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PROPOSALS FOR FURTHER DEVELOPMENT AND REFINEMENT OF THE GUIDELINES FOR INCORPORATING BIODIVERSITY-RELATED ISSUES INTO ENVIRONMENTAL IMPACT ASSESSMENT LEGISLATION OR PROCEDURES AND IN STRATEGIC IMPACT ASSESSMENT: REPORT ON ONGOING WORK

Note by the Executive Secretary

EXECUTIVE SUMMARY

In its decision VI/7-A the sixth meeting of the Conference of the Parties (COP) adopted guidelines for incorporating biodiversity-related issues into environmental-impact-assessment legislation or processes and in strategic impact assessment. In paragraph 3 of the same decision, COP requested the Executive Secretary

(a) To compile and disseminate, through the clearing-house mechanism and other means of communication, current experiences in environmental impact assessment and strategic environmental assessment procedures that incorporate biodiversity-related issues, as well as experiences of Parties in applying the guidelines; and

(b) In light of this information, to prepare, in collaboration with relevant organizations, in particular the International Association for Impact Assessment, proposals for further development and refinement of the guidelines, particularly to incorporate all stages of the environmental impact assessment and strategic environmental assessment processes taking into account the ecosystem approach (particularly principles 4, 7 and 8) and to provide a report of this work to the Subsidiary Body prior to the seventh meeting of the Conference of the Parties.

To facilitate the work of SBSTTA, the Executive Secretary has prepared the present note, which inventories experiences from practice in environmental impact assessment and provides elements for the further elaboration of the Convention guidelines for all steps in the environmental impact assessment

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process. One difficulty encountered in this exercise was the limited availability of evaluation studies on the performance of impact assessment from a biodiversity perspective. The case-studies from which the elements for the further elaboration of the guidelines are derived are provided in the annex to the present note.

Proposed elements for the further elaboration of the guidelines include: (i) lessons on each step of the environmental impact assessment process; (ii) experiences on strategic environmental assessment including biodiversity and trade; and (iii) the further integration of social and cultural aspects in impact assessment instruments. Capacity development needs are discussed as an issue relevant to each of the above-mentioned elements.

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I. INTRODUCTION

1. In paragraph 3 of decision VI/7 A, the Conference of the Parties requested the Executive Secretary to compile and disseminate, through the clearing-house mechanism and other means of communication, current experiences in environmental impact assessment and strategic environmental assessment procedures that incorporate biodiversity-related issues, as well as experiences of Parties in applying the guidelines; in light of this information, to prepare, in collaboration with relevant organizations, in particular the International Association for Impact Assessment, proposals for further development and refinement of the guidelines, particularly to incorporate all stages of the environmental impact assessment and strategic environmental assessment processes taking into account the ecosystem approach (particularly principles 4, 7 and 8) and to provide a report of this work to the Subsidiary Body prior to the seventh meeting of the Conference of the Parties.

2. Pursuant to this decision, the Executive Secretary invited, through notification 2003-007 dated 20 January 2003, Parties, other Governments, international organizations and associations to submit case studies and current experiences in environmental impact assessment and strategic environmental assessment procedures that incorporate biodiversity related issues, as well as experiences in applying the guidelines annexed in the same decision.

3. Only two case-studies were received. Germany provided a report of a national expert workshop held from 31 March to 1 April 2003 in which the guidelines were analysed and suggestions for their further development were made. The European Commission drew attention to the Environmental Impact Assessment Directive (97/11/EC) and Strategic Environmental Assessment Directive (2001/42/EC) as legislative measures and the Habitats Directive (92/43/EEC) and Birds Directive (79/409/EEC) as sectoral instruments.

4. Additional case-studies were therefore solicited through the IAIA network and by contacting participants in its recent annual meetings, in particular the twenty-third annual meeting held from 13 to 16 May 2003 in Marrakech. The Netherlands Commission for Environmental Impact Assessment provided additional material.

II. BACKGROUND

5. Impact assessment is an internationally recognized, and often legally embedded, instrument to analyse the potential consequences of human activities on biodiversity at the earliest possible stage of activity planning. Impact assessment was developed as a tool to predict, mitigate, monitor and manage the environmental and, increasingly, the social consequences of large projects. Accordingly, environmental and social impact assessment procedures were elaborated. Originally, the human living environment (air and water quality, health) was the predominant area of attention.

6. However, it was recognized that projects are usually implemented within larger frameworks such as land-use planning schemes and sectoral or regional policies. In order to effectively prevent negative consequences of developments and enhance positive effects, environmental concerns needed to be addressed more proactively in policies, plans and programmes. This led to the development of strategic environmental assessment with an initially explosive development of techniques, procedures, and guidelines. In recent years a more standardized approach towards strategic environmental assessment has emerged.

7. Parallel to the above development, impact assessment was recognized by other sectors in society and a wide array of impact assessment methodologies has been developed, sometimes within the framework of an existing impact assessment regulatory framework. Examples include health impact assessment, ecological impact assessment, human rights impact assessment, cumulative impact

assessment, strategic impact assessment, and sustainability impact assessment. Confusion arose, not only due to the same acronym being used for different topics, but also due to the widely varying scope of the regulatory frameworks. For this reason, more recently an integrated approach is being advocated in which the biophysical environment is seen as providing the livelihoods of people, thereby combining environmental and social aspects in impact assessment.

8. Most impact assessment systems include public involvement in order to reach transparency in decision-making. As impact assessment deals with the living and working environment of people, it is considered a necessity to inform people about proposed projects and to invite them to present their views in order to represent the interests of affected people in the best possible way. Stakeholder involvement is usually legally embedded in the environmental impact assessment procedure.

9. As the importance of biodiversity is increasingly recognized and its contribution to sustainable development is reiterated the need for additional guidance on how to address biodiversity in impact assessments has become apparent. It has also been recognized that biodiversity is a cross-cutting issue that has to be dealt with in most types of impact assessment: in policies and plans at strategic level; as a source of income, provider of water, food, safety and leisure opportunities in social impact assessment; as a regulator of natural processes and provider of future opportunities in environmental impact assessment; as a source of disease transmitting vectors and biological control agent in health impact assessment, etc.

10. Building on decision VI/7 A, the present document analyses case-studies for the incorporation of biodiversity related issues in environmental impact assessment, strategic impact assessment and sustainability assessment. Proposed recommendations and elements for the further development of these guidelines are predominantly based on the practical experience represented by the network of the International Association for Impact Assessment.

III. BIODIVERSITY CONSIDERATIONS IN ENVIRONMENTAL IMPACT ASSESSMENT

11. In recent years a number of initiatives have attempted to better integrate biodiversity considerations in the impact assessment process. These initiatives usually had a sectoral scope providing both industry and governments with relevant information to enhance the use of EIA within the existing procedural frameworks.

12. When analysing ways of more effectively integrating biodiversity aspects into the various phases of mining projects, Prairie (2003) noted that environmental impact assessments were often deficient in:

(a) Consideration of non-protected species;

(b) Proper baseline surveys/data and use of relevant scientific literature;

(c) Consideration for different levels of biodiversity;

(d) Clear criteria to assess impact magnitude and significance;

(e) Consideration of structural/functional relationships;

(f) Consideration of full range of potential impacts, especially indirect and cumulative impacts, and of possible mitigation measures;

(g) Consideration of possibilities for enhancement;

(h) Proper interpretation of results;

(i) Post-project monitoring;

(j) Consideration of concerns from affected communities and other resource users.

13. A good example of practical guidelines for a specific sector is provided by Rajvanshi *et al*. (2001) in their environmental guidelines for roads, sensitive habitats and wildlife in India and South Asia. The document guides practitioners in the identification of the nature and scope of wildlife-road problems and ways of resolving them. The environmental impact assessment process and related legislation is presented, key impact types are presented combined with practical lessons and methods and tools for each stage of the impact assessment process are described. The guide also includes case-studies as examples of existing road-wildlife issues and the assessment work that should have been or has been undertaken to address these. The annex to the present note contains short summaries of the cases.

14. Another example of practical guidelines on how to address biodiversity in road schemes is provided by Byron (2000). The guidelines are an in-depth reference to existing regulations in the United Kingdom and to the way in which potential impacts of road schemes on biodiversity can be identified, assessed and mitigated. While the guidelines focus on the United Kingdom, a more generic step-by-step approach is provided in the case-studies contained in the annex to the present note.

15. The Energy & Biodiversity Initiative (EBI, 2002) is an international initiative by the oil and gas industry to integrate biodiversity conservation into oil and gas development. This joint initiative of BP, Chevron Texaco, Conservation International, Fauna & Flora International, IUCN, Shell International B.V., Smithsonian Institution, Statoil and The Nature Conservancy provides a suite of guides, discussion papers and resources on the integration of biodiversity issues into the oil and gas industry. The document on "Integrating Biodiversity into Environmental and Social Impact Assessment Processes" closely follows decision VI/7 A and the underlying conceptual framework described in IAIA (2001) and Slootweg & Kolhoff (2003). It is the first example of practical operationalization of decision VI/7-A into a suite of sector-oriented documents.

16. In decision VI/14, the Conference of the Parties took note of the draft guidelines for activities related to sustainable tourism development in vulnerable terrestrial, marine and coastal ecosystems and habitats of major importance for biological diversity and protected areas, including fragile riparian and mountain ecosystems (UNEP/CBD/SBSTTA/7/5, annex I) and requested the Executive Secretary to further review them. A revised draft was submitted to SBSTTA at its eighth meeting, in March 2003. In its recommendation VIII/5, SBSTTA endorsed the revised draft, as annexed to that recommendation, and recommended its adoption by the Conference of the Parties at its seventh meeting. The draft guidelines outline 10 management steps aimed at minimizing the impact of tourism-development activities on biological diversity.

17. Treweek (2001) reviewed the integration of biodiversity considerations into impact assessment procedures in different countries. The study drew on the literature and on the results of 15 country status reports and case-studies. The report reviewed the role and application of environmental impact assessment and strategic environmental assessment in relation to biodiversity conservation and development planning. It summarized current provisions and practices in relation to national biodiversity planning and impact assessment as required by Article 14 of the Convention on Biological Diversity and evaluates the role of environmental impact assessment and related instruments in ensuring that biodiversity issues are given full and appropriate consideration. The report further discussed the integration of biodiversity concerns with impact assessment, providing background on which levels of biodiversity should be addressed and a checklist of biodiversity elements to be considered in environmental impact assessment. The main stages in the environmental impact assessment process are discussed and guidance is provided on the effective integration of biodiversity concerns into these stages. The country status reports and case-studies were reviewed for examples of good and bad practice integrating biodiversity concerns with impact assessment procedures.

18. Based on the case studies described above and additional material cited in the list of references recommendations were compiled for the further development of the guidelines on each stage of the environmental impact assessment process. A number of general recommendations also emerged.

A. Recommendations for screening

19. Screening is used to determine which proposals should be subject to impact assessment, to exclude those unlikely to have harmful environmental impacts and to indicate the level of environmental appraisal required. The guidelines in decision VI/7 A emphasize the screening and scoping stages of environmental impact assessment. This emphasis is because biodiversity will be adequately considered when:

(a) An impact assessment study is mandatory in case a proposed activity has potential significant effects on biodiversity (i.e. screening);

(b) The impact assessment study is done in such a manner that all relevant biodiversity issues are adequately considered, thereby providing sufficient information for decision makers to come to a well founded decision (i.e. scoping).

20. Therefore, the rules for screening need biodiversity-specific criteria to ensure that biodiversity considerations are adequately taken into account. While decision VI/7-A provides guidance, Parties and other States should design their own specific mechanisms that fit the individual country characteristics.

B. Recommendations for scoping

21. Scoping is designed to focus the impact assessment study on relevant issues. It is used to derive terms of reference (sometimes referred to as guidelines) for environmental impact assessment. Scoping also enables the competent authority (or environmental impact assessment professionals in countries where scoping is voluntary) to: (i) 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; (ii) provide an opportunity for stakeholders to have their interests taken into account in the environmental impact assessment; and (iii) 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 environmental impact assessment study.

22. Mandelik *et al.* (2002) carried out a detailed analysis of 50 environmental statements produced in Israel over a six year period. Pallewata (2000) analysed a number of case-studies from Asia. The recommendations below are derived from their findings:

(a) The terms of reference should be unambiguous, specific and compatible with the ecosystem approach;

(b) In order to provide a sound basis for assessing the significance of impacts, baseline conditions must be defined and understood and quantified where possible;

(c) Field surveys, quantitative data, meaningful analyses, and a broad perspective are important elements when assessing biodiversity impacts. Potential indirect and cumulative impacts should be better assessed.

(d) 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.

23. Capacity development is needed to effectively represent biodiversity issues in the scoping stage. Comprehensive guidance for scoping on biodiversity issues in environmental impact assessment need to be developed at country-level. Apart from drawing the attention to protected species and areas, the issues of sustainable use of biodiversity, ecosystem level diversity, and non-protected biodiversity need to be given more attention.

C. Recommendations for impact analysis and assessment

24. Environmental impact assessment should be an iterative process of assessing impacts, redesigning alternatives and comparison. The main tasks of impact analysis and assessment are: (i) the refinement of the understanding of the nature of the potential impacts identified during screening and scoping and described in the terms of reference, including the identification of indirect and cumulative impacts, and of the likely causes of the impacts (impact analysis and assessment). Identification and description of relevant criteria for decision-making can be an essential element of this period; (ii) the review and redesign of alternatives, consideration of mitigation measures, planning of impact management, evaluation of impacts, and comparison of the alternatives; and (iii) the reporting of study results in an environmental impact statement.

25. Impact studies often are directed by legal obligations, while the aim of impact assessment is the provision of information for good decision-making. The focus on legal requirements entails the risk of losing relevant information on those biodiversity issues that have no formal legal status. In contrast, the power of legal instruments may also be underestimated. The European Community birds and habitats directives, for example, allow development in designated areas only if the proponent convincingly shows that there are no significant biodiversity effects and provides information on identified species.

26. The following lessons can be drawn with respect to biodiversity in the impact assessment for Rotterdam main port development (see annex for case description):

(a) In the impact analysis attention should be paid to (i) internal effects; (ii) external effects, in particular when dealing with priority protected areas; (iii) temporary effects, for example during construction; (iv) permanent effects during operation and maintenance; and (v) effects with other projects in the area under the influence of these effects (cumulative effects);

(b) For species and habitats with legal protection status impact analysis and reporting should be done for individual species and individual habitats. When aggregated indicators are being used, one tends to loose sight of data on individual species of importance. There are certain advantages to use several scales on the basis of different ecological profiles (multiple response to environmental variables) of vulnerable species. Working with species level indicators is effective by engaging the general public;

(c) Due attention should be given not only to species and habitat diversity but also to spatial and temporal structure and key ecological processes;

(d) In the impact analysis attention must be paid to intervention-effect chains in order to provide insight and to provide arguments why certain impacts do not need to be studied (i.e. focus on relevant issues only);

(e) The application of the precautionary principle requires the assumption of the worst-case scenario. This should be the point of departure for mitigation or compensation measures;

(f) When applying the European Community birds and habitats directives, the project proponent has to determine the significance of the impact. It is recommended to determine the significance of the impact in relation to an ecological unit such as a population or a protected area;

(g) Early and appropriate involvement of stakeholders is in the interest of proponent and stakeholders;

(h) External and impartial experts should be drawn upon to provide advice and review;

(i) Each step (choice, appointment, discussion, advice, test, etc.) should be documented and archived for later reference.

27. A national expert workshop on the further development of the guidelines contained in decision VI/7 A, which was held from 31 March to 1 April 2003 in Berlin, Germany, concluded that:

(a) The strict separation between data collection and impact analysis on the one hand and evaluation of the predicted environmental impacts on the other hand is essential;

(b) The way in which the results of the evaluation becomes part of the decision making process requires separate attention.

28. Balfors and Mörtberg (2002) and Gontier *et al.* (2003) provide additional recommendations based on experience from Sweden:

(a) Environmental impact assessment practices need to be focused and draw on common methodologies. The analysis of biodiversity considerations needs to go beyond simple descriptions;

(b) While a (descriptive) base-line study may be appropriate in scientific language, it is often difficult to understand by the general public, including decision makers and stakeholders. Base-line studies should go beyond the directly affected area and consider the landscape scale, as well as cumulative and indirect effects. Quantitative predictions are required, especially those taking into account the scale of the biological processes, communities and populations.

29. Cumulative effects, taking into account the significance of planned and existing projects that affect the same area should explicitly be addressed. However, there is often little understanding among regulatory authorities and developers of the concept of cumulative effects. This is also true in part for environmental impact assessment practitioners. Capacity-development activities should thus explicitly pay attention to biodiversity issues.

D. Recommendations for alternatives, mitigation and compensation

30. The purpose of mitigation in environmental impact assessment is to look for better ways to implement project activities so that negative impacts of the activities are avoided or reduced to acceptable levels and the environmental benefits are enhanced, and to make sure that the public or individuals do not bear costs which are greater than the benefits which accrue to them. Remedial action can take several forms, i.e. avoidance (or prevention), mitigation (including restoration and rehabilitation of sites), and compensation (often associated with residual impacts after prevention and mitigation).

31. Tanaka (2000, 2001) described the environmental impact assessment legislation introduced in Japan in 1997, which introduced the concept of “ecological mitigation” without providing clear guidelines. For ecological mitigation measures, assessment aspects of both “quality” and “quantity” are indispensable. The assessment aspect of “quantity” is further divided into “space” and “time”. Tanaka (2002) therefore proposed the following sequential analysis:

(a) Do we really need the proposed project? (avoidance mitigation);

(b) Do we really need the project here/now? (avoidance mitigation);

(c) Do we really need proposed project as a whole? (minimization mitigation);

(d) Can we minimize the size/duration of the original proposal? (minimization mitigation);

(e) When we cannot avoid/minimize the impacts of the original proposal, we must compensate for the remaining impacts (i.e. loss of ecosystems/habitats of the site) (compensation mitigation).

32. Compensatory mitigation measures such as the restoration or creation of ecosystems can thus only be identified after considering "avoid" and "minimize" mitigation measures, and they must always be proposed when ecological impacts can not be avoided.

33. The European Community habitats directive requires timely and efficacious measures: compensation has to be in place when effects of a project materialize and compensation should provide natural values comparable to the ones lost.

34. According to Hensen (2003) who described an environmental impact assessment in which the presence of a red-listed toad in an area of horticultural development in the Netherlands triggered the need to develop an environmentally friendly alternative. As this alternative was also the economically most sensible solution, she concluded that the integration of conservation and sustainable use can result in an economically viable and ecologically sustainable solutions.

35. Tempel and Brouwer (in press) provide a number of general conclusions based on experiences in a number of large infrastructure projects in the Netherlands:

(a) Timely and ample attention to mitigation and compensation, addressing contents as well as the interaction with society, will largely reduce the risk of negative publicity, public opposition and delays;

(b) Mitigation requires joint effort of engineers and ecologists;

(c) Potential mitigation or compensation measures have to be included in an impact study in order to assess their feasibility;

(d) In project planning, it has to be kept in mind that it takes time for effects to become apparent and that the development of compensation measures is often slow.

36. Quigley and Harper (in prep.) report on habitat compensation in Canada as required by the Fisheries Act. A "harmful alteration, disruption, or destruction to fish habitat" (HADD) cannot occur unless authorized with legally binding compensatory habitat to off-set the HADD. The study demonstrated that fish habitat compensation is, at best, slowing the rate of habitat loss. Essentially, adaptive management has not been occurring because follow-up monitoring (by proponents and Fisheries and Oceans Canada (DFO)) and independent quantitative evaluations are rarely completed. Compensation habitat is almost always smaller than authorized and the habitat impacts are often larger than authorized. The ability to replicate ecosystem function is limited and both improvements in compensation science and institutional approaches are necessary. Recommendations to improve success include larger compensation ratios, creation and documentation of the functionality of compensation habitats prior/concurrent to HADDs, maintenance programs, increased monitoring and enforcement, and attention to limiting factors on a watershed basis among others.

37. It is important to acknowledge that some habitats cannot be compensated for. Failure to acknowledge the limitations of compensatory science will lead to net loss of specific habitats.

E. Recommendations for monitoring and environmental auditing

38. The need for monitoring is stressed in many texts on impact assessment. However, there are few reports on actual monitoring and evaluation. It is therefore difficult to assess the present status of biodiversity monitoring and *ex post* evaluations of projects. However, the following conclusions can be drawn:

(a) There is a need for more evaluative case studies on monitoring and environmental auditing;

(b) There is need to identify competent authorities and institutions to be entrusted with monitoring and follow-up of mitigation measures;

(c) Institutions must have a clear mandate and be allowed to operate independently. Conflict over competencies must not occur;

(d) Monitoring and evaluation must focus on the underlying causes of observed changes;

(e) The responsible authority must ensure that monitoring requirements are budgeted for, carried out and paid for. The cost of monitoring must be internalized by the project.

F. General recommendations

39. The guidelines contained in decision VI/7 A should not take over the function of general environmental impact assessment guidelines, but rather focus on aspects relevant to the conservation of biological diversity. General provisions in terms of procedures should be kept as short as possible while remaining on a conceptual level and should be limited to the components essential for conducting sound environmental impact assessment/ strategic environmental assessment. This will ensure that the guidelines remain compatible to existing national and regional planning systems and environmental impact assessment procedures. In addition, there is a need to develop sector specific guidelines on how to address biodiversity concerns in environmental impact assessment.

40. Parties and other States should be encouraged to review their environmental impact assessment system (legislation, appeal, procedures and guidelines) and capacity (size of the staff, experience, skills and motivation). When environmental impact assessment systems are introduced or adapted, Parties and other States should ensure that biodiversity considerations are fully taken into account.

IV. BIODIVERSITY CONSIDERATIONS IN STRATEGIC ENVIRONMENTAL ASSESSMENT

41. Strategic environmental assessment is the formalized, systematic and comprehensive process of identifying and evaluating the environmental consequences of proposed policies, plans or programmes to ensure that they are fully included and appropriately addressed at the earliest possible stage of decision-making on a par with economic and social considerations (Saddler and Verheem, 1996). Strategic environmental assessment is an answer to the shortcomings of traditional project-level environmental impact assessment that cannot, for example, deal with the cumulative effects of multiple activities. It also allows assessing the impacts of proposed activities at the earliest possible stage, where options for alternative solutions are greatest. Strategic environmental assessment has therefore been recognized as a key tool for integrating the principle of sustainability into the formulation of policies, plans and programmes and has the potential of moving development towards the goals of sustainability (Weaver *et al.* 2003).

42. Strategic environmental assessment should be applied to or be integrated into development planning. Cumulative environmental effects are not attributable to any one source of activity and cannot be regulated in isolation. Planning for new development must therefore take account of cumulative threats to biodiversity as well as those posed by individual proposals. Biodiversity considerations must systematically and consistently be addressed in strategic environmental assessment. It is recommended that the methodology should follow the general framework established for environmental impact assessment and that environmental impact assessment and strategic environmental assessment guidelines be maintained jointly. The biodiversity considerations contained in decision VI/7 A are fully applicable to strategic environmental assessment.

43. Treweek (2001) lists specific situations in which the implementation of strategic environmental assessment is recommended:

(a) Where comprehensive monitoring of biodiversity has not been instituted. In such a case, strategic environmental assessment can provide baselines and indicators;

(b) Where strategic environmental assessment enables assessment of the risk of cumulative impact on biodiversity;

(c) Where ecosystem behaviour is poorly understood and long lead-times are required to collect reliable baseline information;

(d) Where ecosystems are unstable or fluctuating, more baseline data are required for predictions and these can reliably be obtained in the framework of an strategic environmental assessment;

(e) Where important biodiversity resources are limited and fragmented strategic environmental assessment is more effective than project environmental impact assessment and resources can be assessed throughout their range;

(f) Where mitigation options are limited (e.g. few suitable alternative sites are available);

(g) Where replacement options are all long-term (e.g. restored habitats will take a long time to establish);

(h) Where biodiversity resources are threatened from many directions or by activities in a number of sectors;

(i) Where there are many stakeholders requiring local uses of biodiversity to be sustained.

44. Generally, it emerges from a number of case studies on wetland development and/or restoration, that a participatory approach at the earliest possible planning stage, which includes all relevant stakeholders and particularly the people which are likely to be affected, can result in more cost-effective project design and effective biodiversity conservation or restoration. A participatory approach will always be necessary to balance present day uses and the safeguarding of biodiversity for future generations and purposes.

45. For strategic environmental assessment to be effective, the following preconditions are ideally met:

(a) Existing clear environmental policies and objectives;

(b) An effective state of the environment reporting;

(c) A well structured planning process;

(d) Political will and bureaucratic responsiveness to use strategic environmental assessment effectively.

46. Practice shows that almost all methods and techniques needed are available. These are developed either in project environmental impact assessment or as policy instruments. Sometimes these methods may be applied directly, while in other cases they may have to be fine-tuned to the needs of the particular strategic environmental assessment.

47. According to the South African Strategic Environmental Assessment Guideline Document (Department of Environmental Affairs and Tourism, 2000) sustainable development requires the consideration of all relevant factors including the following:

(a) That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimized and remedied;

(b) That pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimized and remedied;

(c) That the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimized and remedied;

(d) That waste is avoided, or where it cannot be altogether avoided, minimized and re-used or recycled where possible and otherwise disposed of in a responsible manner;

(e) That the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;

(f) That the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardized;

(g) That a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and

(h) That negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimized and remedied.

V. INTEGRATION OF SOCIAL AND CULTURAL COMPONENTS INTO IMPACT ASSESSMENT

A. Background

48. It is recognized that the industrial exploitation of renewable and non-renewable resources (mining, oil extraction, fishing, agriculture and logging), the establishment of industrial facilities (factories, refineries, storage facilities), the construction of public works and infrastructure (urban development, waste-disposal facilities, dams, highways), and tourism and recreational facilities can constitute major threats to biological diversity, as well as the natural resources on which indigenous and local communities depend for their survival. Both components of biological diversity and the traditional knowledge and practices of indigenous and local communities which sustain biodiversity continue to be at risk from unsustainable development and resource use practices which reduce or alter habitats and diminish the traditional natural resource base essential for the survival of indigenous and local communities. It is therefore essential that before any development is allowed to take place, the potential impacts on both habitat and the lifestyles of affected indigenous and local communities are identified and given full consideration in cultural, environmental and social impact assessments.

49. An integration framework has been prepared by Slootweg *et al.* (2001), and elaborated for biodiversity (Slootweg & Kolhoff, 2003). It is recommended that further attempts be made to integrate environmental, social and cultural impact assessment. The integration framework provides a useful conceptual basis for the preparation of a generic integrated impact assessment procedure. However, it is recognized that Parties may be require modifications as legislative frameworks and the scope of impact assessment may differ between countries.

50. The need for integrated impact assessment is supported by evidence from various sectors including hydrological engineering, energy and nature conservation. Based on an analysis of drainage projects, Abdeldayem *et al.* (in prep.) make a strong case for integration of various impact assessment instruments. They propose an ecosystem approach focussed on the identification of functions provided by a well defined landscape or ecosystem, including the identification of stakeholders of these functions, and the assessment of the potential role of drainage in enhancing functions while avoiding damage to other functions.

51. Athanas *et al.* (2002) and EBI (2002) describe the need for integration of impact assessment tools within the oil and gas industry. Their papers summarize experiences learned through the process of integrating biodiversity into the corporate guidelines for environmental and social impact assessments. Shell's guidelines on impact assessment introduce an integrated approach which brings together three key elements—environmental, social and health—into a single assessment process which is applied at the discrete project level, full field development level, and at a wider (cumulative and regional) level. Importantly, this integrated approach is also integrated in the sense that it is designed to fit into the business process. The guidelines are structured such that there is an overarching guide for impact assessment, which is supported by three modules on environment, social, and health impact assessment, which are then in turn supported by a tool box containing specific tools for issues within the impact assessment.

52. Integrated impact assessments are considered important by Shell because they:

(a) Provide the opportunity to identify and address conflicting impacts (for instance, where mitigating an environmental impact results in subsequent social impacts);

(b) Enable decision makers to identify possible synergies between the environment, social and health elements of a project;

(c) Facilitate consistency in the reporting and management cycles of the project; and

(d) Encourage project managers and decision makers to examine the project in the surrounding context (environmental, social and health).

53. From a conservation and development perspective a strong statement is provided by Schmidt-Soltau (2002) in a description of an impact assessment in a national park project in south-west Cameroon. In 1986 Korup National Park was created, covering an area of 1,259 km^2 of traditional communal land shared between seven villages with 1,400 inhabitants. Nearly 30,000 individuals from 187 villages are utilizing the park and its surrounding area for hunting, gathering, fishing and farming since nearly 5,000 years. An assessment of the impacts of prohibiting further exploitation of the forest showed that even if the project were to use its entire budget to compensate the traditional owners on an annual basis, the villagers – not considering the impact on their subsistence - would be forced to contribute some 20% of their annual cash income to the conservation of rainforests. The conflicting interests between strict protection and sustainable use of nature conservation areas can only be analysed from both biophysical and social points of view.

54. The need for integration is not undisputed, however. Georgi and Peters (2003) state that impacts on socio-economic aspects should only be analysed and taken into consideration within the scope of environmental impact assessment to the extent to which they are directly related to biological diversity. Otherwise, environmental impact assessment should focus on environmental aspects in a strict and narrow sense. In any case it is advisable to treat ecological, socio-economic and cultural issues separately as decision-making may otherwise become less transparent.

B. General recommendations

55. It is recommended to:

(a) Analyse the complementarities of the recommendations for the conduct of cultural, environmental and social impact assessments regarding developments proposed to take place on, or which are likely to impact on, sacred sites and on lands and waters traditionally occupied or used by indigenous and local communities in annex II of decision VI/10 with the guidelines for incorporating biodiversity-related issues into environmental impact assessment legislation and/or process and in strategic environmental assessment annexed to decision VI/7 A;

(b) Consider, within the process of further development, the preparation of a proposal for the integration of the recommendations for the conduct of cultural, environmental and social impact assessments regarding developments proposed to take place on, or which are likely to impact on, sacred sites and on lands and waters traditionally occupied or used by indigenous and local and the guidelines for incorporating biodiversity-related issues into environmental impact assessment legislation annexed to decision VI/7 A.

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Annex

CASE-STUDIES

Canada

Source: Quigley & Harper (in prep.) and Harper & Quigley (in prep.)

Fisheries Act

Canada contains approximately one quarter of the world's wetlands that support a rich biodiversity of over 198 fish species. About one seventh (20 million ha) of Canada's wetlands have been lost in the last century. In North American inland waters, 73% of fish extinctions can be attributed to habitat alterations.

In response, Fisheries and Oceans Canada (DFO) enacted the habitat provisions of the Fisheries Act. A "harmful alteration, disruption, or destruction to fish habitat" (HADD) cannot occur unless authorized with legally binding compensatory habitat to off-set the HADD. Canada's conservation goal is no net loss of the productive capacity of fish habitats (NNL). While this NNL policy has been in place for nearly two decades, DFO has conducted or commissioned only ten studies evaluating its performance in achieving no net loss through habitat compensation.

Compensation

A total of 103 compensation projects were assessed by these 10 studies, representing only 4% of the total number of HADDs authorized since 1986. Despite Canada's progressive conservation policies, the performance in achieving NNL has never been evaluated on a national scale. As such, a national review of habitat compensation was initiated in 2000.

Files relating to 124 Fisheries Act authorizations issued by DFO for HADDs that occurred from 1994 to 1997 were collected across Canada and analysed to provide an indication of the trends and patterns relating to fish habitat compensation projects, to determine the effectiveness of fish habitat compensation in achieving no net loss, and to provide recommendations for improvement.

Compliance

This file review was unable to determine whether the compensation projects achieved no net loss because of a low 47% compliance rate with post-construction monitoring: a total of 210 monitoring reports were never submitted to DFO. Moreover, post-construction monitoring was often more qualitative than quantitative, offering little insight into the achievement of no net loss on a per project basis.

As such, 52 of the 124 projects were investigated to determine biological, physical, and chemical compliance with authorization specifications. Biological requirements had the lowest compliance (58%) and chemical requirements the highest (100%). Approximately 86% of authorisations had larger HADD and/or smaller compensation areas than authorized. These were not small differences. On average, HADDs in riverine habitat were 389% larger than authorized. Consequently, 45% of in-channel compensation projects and 72% of riparian projects resulted in net losses in habitat area. Potential Fisheries Act violations were prevalent at 50% of the projects. Multiple regression analyses indicated violations were negatively associated with the occurrence of a DFO field inspection, providing empirical support for increased monitoring.

At 16 of the 52 projects, the effectiveness of habitat compensation in achieving no net loss of habitat productivity was evaluated. Periphyton biomass, invertebrate density, fish biomass and riparian

vegetation density were used as indicators of habitat productivity. Approximately 13% of projects achieved a net gain in habitat productivity. These projects were characterized by mean compensation ratios (area gain:area loss) of 5:1. Twenty-five percent of projects achieved NNL and 63% of projects resulted in net losses in habitat productivity. These projects were characterized by mean ratios of 1.1:1 and 0.7:1 respectively. Artificially increasing ratios to 2:1 was not sufficient to achieve NNL for all projects.

The study concludes that habitat compensation is at best slowing the rate of habitat loss in Canada. The ability to replicate ecosystem function is limited. Increasing the amount of authorized compensatory habitat in the absence of institutional changes will not reverse this trend. Improvements in both compensation science and institutional approaches are recommended to achieve Canada's conservation goals.

Estonia

In Estonia a pilot project was initiated in the framework of cooperation agreement between the Finnish and Estonian Ministries of the Environment in the end of 1995 (Jalakas, 1998). The objective was to conduct Strategic Environmental Assessment during the development of comprehensive planning for a selected municipality. The aim of the pilot project was to use the experience obtained throughout the EA process for development of strategic environmental assessment methodology suitable for the Estonian conditions. The subject of the SEA was Naissaar island. The whole territory of the island belongs to a Nature Park (a protected area with recreational objectives) setting certain restrictions to planning the nature management and human settlement of the island. The project followed a staged approach; each planning stage coincided with it's counterpart environmental assessment stage. Each stage contained a public participation element.

Stage	Planning	Environmental assessment
1	Development strategy and objectives	Identify environmental aspects of the strategy
2	Proposing of development alternatives	Scoping (prognosis of magnitude and significance of impacts)
3	Draft planning proposal	Preparation of SEA on preferred alternative
4	Planning proposal	SEA Report
5	Implementation and monitoring	Implementation of mitigation measures / post-audit

For identification and assessment of environmental impacts, the matrix analysis method was used. Environmental components, at which impacts arising from implementation of the planning would be directed, were presented in horizontal lines:

(a) Nature and landscape(ground and surface water; weather; fauna; biological diversity; etc.)

(b) Structure of population and man-made environment (buildings; facilities; infrastructure; historical heritage; etc.)

(c) Man and society (living; working; service; health; safety; private property, etc.)

Activities bringing about the impacts were presented in vertical columns:

(a) Activities causing the impacts: short-term activities (construction; risks; dangerous situations; etc.) And continuous or long-term activities(living; tourism; recreational activities; traffic; economic activities; etc.);

(b) Description of the impacts (frequency; scope; strength; etc.);

(c) The significance of the impacts;

(d) Possibilities for avoiding or mitigation of the impacts.

Strategic environmental assessment conducted in parallel to the development of comprehensive planning resulted in directing the planning process already in its course towards environmentally sound solutions, while taking into account the interests of different interested parties related to the planning territory. As a consequence, no considerable problems or seriously differing opinions arose in the final stage of the planning - the implementation stage.

One of the most important and successful stages of the process was public involvement and participation. Timely and early informing of the public enabled to avoid the arising of conflicts, find new creative solutions and receive information concerning the preferences of interested parties and inhabitants. Good organization of the public involvement process made it possible to avoid the situation in which changes would need to be made in the planning implementation stage. The effectiveness of the process was also enhanced by the division of the planning and environmental assessment process into stages. Thus, it was easier.

The opinion of the competent authority concerning the effectiveness of the process was positive. The implemented pilot project proved well that the integration of environmental assessment into the very process of development of planning is the only way to reach a solution optimum from the viewpoint of both the natural environment and the society while using the minimum of resources.

Source data concerning the state of some environmental components of the island were partly lacking. Gaps and partial insufficiency were identified in data concerning biological (mainly faunistical) and geological (especially concerning the genesis) and geomorphological information. Consequently, the identification of environmental impacts in these areas proved to need further investigation.

European Union – Habitats directive

Abstract from: European Communities (2000). MANAGING NATURA 2000 SITES. The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (http://europa.eu.int/comm/environment/nature/art6_en.pdf)

One of the key instruments relating to nature conservation within the European Union is Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive). This directive provides for the setting up of a coherent European ecological network of special areas of conservation under the title Natura 2000. The network shall enable the Member States to conserve the natural habitat types listed in Annex I as well as the animal and plant species (Annex II) of Community interest.

Pursuant to Article 6 of the Directive, any new plan or project likely to have a significant effect on a Natura 2000 site must take account of the natural value, which determined the integration of the site into the network. An appropriate assessment of the effects of the project on the site's conservation aims is therefore required. The national authorities are free to authorize an activity provided that the assessment shows that it will not have an adverse effect on the site.

To assess the possible consequences of a project against the objectives of the directive, the following indicators, which define a favourable conservation status of a natural habitat in accordance with Article 1(e) of the Directive, can be used:

- *The natural range and areas covered by the habitat within that range are stable or increasing*: Any event which contributes to the reduction of the areas covered by a natural habitat for which this site has been designated can be regarded as deterioration. For example, the importance of reduction of the area of the habitat has to be assessed in relation to the total surface occupied in the site according to the conservation status of the habitat concerned.

- *The specific structure and functions of the area necessary for its long-term maintenance exist and are likely to continue to exist in the foreseeable future*: Any impairment of the factors necessary for the long-term maintenance of the habitats can be regarded as deterioration. The functions necessary for the long-term maintenance depend of course on the habitat concerned (it would be useful to have common indicators enabling to assess these elements for each habitat type). Member States have to know these requirements (by means of studies, data collection, etc.) since Article 6(1) provides that they have to take measures 'which correspond to the ecological requirements of the habitats in Annex I and species in Annex II'.

- *Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable element of its natural habitats*: Any event which contributes to the long-term decline of the population of the species on the site can be regarded as a significant disturbance.

- *The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future*: Any event contributing to the reduction or to the risk of reduction of the range of the species within the site can be regarded as a significant disturbance.

- *There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis*: Any event, which contributes to the reduction of the size of the habitat of the species within the site, can be regarded as a significant disturbance.

Article 6(3) of the Directive provides that:

> "Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."

As regards geographical scope, the provisions of Article 6(3) are not restricted to plans and projects, which exclusively occur in or cover a protected site; they also target developments situated outside the site but likely to have a significant effect on it.

The notion of what is "significant" needs to be interpreted objectively. At the same time, the significance of effects should be determined in relation to the specific features and environmental conditions of the protected site concerned by the plan or project, taking particular account of the site's conservation objectives.

As regards the connotation or meaning of "integrity", this can be considered as a quality or condition of being whole or complete. In a dynamic ecological context, it can also be considered as having the sense of resilience and ability to evolve in ways that are favourable to conservation. The "integrity of the site" has been usefully defined as "the coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for

which the site is or will be classified". A site can be described as having a high degree of integrity where the inherent potential for meeting site conservation objectives is realized, the capacity for self-repair and self-renewal under dynamic conditions is maintained, and a minimum of external management support is required.

Article 6(4) lays out conditions under which projects that may degrade a Natura 2000 site can be pursued:

> "If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted. Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest."

The preliminary assessment of the impacts of a plan or project on the site, provided for in Article 6(3), enables the competent national authorities to arrive at conclusions regarding the consequences of the initiative envisaged in relation to the integrity of the site concerned. If these conclusions are positive, in the sense that there is a high degree of certainty that the initiative in question will not affect this site, the competent authorities can give their consent on the plan or project. In case of doubt, the precautionary principle should be applied and procedures under Article 6(4) followed, as in the case of negative conclusions.

The first step of the competent authorities is to examine the possibility of resorting to alternative solutions, which better respect the integrity of the site in question. In the absence of alternative solutions—or in the presence of solutions having even more negative environmental effects on the site concerned, with regard to the abovementioned conservation aims of the directive—the second step of the competent authorities is to examine the existence of imperative reasons of overriding public interest, including those of a social or economic nature, which require the realization of the plan or project in question.

The compensatory measures constitute measures specific to a project or plan, additional to the normal practices of implementation of the "Nature" directives. They aim to offset the negative impact of a project and to provide compensation corresponding precisely to the negative effects on the species or habitat concerned. The compensatory measures constitute the 'last resort'. They are used only when the other safeguards provided for by the directive are ineffectual and the decision has been taken to consider, nevertheless, a project/plan having a negative effect on the Natura 2000 site.

The compensatory measures *sensu stricto* have to ensure the maintenance of the contribution of a site to the conservation at a favourable status of one or several natural habitats 'within the biogeographical region concerned'. It results from the fact that:

- A site should not be irreversibly affected by a project before the compensation is indeed in place. For example, a wetland should normally not be drained before a new wetland, with equivalent biological characteristics, is available for inclusion in the Natura 2000 network;

- Compensation must be additional in relation to the Natura 2000 network to which the member State should have contributed in conformity with the directives.

The compensatory measures can consist of:

- Re-creating a habitat on a new or enlarged site, to be incorporated into Natura 2000;
- Improving a habitat on part of the site or on another Natura 2000 site, proportional to the loss due to the project;
- In exceptional cases, proposing a new site under the "Habitats" directive.

The result has normally to be operational at the time when the damage is effective on the site concerned with the project unless it can be proved that this simultaneity is not necessary to ensure the contribution of this site to the Natura 2000 network.

In order to ensure the overall coherence of Natura 2000, the compensatory measures proposed for a project should therefore: (a) address, in comparable proportions, the habitats and species negatively affected; (b) concern the same biogeographical region in the same member State; and (c) provide functions comparable to those which had justified the selection criteria of the original site. The distance between the original site and the place of the compensatory measures is not therefore an obstacle, as long as it does not affect the functionality of the site and the reasons for its initial selection.

Hong Kong, China

Source: Dahmer (pers. comm.)

Annex 1 of this document contains Annexes 8 and 16 of the Hong Kong Environmental Protection Department's "Technical Memorandum on Environmental Impact Assessment Process". The Hong Kong EIA guidelines are considered either equivalent to or superior to those of the CBD. In effect rather stringent guidelines are being used.

The Technical Memorandum (or TM) is statutory: Environmental Impact Assessment Ordinance, Chapter 499, Section 16. Each project proponent must submit to the Environmental Protection Department (EPD) a project brief requesting an assessment by EPD on the need for a formal EIA. Large projects require EIAs, while the ecological importance of the project site will determine whether small projects require an EIA. 2/ Appendix A of Annex 16 of the Technical Memorandum provides the flow chart summarizing the general procedures in determining whether an ecological assessment is needed in an EIA study. The Project Profile (similar to a project brief) submitted by the project proponent contains all the necessary information of the project, including elements of the surrounding environment and potential impacts of the project, for the regulatory authority to determine the scope of the ecological and biodiversity issues associated with the project so as to prepare the study brief. In addition, the Project Profile is required to be made available for public inspection, and relevant public comments received subsequently would be incorporated into the study brief where appropriate. Professional consultants who are responsible for undertaking the EIA studies are expected to be able to focus on the key issues identified in the process.

In practice the Technical Memorandum works fairly well as a guideline. Biodiversity and habitat information is collected and reported, impacts assessed, avoided, minimized or mitigated as directed. Similar to other places in the world, practitioners of varying quality levels are available. The Hong Kong Special Administrative Region of the People's Republic of China has an effective legislation placing reasonable emphasis on biodiversity, growing technical capacity and experience. The Technical Memorandum is a very good example of integrating biodiversity considerations into a national EIA

2/ See http://www.epd.gov.hk/eia/english/legis/index1.html for further details

system, although predominantly focussed on the conservation of biodiversity and less so on the sustainable use.

Israel: Analysis of environmental statements

Source: Mandelik et al. *(2002)*

Mandelik et al. (2002) carried out a detailed analysis of 50 environmental statements produced over a six year period. The statements were representative for 9 major sectors. Each statement was evaluated, based on a common evaluation form, which specified the ecological aspects that need to be addressed. The form consisted of 64 detailed criteria. The conclusions of this study apply to many countries, but this case is scientifically well documented and merits some special attention.

Environmental impact assessment was introduced since the mid 1970's, and legally binding since 1982. EIA is mandatory for four major developmental categories, and optional, based on screening, for the other categories. Guidelines are prepared by the Ministry of Environment (MoE). Based on these guidelines, the environmental impact statement (EIS) is prepared by the proponent. MoE reviews the EIS; the EIS and the MoE review are submitted to the relevant planning commission for a decision on how to proceed.

The main conclusions of the analysis were that, with respect to biological diversity:

(a) Lack of quantitative data, meaningful analyses and broad perspective were apparent throughout the EISs reviewed.

(b) Most EISs presented baseline information and potential ecological impacts, but failed to give any quantified data, or predict indirect, cumulative effects.

(c) Many EISs failed to perform field surveys and their qualitative nature hampered meaningful impact prediction.

(d) Most EISs mentioned the need for mitigation measures, but provided no description of these measures or their likely success.

The reason for the apparent lack of attention for biological diversity could largely be traced back to a lack of ecological requirements in the guidelines (or term of reference) for the EIA study. There is a generally high correlation between the (ecological) quality of the EIS and their corresponding guidelines. If the guidelines do not specify the scope and nature of study to be carried out, one can hardly expect a proponent (and its hired consultant) to provide more information than requested. The role of the guidelines, and the entire scoping phase that leads to guidelines, in upgrading the role of biological diversity in impact assessment in Israel, and elsewhere, is well demonstrated by this study. Lack of basic ecological knowledge and databases are said to critically hamper ecological assessment in Israel.

Japan

Source: Tanaka, 2000, 2001, 2002

In Japan, the EIA Administrative Order of 1984 played a role in preventing serious pollution problems. However it did not do enough to conserve ecosystems and could not cope with global environmental issues. UNCED in 1992 triggered to establish an EIA law, which was enacted in 1997. The principal differences between the order and the law with respect to ecological impact assessment are that (i) "ecosystem" assessment became a requirement in addition to traditional "flora and fauna" assessment, and (ii) that mitigation provisions such as "avoid-minimize-compensate for" were regulated.

Consequently “ecological mitigation”, especially compensatory mitigation became the most controversial concept in EIAs.

Example: The 1985 EIS of the trans-Chugoku highway construction project overlooked the presence of an important wetlands area as there was no information on this wetlands and field surveys were not required by the early guidelines. Local NGO's protested during construction, which led to the creation of a new wetland as a compensatory measure. This is the first case in Japan in which a proponent tried to implement compensatory measures based on biological diversity considerations. The role of local NGO's and universities was important as initiator of the discussion. A point of discussion is that, in order to assess the effectiveness of the measure, success criteria for compensation measures need to be provided beforehand.

Since clear guidelines on ecological mitigation have not been published yet, some ecological restoration projects have been proposed as remissions of ecologically not sound development projects without reconsideration of original project plans.

Example: Nagoya City decided to reclaim 46.5 ha of Fujimae tidal wetland to secure a landfill area for waste. However, Fujimae was an important wetland for migrating birds. Ecological impacts were neglected or rated as “very slight” in the 1.000 page EIS. Strong opposition from civil society led to a proposal for the creation of new wetlands as a compensatory measure. This compensatory plan was announced without looking at potential avoidance and minimization of impact measures in the original plan so opposition remained strong. Finally, Nagoya City gave up the landfill plan in Fujimae wetland. This is the fist case where a proposed project was totally rejected on ecological arguments in the EIA process. Points to be highlighted in the case are (i) the little useful information for the definition of mitigation measures in spite of an enormous amount of survey data, and (ii) the definition of compensation in the mitigation sequence wasn't clearly defined (compensation was proposed without first looking at possibilities for avoidance and/or minimization. In the end Nagoya City started to promote waste management and recycle programmes although there still is a need for a landfill site.

The 1984 Order emphasized on checking whether there was any “rare species” in the project site and so the outcomes of EISs often became just inventories of flora and fauna. So, absence of rare species was usually translated into no significant ecological impacts expected. Thus, EISs usually did not show substantial mitigation measures against ecological impacts because EISs showed no significant ecological impacts.

In case a rare species was found, they were simply transplanted to other areas, as the former Japanese EIA system did not require project proponents to conserve their habitats. In the 1997 EIA law logical mitigation sequence “avoid – minimize – compensate” was regulated and ecological mitigation, especially compensatory mitigation, got spotlight for the first time. Guidelines of ecological mitigation requirements to EIA practitioners do not exist yet. Tanaka in his publications proposes elements of such guidelines.

“Avoidance” mitigation means to avoid impacts by avoiding a whole or parts of original development plan. “Minimization” mitigation means to minimize impacts by the proposed development development plan. “Compensation” mitigation means to compensate impacts by restoring/creating ecosystems similar to the ones affected. This three step sequencing is very clear and may be the best way to consider adequate ecological mitigation measures. However, this sequencing is considered too general for EIA practitioners who need to propose substantial mitigation measures to their project proponents. For ecological impact assessment or substantial ecological mitigation measures, assessment aspects of both “quality” and “quantity” are indispensable. Assessment aspect of “quantity” is further divided into “space” and “time”.

The following new sequencing is proposed:

(a) Do we really need the proposed project? (We may be able to avoid the whole project.);

(b) Do we really need the project here/now? (We may be able to avoid the site/time of the original proposal.);

(c) Do we really need proposed project as a whole? (We may be able to avoid some parts of the original proposal.);

(d) Can we minimize the size/duration of the original proposal?

(e) When we can not avoid/minimize the impacts of the original proposal, we must compensate for the remaining impacts (i.e. loss of ecosystems/habitats of the site).

Compensatory mitigation measures such as the restoration or creation of ecosystems can thus only be considered after considering "avoid" and "minimize" mitigation measures. Secondly, compensatory mitigation measures must always be proposed when ecological impacts can not be avoided.

Compensatory mitigation implies that project proponents must keep "quality," "space" and "time" of habitats, which will (or may be) be affected by proposed development projects. The "space" variable should be further divided into "location" and "size".

From an ecological viewpoint, the following solutions are more desirable:

(a) Quality: restore/create similar type of habitats, not different;

(b) Location: restore/create habitats within the development site;

(c) Size: restore/create similar (or larger) sized habitats;

(d) Time: restore/create before/at the same time of the development project.

Recommendations

For policies/administration sides, guidelines that describe principles of ecological mitigation proposals such as sequencing of "avoidance-minimization-compensation" must be prepared to avoid "excuse" type compensation.

Netherlands: Horticultural development

Source: Hensen, case study presented at the 2003 annual IAIA conference in Marrakech

Horticultural development, as virtually all other spatial development in the Netherlands, is limited by multiple spatial demands in a densely populated environment. Water storage, biodiversity conservation, economic development and quality of landscape are some of the main issues that had to be dealt with in a new horticultural development scheme. At the onset of the environmental impact assessment process to two largely conflicting views were dominant: the economical department view, stressing the need for few regulations and cheap solutions, versus the environmental department view stressing the need for new examples of multiple use of space and the use of opportunities for other sectors. The occurrence of a red-listed toad underlined the need for a seriously developed environmentally most friendly alternative. (This is a legal requirement in the Netherlands). In a participative process all stakeholders reviewed their positions in an attempt to continue with the desired development. The environmentally most friendly alternative became a serious alternative. In a traditional exploitation of greenhouses each private owner collects rainwater in a storage pool, to be used for watering in dry periods. In the new design rainwater storage was combined for a larger number of greenhouse exploitations, thus saving space that was used for a large storage basin which also served as a nature

conservation area, suitable for the toad but also creating an attractive landscape for neighbouring residential area. In the end, the environmentally most friendly alternative appeared to be the economically most sensible solution.

Lessons in the light of the framework and decision VI/7 A:

(a) The presence of a red-listed animal can be a trigger for more integrated solutions.

(b) Putting conservation goals opposite to exploitation goals leads to deadlock: integration of conservation with sustainable use can result in an economically viable and ecologically sustainable solution.

Netherlands: Rotterdam mainport development project.

Source: Brouwer & Tempel (in press), Tempel & Brouwer (in press) and presented at the 2002 annual IAIA conference in The Hague

A proposed (second) extension of Rotterdam harbour into open sea (by land reclamation) leads to significant biodiversity impacts. An extensive biodiversity impact assessment has been carried out, legally based on the Netherlands Law on Flora and Fauna, and the European Habitat and Birds directives, and Natura 2000 ecological network.

Background

Initially, the European directives were considered to be of importance for nature conservation areas only. This dramatically changed when NGOs started to use the directives to oppose projects in non-protected areas, based on the presence of threatened species or habitats. Large development projects where halted by the European Commission because information on these species or habitats was lacking in the environmental impact statements. Economic damage was significant. Suddenly, local authorities and NGO's realized that the directives did not only apply to protected areas but also to other areas where protected species or habitats occurred. As impact statements in The Netherlands usually produced two aggregated scores, one on species and one on ecosystems, they where largely insufficiently in providing detailed answers on specific protected habitats or species.

Impact analysis

In the environmental impact assessment for the Rotterdam mainport development, an attempt was made to deal with these issues. Some fundamental questions needed to be answered by the study:

(a) *Are significant effects to be expected on protected area's and/or species?* Four main assessment aspects where defined: (i) (inter)national diversity of ecosystems, (ii) (inter)national diversity of species, (iii) naturalness, and (iv) ecological functioning. The weighting of the first two aspects was done by defining categories of protected status, combining national (conservation status and trend) and international (yes or no priority status under the European Habitat directive) criteria. This resulted in a transparent weighting process between alternatives. Difficulties arose in comparing national and international regulations. Emphasis is put on defining changes in numbers per species or area per habitat type. In case of prioritized habitats the "precautionary principle" was applied, using the most negative scenario's: 3200 ha net loss of marine habitat, 16 hectares of protected dune vegetation;

(b) *Are alternatives possible with no effects?* This was not possible since a large area of prioritized marine habitat was to be reclaimed for port development. However, the need to minimize as much as possible the area to be reclaimed (because of the special status of the marine area) produced an environmentally most friendly design which appeared to have, not surprisingly, the lowest land

reclamation costs. Another mitigation measures, the use of coarse sand to reduce inland hydraulic effects, also appeared to produce major savings in maintenance costs;

(c) *If no, is the project of "overriding public interest"?* Intervention in these locations is only permitted if the national government can convince the European Commission that intervention must take place in this particular location, due to important social interests (the "no, unless principle"). In such cases, any hazardous effects for the natural environment must be alleviated or compensated for, wherever possible. The mainport development of Rotterdam is considered to be of overriding public interest;

(d) *If yes, how can the effects be mitigated (=avoid effects)?* Economic design, location and building in phases;

(e) *How can remaining effects be compensated?* Developing new dune area (100 hectares) and establishing a marine reserve (about 32,000 hectares)

Spontaneous natural processes (development of vegetation) can be unfavourable for the requirement of maintaining certain protected zones. The legal focus on protected status consequently leads to artificial maintenance of areas/species and blockage of natural processes. One can question whether this is to be desired or not.

The process

Since the legally required formal public reviewing process was considered to be too late in the process stakeholders where involved throughout the process. Early involvement of external experts as well as stakeholders appeared to be vital to the process. The extra effort is considered worthwhile, because it is believed to reduce the risk on a negative advice by the European Commission and it results in viable nature compensation projects. The process was deliberately phased, moving from broad consensus on expected problems to focussed discussion on preferred measures: (i) creating consensus on possible effects; (ii) make an inventory of possible solutions, (iii) prioritizing measures likely to be supported, and (iv) elaborate preferred measures. Each step in the process has to be properly described and documented in a transparent and consistent manner.

An important aspect of the European directives is the "external effect" clause. Activities outside birds or habitat directive areas, but with potential effects on these areas, should comply with the directives. Aspects that were specifically addressed in the study included a potential change in salt disposition in the coastal dune system (which will in future be more remote from open sea), effects of sediment transport to the Waddensea (a large protected tidal area of international importance at 100 km distance), potential air pollution from the new port area.

Lessons drawn by the environmental impact assessment team with respect to biodiversity in the impact assessment for Rotterdam mainport development:

(a) In the impact analysis one should pay attention to (i) internal effects ánd (ii) external effects, in particular when dealing with prioritized protected areas, (iii) temporary effects, for example during construction, (iv) permanent effects during operation and maintenance, and (v) effects with other projects in the area under the influence of these effects (cumulative effects);

(b) For species and habitat with legal status (i.e., appearing in appendix 4 of the habitat directive, qualifying species, and habitats in specially protected areas) impact analysis and reporting should be done for individual species and individual habitats;

(c) In the impact analysis one has to be pay attention to intervention-effect chains; provide arguments why certain intervention – effect chains do NOT need to be studied;

(d) Application of the precautionary principle requires the use of the worst –case-scenario. This should be the point of departure for mitigation or compensation measures;

(e) Significance of the impact has to be determined by the project proponent. European Directives nor national legislation provide criteria to determine the significance of impacts. It is recommended to determine significance of impact in relation to an ecological unit such as a population or a protected area;

(f) Early involvement of stakeholders is in the interest of proponent as well as stakeholders;

(g) Address any request from stakeholders for further information and/or investigation in a serious manner; this not necessarily imply that all requests need to be honoured;

(h) Use external experts for advise and review;

(i) Document and properly archive each choice, appointment, discussion, advice, test, etc.

South Asia: Case summaries from roads, sensitive habitats and wildlife

Source: Rajvanshi et al. 2001

Case 1. Road and rail network development in Gir National park and Sanctuary

This case study describes how long-term "management" of roads passing through habitat for rare animals has had serious long-term negative effects and how rehabilitative action scan help.

Case 2: Kohalpur-Mahakali highway project, Nepal.

This case describes what happens when well thought-out mitigative measures are ignored, leading to human intrusion into highly sensitive areas. The importance of having laws and regulations supported by compliance monitoring is highlighted. Poor construction practises have resulted in stress on wildlife and the deterioration of an entire mitigation programme has taken place due to administrative disinterest and a lack of funds.

Case 3: Mumbai – Pune expressway project.

This case describes habitat loss, fragmentation, mitigation restrictions, ecosystem modification, erosion and sedimentation impacts. It also underscores the need to get environmental specialists involved early in the planning process, thereby saving costs and time. Finally, it highlights how environmental safeguards through carefully developed mitigative measures for integrating biodiversity concerns have been grossly violated during the implementation phase of a major expressway project.

Case 4: Linear developments and elephant movement in Rajaji – Corbett conservation area.

This case example highlights the impacts of linear barriers, including roads, on the movement of elephant in their largest conservation unit in the state of Uttaranchal. The options of suitable modifications in the design of existing structures that reflect faulty engineering planning of the roads and cross drainage structures in the conservation area are discussed.

Case 5: Colombo – Katunayake expressway project: integrating environmental considerations in project planning

This case describes habitat fragmentation, ecosystem modification and movement restrictions in a biologically significant coastal wetland habitat due to construction of an expressway. It exemplifies how

availability and integration of good scientific information on ecosystem dynamics, during the planning and design phase can help to mitigate ecological impacts.

Case 6: Andra Pradesh state highway rehabilitation project: the Nandyal – Giddalur – Thokapalli road

The case describes how simple errors in initial baseline data can lead to significant future economic losses, requiring a large cooperative effort to correct. This case underscores that sharing information with other stakeholders as it is obtained will often prevent such costly mistakes. Finally, it also illustrates that examination of a project in the context of what is taking place in the region, may help in identifying more regional and cumulative effects, and place the project's total impact in perspective.

Sweden

Sources: Balfors & Mörtberg (2002), Gontier et al. *(2003)*

Balfors and Mörtberg (2002) and Gontier *et al.* (2003) report on problems with incorporating biodiversity in IA in Sweden. These include:

(a) Lack of focus and common methodology in the current practices! When biodiversity issues are addressed in impact assessment it often remains at the impact description level;

(b) A common experience is, that at best, the descriptive base-line study may be good, in scientific language, which unfortunately often does not mean much to the reader, usually decision-makers or stakeholders. Even when the base-line study is good with respect to the directly affected area, the landscape scale is neglected, as are cumulative effects, and indirect effects. Quantitative predictions are lacking, especially those taking into account the scale of the biological processes, communities, and populations.

Case material was provided regarding biodiversity in relation to urban development. In urban regions new exploitations raise spatial claims on existing natural areas. In the long run the urbanization process will lead to a considerable loss and fragmentation of natural habitats, and habitat remnants are prone to urban disturbances. Yet, the preservation of biodiversity is one of the core objectives in Swedish environmental policy. In order to minimize adverse impacts, biodiversity aspects should be considered in the strategic planning of urban regions. For this purpose, adequate tools are required to identify the consequences of fragmentation and loss of natural habitats, caused by urban developments. Methods for landscape ecological assessment in the urbanizing environment are being developed and implemented in the Stockholm region.

In order to measure the consequences of fragmentation, indicators are studied that represent biodiversity on a landscape level and are sensitive to effects of urbanization. Indicators should be scientifically accurate but also possible to communicate effectively to actors. The case study evaluated fragmentation and disturbance effects of urbanization scenarios. To achieve biodiversity objectives communicative targets were used, measured by indicators in the form of suitable habitats of target species. Based on analyses of target species, predictions are made of consequences of planning scenarios. For this purpose a GIS-based landscape ecological decision support system is used. The results indicate that a diffuse development pattern have significant effects on the most sensitive target species. A dense development pattern has little effects on these species, but can have effects on the smaller target species. In both scenarios, it seems possible to mitigate the adverse impacts through adjustment of development patterns.

The case-study provides suggestions on indicators. The applied method concentrates on species level indicators, with the aim to support the survival of indicative species populations in the landscape. There are certain advantages to let the species set the scale: it provides a link between landscape pattern

and process so that protected areas do not become too small or isolated habitat patches. Several scales can be used, using vulnerable species with different ecological profiles (multiple response to environmental variables). Working with species level indicators works also quite good from a pedagogic / communications perspective.

Species that may be useful indicators, are vulnerable to:

(a) *Habitat loss and fragmentation*: the indicator species should have a large home range, broad resource requirements, and use several habitat types; its dispersal should be slow and consequently terrestrial animals have preference. Population density and reproduction rate should both be low;

(b) *Disturbance, habitat degradation*: habitat specialists with low competitive ability are needed, that avoid or are incompatible with human activities.

56. *Conclusion*: landscape ecological assessment can be used as a tool to make biodiversity information an integrated part of strategic planning. The use of species as indicators for impacts on landscape level can be useful from an impact prediction perspective as well as from a public communications perspective.

United Kingdom: Biodiversity impact of road schemes

Source: Byron, H. (2000)

Biodiversity and environmental impact assessment: a new approach

A step-by-step guide to the new approach

Following these steps will help you to ensure that all impacts on biodiversity are fully considered. The steps also provide a useful checklist if you are making decisions based on environmental impact assessment information.

Screening

The screening process will determine whether the development is likely to have adverse effects on biodiversity. You will need to decide whether a development might impact directly, indirectIy or cumulatively on:

(a) Designated areas;

(b) Areas of semi-natural habitat;

(c) Ecosystems and habitats subject to the national or local biodiversity action plan (BAP);

(d) Protected species and communities subject to the national or local biodiversity action plan (BAP).

If it might, an environmental impact assessment is needed.

Scoping

This stage identifies the potential impacts of the development on biodiversity. These need to be investigated in the environmental impact assessment. In particular you should consider habitat loss, fragmentation, and changes in habitat quality; other direct, indirect or cumulative effects. There may also

be positive effects through habitat enhancement, management or creation. To achieve successful scoping you should:

(a) Carry out early consultation with the relevant planning authorities, statutory and voluntary nature conservation bodies, and relevant biodiversity partnerships;

(b) Prepare and circulate a scoping report.

Description of the environment

Once you have identified which biodiversity elements and impacts to investigate, you need to collect information on these for the environmental impact assessment by:

(a) Gathering existing baseline information;

(b) Carrying out new surveys of all habitats likely to be directly -or indirectly -affected and of selected key species (determining species abundance and distribution);

(c) Selecting species for detailed study, particularly threatened, protected or BAP species, characteristic species for each habitat, and/or species susceptible to habitat fragmentation;

(d) Describing the criteria used to evaluate the importance of biodiversity elements.

Impact prediction and assessment

Provide a clear explanation of the criteria used to assess impact magnitude and significance. It is helpful to quantify the predicted impacts by giving the area and percentage of each habitat lost or gained. For each impact provide information on:

(a) Impact magnitude, duration, timing, probability and reversibility;

(b) The potential for and likely success of mitigation;

(c) Impact significance both before and after mitigation.

Mitigation and enhancement

Think “SSDD”; appropriate site selection and development design can avoid impacts on biodiversity -use this option wherever possible. Failing that, identify and implement the best practical mitigation option. However, compensation measures like translocation or habitat re-creation should be viewed as a last resort. Identify opportunities for enhancement. Mitigation and enhancement measures can contribute to BAP/LBAP targets.

Environmental impact statement

AII the biodiversity information should be detailed in the environmental impact statement. This should include a biodiversity-methods statement, discuss the scoping process, including consultation, then:

(a) Include maps showing: the study areas considered, biodiversity constraints, and the different types and quality of all habitats likely to be affected;

(b) Include or reference all new survey material .explain proposed mitigation and enhancement measures and give detailed prescriptions for their implementation and assessments of their likely success;

(c) Summarize the residual impacts on biodiversity;

(d) Detail how -and by whom -unexpected impacts will be identified and remedied.

Monitoring programmes

Impacts on biodiversity can be long-term and may take time to become apparent. Therefore it is important that monitoring is carried out both during and post-development. This monitoring will provide feedback for the development environmental impact assessment and enable the effectiveness of mitigation measures to be evaluated. It will also provide valuable information for subsequent environmental impact assessments. The environmental impact statement should:

(a) Describe the proposed biodiversity monitoring programme, by defining targets, and selecting indicators;

(b) Establish a quality control mechanism -a group of independent experts, for example -to assess the monitoring data;

(c) Use an environmental management plan (EMP) to operationalize mitigation measures and monitoring procedures.

Guiding principles

(a) Apply the “precautionary principle”;

(b) Avoid negative impact on biodiversity;

(c) Create opportunities for biodiversity enhancement;

(d) Assess the full range of biodiversity impacts;

(e) Assess the significance of biodiversity impacts in the context country regulations;

(f) Base decision on full information on biodiversity;

(g) Ensure biodiversity monitoring is provided during and after development.

Uzbekistan

Case study based on Euroconsult / The Wetland Group (1995), Schutter (2003)

The Aral Sea wetland restoration project: strategic environmental assessment for regional development

Due to overexploitation of upstream water resources, the functions of the Amu Darya wetlands on which the local society highly depends were severely affected. The main objective of the planning study was to bring to a halt and if possible mitigate the deteriorating environmental conditions and its detrimental effects on the local population in the Amu Darya delta by wetland restoration.

Since different ecosystem will react differently to forms of management, a differentiation was made between individual ecosystems. A delineation of specific ecosystems also helps in defining on- and

off-site effects of interventions. In the Amu Darya delta three major ecosystems were identified: permanent lakes and marshes, seasonally flooded plains, and drylands with groundwater at 2-5 metres supporting dense vegetation. Large parts of the delta, which in former days belonged to one of these systems, have now changed into desertified steppes, no longer functioning as a delta ecosystem. The upstream half of the delta nowadays is irrigated cotton land.

Environmental functions were determined with reference lists of potential wetland functions from literature, combined with local expertise.

Figure: Most important functions of the natural ecosystems in the Amu Darya delta

Lakes and marshes	Floodplains	Drylands (groundwater)
Maintenance of groundwaterlevel counteracting desertification (prevention of dust transport by winds).		
Maintenance of biological diversity (medicinal herbs, genetic resources, etc.)		
Fish reproduction and growth		
	Quality and regeneration capacity of pastures (livestock)	
Water supply for agri/aquaculture		
Reed production for construction / processing		
Hunting for musk rats (and water fowl / other animals)		
	Wood and liquorice production	
	Protection of infrastructure	

A socio-economic description contained the relevant types of human activities, such as settlements, agricultural areas, industries, nature reserves, fishing grounds, shipping lanes, etc. An inventory of all social, economic and ecological values derived from the wetland functions was made and where possible quantified and stakeholders identified. Stakeholders attach values to the environmental functions; their specification is the base for the determination of values. Local scientists from the Nukus Academy of Sciences, government agencies of the autonomous region of Karakalpakstan and representatives from the delta population all provided relevant input.

With this information a function-value matrix was constructed. For each ecosystem a matrix was constructed to provide insight in the multifunctional character of the natural environment in relation to human activities. It is a helpful tool for planning exercises that follow, because it provides immediate insight in the consequences that interventions might have on the functioning of ecosystems. Presenting the matrix for the former, the present and possible future restored situation, proved to be a very strong tool to convince decision makers of the value of wetlands. It proved to them that restoration of (natural) wetland functions might be a better option than to continue on the path of constructing water retention and irrigation works that cannot cope with the dynamics of the delta system and which solely concentrate on one function: water supply, thus neglecting the other functions and ultimately leading to desertification.

Figure: Simplified function value matrix for Amy Darya wetlands

Wetland functions	**Social values**	**Economic values**	**Ecological values**
Maintenance / recharge of groundwater	Fundamental function for the maintenance of all other ecological processes in the lower Amudarya delta, since it determines the subtle balance between irreversible desertification of the area through lowering of the water table, and salinization of surface soils through irrigation and above surface storage of water.		
Prevention of dust/salt transport by wind	living conditions and health	Protection of irrigation schemes	

Maintenance of biological diversity.		genetic reservoirs for wild ancestors of crops and medicinal plants	plants, birds and mammals on red list of threatened species.
Spawning and nursing grounds for fish.		fisheries and canning plant	reproductive and survival potential of aquatic organisms.
Pastures		cattle raising, presently most important economic activity	
Reedlands		processing industry	
Water supply		Small scale agriculture, semi-intensive aquaculture	
Muskrat, waterfowl, mammals	Local hunting for meat.	Fur & meat industry	
Liquorice production and other wood resources	Fire and construction wood for local use.	Liquorice roots for export. Dried plants for fodder.	

Within the boundaries set by the hydrological scenario, alternative strategies have been developed. A decision hierarchy for evaluating the strategies was constructed, based on the function-value matrix. This decision tree was constructed during a workshop with all involved experts and reflects the outcome of intense debate. Components were based on the values of wetlands for society, divided into the three main groups:

(a) Social (mainly public health related criteria);

(b) Economic (resource productivity, employment, household income);and

(c) Ecological values (surface area of wetland, habitat diversity, and possibilities of biological exchange between habitat types.

Criteria were, where necessary, further divided into subcriteria. For example resource productivity was subdivided into livestock, fisheries, reed industry, liquorice industry, muskrat (fur) industry. Since water is such an overwhelmingly important aspect, hydrology was considered to be a fourth main component (divided into three criteria: surface water, groundwaters, and drought risk), which takes into account all other potential values which have been neglected or which might in future become important (e.g. tourism). For each criterion the five strategies are compared and ranked. This ranking was done during a workshop in which local experts and stakeholders.

The final outcome of this weighing process not only reveals the most beneficial strategy, but also provides insight in the relative importance of individual assessment criteria (sensitivity analysis), and may identify fields where lack of knowledge hampers proper decision-making. More important, the intense process leading to this decision provides important elements for improvement of the chosen strategy and creates a sense of shared responsibility for the outcome between local stakeholders and local and national authorities.

The outcome of the final weighing by high level decision makers showed that these people were very well aware of the ecological disaster taking place in the delta. Ecological values ranked by far highest, followed by social-economic values and implementation feasibility rating equally important. Hydrology rated somewhat lower and the Aral Sea rated very low, indicating that people, for the time being, have more or less given up on the Aral Sea itself in favour of the delta area.

The final step in the project was to define concrete pilot project, based on the chosen strategy and intended to provide further guidance for the implementation of the strategy, which is based on many assumptions, which have to be verified during implementation. Pilot projects are subjected to the standard economic and financial cost-benefit analysis. One of the pilot-project has since been implemented; a workshop in the result is scheduled for September 2003 (Schutter, 2003, personal communication).
