

Indicators

Indicators can be used within SEAs as a means of describing baseline conditions, predicting impacts, and comparing alternatives, and for monitoring the long-term effectiveness of a particular PPP. We have reviewed biological indicators in previous courses. Some of these same indicators can be effective for SEA. For example, fish tissue sampling results for mercury concentrations can be extrapolated to gauge health risks to local people who eat fish. In addition, periodic water or sediment sampling can be used to gauge the effectiveness of a country's water quality protection measures. If parameters such as heavy metals or fecal coliforms are consistently high, environmental managers might wish to re-evaluate existing water or effluent quality standards and possibly make those standards more stringent (i.e. even more protective). If the same or comparable standards are in use in other countries, and standards are rarely exceeded, then environmental managers might want to look at the how their water quality protection program is implemented. Perhaps education or enforcement need to be improved.

Indicators should satisfy the following criteria to maximize their effectiveness:

- Indicators are individually and collectively meaningful
 - They represent key issues
 - They reflect both national/regional interests and local trends
 - They are based on valid principles and assumptions
 - They are based on relatively easy-to-collect information
- Ideally, information is already available over a reasonable time scale
 - They allow the collection of both qualitative and quantitative information at different spatial scales
 - They allow consideration of alternatives, both separately and in combination
 - They lead to the measurement of baseline information and the prediction and monitoring of impacts
 - They yield results that are repeatable given certain explicit assumptions
 - They stimulate the imagination of decision makers and increase insight into the choices to be made
 - They yield results that are understandable to decision makers and the public.

Alternatives

The alternatives addressed in PPPs can be broader and perhaps of a different nature than typical alternatives for project-level EIA. Examples of PPP-specific alternatives include:

- The 'do nothing' or 'continue with present trends' option
- Demand reduction, such as reducing the demand for water through water metering, as well as meeting demand
- Different locational approaches, for instance building new houses in existing towns or in new towns
- Provision of different types of development, which achieve the same objective, for instance producing energy by gas, coal, wind, etc.

- Fiscal measures such as toll roads or congestion charges
- Different forms of management, such as waste management by recycling, incineration, etc.
- Combinations of development and management approaches which exemplify themes, such as more public versus more private transport.

Mitigation

Finally, potential mitigation measures which can be appropriate in SEAs include:

- Planning future developments to avoid sensitive sites.
- Placing constraints on, or establishing a framework for, lower-tier PPPs. This could include requirements for SEA/EIA of lower-tier PPPs and projects, or specific requirements for the implementation of projects resulting from the PPP.
- Establishing, or funding the establishment of, new areas for nature conservation or recreation.
- Establishing management guidelines for the implementation of PPP.
- Relocating sensitive/rare wildlife species or habitats, or local amenities.
- Requiring 'cleaner production' technology that can reduce pollution emissions for various types of industry within a country or region.

TECHNIQUES FOR CONDUCTING SEA

A number of techniques can be useful within the context of the tasks associated with SEA. Applicable

techniques for SEA include the types of techniques for project-level EIA, as well as techniques often used for policy analysis/plan evaluation. Examples of the latter group of techniques include scenarios, planning balance sheets, and cost-benefit analysis. Depending upon the particular characteristics of the PPP subjected to SEA, modifications may be necessary in selected techniques from both groups. Table 1 shows examples of techniques associated with different steps in planning and conducting a SEA. It is important to note that no single technique can be used to fulfill all the steps in a SEA.

One crucial aspect of SEA involves impact prediction. Examples of impact prediction techniques which can be used in SEAs include:

- Checklists which show whether the PPP have an impact or not, sometimes with further details on, for instance, impact type (i.e., positive, negative) and magnitude
- Compatibility or consistency assessments, which tests whether different subcomponents of the PPP are internally consistent
- Scenario analysis
- Overlay maps or geographic information systems showing, for instance, sites affected by PPP
- Various index, indicator and/or weighting techniques, such as the Habitat Sustainability Index
- Computer models, such as models that predict likely air pollution based on assumptions regarding vehicle type, number, occupancy rate, and fuel use
- Expert opinion.

Table 1 Methods useful in completing the steps of SEA

STEP	EXAMPLES OF METHODS
Baseline Study	SOE reports and similar documents Environmental stock/setting 'Points of reference'
Screening/Scoping	Formal/informal checklists Survey, case comparison Effects networks Public or expert consultation
Defining Options	Environmental policy, standards, strategies Previous commitment precedents Regional/local plans Public values and preferences
Impact Analysis	Scenario development Risk assessment Environmental indicators and criteria Policy impact matrix Predictive and simulation models GIS capacity/habitat analysis Cost-benefit analysis and other economic valuation techniques Multi-criteria analysis
Documentation for Decision Making	Cross-impact matrices Consistency analysis Sensitivity analysis Decision 'trees'

Table 2 summarizes, on a relative basis, the usage of several types of EIA techniques for project-specific EIA, cumulative effects assessment (CEA), and for SEA. It should be noted that the actual application of the individual techniques varies somewhat between project-level assessments and strategic-level assessments.

In summary, while techniques for SEA can be listed, they are not as well-developed and refined as for project-level EIA. Comparative studies are needed on the relative usefulness and effectiveness of various types of techniques in SEA.

Table 2 EIA techniques used in EIA, CEA, and SEA

TYPES OF METHODS	RELATIVE USAGE		
	Project EIA	CEA	SEA
Analogs	H	M	L
Checklists	H	M	M
Decision-focused Checklists	M	L	L
Cost-Benefit Analysis	L	O	O
Expert Opinion	H	M	M
Expert System	L	O	O
Indices or Indicators	M	L	M
Laboratory Testing	M	L	NA
Landscape Evaluation	M	L	L
Literature Reviews	M	L	L
Mass Balances	H	L	L
Matrices	H	L	M
Monitoring (baseline)	L	O	O
Networks	M	O	O
Overlay Mapping	M	L	L
Photographs/Photomontages	M	L	L
Qualitative Models	H	L	L
Quantitative Models	M	L	L
Risk Assessment	L	L	L
Scenario Building	L	O	L
Trend Extrapolation	L	L	L

H = relatively high usage
 M = relatively moderate usage
 L = relatively low usage
 O = limited usage, if at all
 NA = not applicable