Environmental Impact Assessment

# Course Curriculum for Higher Education Institutions

in Pakistan

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# 1    Introduction

This introduction consists of two parts. First, the background to the development of the curriculum is described. Secondly, the course structure is explained.

## 1.1    Background to EIA course curriculum

This EIA course curriculum for higher education institutions in Pakistan has been developed on the basis of a total of seven National Impact Assessment Programme (NIAP) workshops that were conducted between 2011 and 2013. A total of over 150 individuals were involved in these workshops, representing over 30 higher and tertiary level institutions, the Higher Education Commission, Federal and Provincial EPAs, as well as various other private and public sector organisations, institutions and companies. Workshop participants were actively involved in the development of the curriculum, providing ideas, suggestions and feedback on materials and proposals. The following workshops were held:

1. 20th October, 2011 - ('EIA curricula review', Islamabad);
2. 17th November, 2011 - ('EIA curricula review', Lahore);
3. 26th November, 2011 - ('EIA curricula review', Karachi);
4. 16th February, 2012 - ('Strengthening of EIA curricula in tertiary level institutions', Islamabad);
5. 13th September, 2012 - ('Improvement of EIA curricula of tertiary level academic institutions', Islamabad);
6. 5th November, 2012 - ('Enhancing the relevance of EIA curricula in Pakistani tertiary education institutions – towards closer linkages with the public sector, industry and practice', Islamabad); and
7. 27th June, 2013 - ('Towards a standardised EIA curriculum for Pakistani tertiary education institutions', Islamabad).

Workshops 1 to 4 aimed at establishing a basic overview of current EIA teaching activities in higher education institutions in Pakistan. This included identifying those institutions that currently teach EIA and establishing their teaching methods and techniques. The first four workshops were chaired by Prof. Irfan Khan of the International Islamic University, Islamabad.

Workshops 5 and 6 involved empirical data collection exercises within a targeted NIAP assignment on the 'Development of EIA curricula for higher education academic and public administrations'. This assignment had the following five objectives:

1. To identify strengths and weaknesses of existing EIA curricula being taught at tertiary level institutions in Pakistan;

2. To support the development of EIA curricula for these institutions, taking international research and best practices into account;
3. To identify the feasibility of including SEA in the curriculum;
4. To prepare an action plan for implementation of different curricula; and
5. To advise on a comprehensive one-week EIA training curriculum for public administration institutions.

Here, data were collected through:
1. A pre-fifth workshop questionnaire survey with 20 representatives of tertiary level education institutions in Pakistan. Seventeen completed questionnaires, representing sixteen institutions were obtained, *i.e.* the response rate was 85% (a total of 35 institutions were identified to teach EIA, in one form or another);
2. An initial anonymous fifth workshop survey, using an audience response system (Genee World). Depending on the question, up to 21 workshop participants took part;
3. An evaluation exercise based on an 'EA Lecturers' Handbook', which had been produced during an earlier European Commission Erasmus Mundus Project on environmental assessment higher education in Europe and Asia (see www.twoeam-eu.net); eighteen workshop participants completed an associated evaluation questionnaire;
4. Group work on three essential EA tertiary level education questions;
5. A short final fifth workshop survey, again using the audience response system. Depending on the questions asked, up to nineteen workshop participants took part;
6. Feedback on the results of the data collection exercises during the sixth workshop held on 5th November, 2012, in Islamabad on 'Enhancing the relevance of EIA curricula in Pakistani higher education institutions – towards closer linkages with the public sector, industry and practice'. Workshop participants included 46 experts, representing tertiary level

institutions, national and provincial EPAs, private sector representatives, the national Ministry of Climate Change and other NIAP partners; and
7. Some detailed reflections by nine EIA experts on a detailed second EIA curriculum outline, of which a draft had been introduced and commented upon during the sixth workshop and which had subsequently been further developed.

The results of these various exercises are described in a NIAP Report 'Development of an EIA Curriculum for Tertiary Level Institutions in Pakistan - Baseline, Development Needs, Curriculum Outline and Suggestions for Further Action' which can be accessed via http://niap.pk/docs/Knowledge%20Repository/Reports/ReportEIAeducationPakistanFischer.pdf Overall, representatives of 24 tertiary level academic institutions contributed in one way or another to the various exercises.

The EIA course curriculum put forward here was developed in two main stages. A first draft version was produced in May 2013. This was then commented on by numerous people, among which were those attending the seventh curriculum workshop in Islamabad on 27th June, 2013. Taking the feedback thus received into account, this final version of the report was subsequently produced.

The EIA course curriculum is complemented by another NIAP document, the 'EIA Handbook for Pakistan'. This handbook was prepared specifically in order to share practical experiences of EIA applications in Pakistan with a wide audience, providing numerous EIA case studies that professors and lecturers should also use in their EIA courses.

## 1.2 Structure of EIA course curriculum

There are various options for the development of an EIA curriculum for Pakistani tertiary level academic institutions. These range from curricula

for *e.g.* full diploma degree programmes in EIA to a 2+0 lecture-based EIA course.

This document presents a generic curriculum, which can be adapted to different purposes. The curriculum consists of sixteen themes, each consisting of lecture and practice elements. While it can be readily used in a 16-week semester 2+1 course, it can also be taught over *e.g.* two or more courses.

Based on the results of the various surveys conducted with Pakistani representatives of tertiary level academic institutions introduced above, it has been established that the overall curriculum outline can be broadly in line with what is considered to be good practice internationally. However, the specific content needs to be both, international as well as Pakistan specific. The sixteen themes include the following:

**Theme 1**: What is EIA, what is it trying to achieve, what are its principles, what benefits can result from EIA if considered in decision-making and where in the world is it applied?

**Theme 2**: Decision-making theory and practice and EIA;

**Theme 3**: Main environmental problems that the international community and Pakistan are faced with;

**Theme 4**: Legal background and guidance on EIA in Pakistan;

**Theme 5**: Requirements of international development banks;

**Theme 6**: Screening / project categorisation and scoping;

**Theme 7**: Assessment of impacts;

**Theme 8**: Public participation and consultation in EIA;

**Theme 9**: Baseline data collection and presentation, identification of impacts, consideration of alternatives and mitigation in EIA;

**Theme 10**: EIA reporting and EIA report quality reviews;

**Theme 11**: EIA follow-up, monitoring and auditing; the role of environmental and social management plans;

**Theme 12**: EIA effectiveness – what do we need to consider in order to enhance positive and avoid negative effects?

**Theme 13**: SEA part 1: Introduction to SEA;

**Theme 14**: SEA part 2: SEA application at the policy level and in Pakistani planning processes;

**Theme 15**: Developing EIA and SEA further: Integrating different aspects and sustainability assessments; and

**Theme 16**: Studying specific EIAs (guest lectures by consultants/public servants).

All themes include lecture and practice based elements. Theme 16 revolves around guest lectures by practitioners (consultant / public servants). Guest lectures should reflect personal experiences by practitioners and, therefore, cannot be prescribed. In this way this document provides the basis for themes 1-15 (chapters 2 - 16), guiding the lecturer through one theme at a time, *i.e.* providing them with the baseline for their lectures. In this context, reference is made to many other works, that complement the information given here.

The *curriculum* includes some case studies, mainly with regards to SEA applications. Numerous Pakistani-specific EIA case studies are introduced in the NIAP 'EIA Handbook for Pakistan'. For this reason, this *curriculum* does not follow a case study-based approach for EIA.

Generally speaking, it is suggested that themes 1-10 (chapters 2 to 11) are suitable for both, undergraduate and postgraduate levels (*i.e.* bachelors and masters levels). Themes 11-15 (chapters 12 to 16), on the other hand, are thought to be particularly suitable for post-graduate teaching (*i.e.* masters levels). Theme sixteen should feature in any EIA course. Many of the references and sources provided are web-accessible and are therefore easily usable. Some other, non-web-based key resources are, however, also provided.

# 2 What is EIA? What is it trying to achieve and what are its principles? What benefits can result from EIA if considered in decision-making and where in the world is it applied?

This chapter consists of seven sections. First, definitions of EIA are provided. This is followed by an introduction to its principles. Thirdly, the origin and development of EIA are described before different types of impacts to be considered in EIA are introduced. Purposes, objectives, scope and effectiveness of EIA are elaborated on and some of the different international legal, administrative and policy EIA frameworks are introduced. Finally, context specific elements that enable effective EIA application are defined. The main sources that this chapter draws on include Fischer *et al.* (2008; chapter 6 by Gazzola and Fischer: 42-57), Fischer (2005), IAIA (1999), UN ESCAP (2003), UN University (2006 a; b; c) and UNEP (2002a).

## 2.1 Definition of EIA

Environmental Impact Assessment (EIA) is a decision-making support instrument that aims at identifying, predicting, evaluating and mitigating the biophysical, social and other relevant environmental effects of development proposals prior to major decisions being taken and commitments being made (IAIA and IEA 1999). It aims to (Gazzola and Fischer, 2008, p44):

- ensure that environmental considerations are explicitly addressed and incorporated into the development decision-making process;
- anticipate and avoid, minimise or offset the adverse significant biophysical, social and other relevant effects of development proposals;
- protect the productivity and capacity of natural systems and the ecological processes which maintain their functions; and
- promote development that is sustainable, optimising both resource use and management opportunities.

EIA is a legal requirement in well over 100 countries. Furthermore, in most countries where it is not legally required, it is either practiced voluntarily or introduced through other requirements, *e.g.* by development banks (World Bank, Asian Development Bank, *etc.*), meaning that there are experiences with EIA in most of the nearly 200 countries worldwide.

EIA is usually thought of as a process which involves consultation with statutory and non-statutory bodies and general public participation. An EIA

report is usually seen to be at the heart of the assessment process. This is the main document produced during an EIA which describes the likely significant impacts and possible mitigation in detail.

However, in order to be an effective decision-making instrument, EIA needs to be seen as being more than a simple assessment process, namely an integral part of a planning system of a wider environmental protection policy (Lawrence, 1994). By establishing comprehensive baseline data and by applying suitable assessment methods to assess environmental impacts, EIA aims at adding scientific evidence to development planning processes, *i.e.* it also has a substantive component. It has been suggested that it can be considered a science and an art, as in that it attempts to combine a scientific approach to assessment while accepting the political nature of decision-making (Bartlett and Kurian, 1999; Kennedy, 1988).

EIA should be pro-active, *i.e.* it should not only react to development proposals, but should influence them early on. This way, its impact is not reduced to just trying to mitigate given impacts, but rather to help avoid or reduce impacts in the first place.

EIA should be tailor-made, *i.e.* it should be designed to suit the specific situation and context in which it is applied. This means that *e.g.* specific geographical, societal, cultural, sectoral

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**Box 2.1: Different EIA definitions**

EIA is:

- *"a technique and a process by which information about environmental effects of a project is collected, both by the developer and from other sources, and taken into account by the planning authority in forming the judgement on whether the development should proceed" (Department of Environment, UK, 1989);*

- *"the systematic, reproducible and interdisciplinary evaluation of the potential effects of a proposed action and its practical alternatives on the physical, biological, cultural and socio-economic attributes of a particular geographical area" (USEPA, 1993);*

- An instrument that *"integrates the environmental concerns in the developmental activities right at the time of initiating for preparing the feasibility report. In doing so it can enable the integration of environmental concerns and mitigation measures in project development. EIA can often prevent future liabilities or expensive alterations in project design" (Indian Ministry of Environment and Forests;* http://envfor.nic.in/divisions/iass/eia/Chapter1.htm*);*

- *"an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigatory and compensatory measures, formulation of environmental management and training plans and monitoring arrangements, and framing of recommendations and such other components as may be prescribed" (Pakistan Environmental Protection Act, 1997);*

- *"the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made (IAIA, 1999);*

- *"the systematic, reproducible and interdisciplinary identification, prediction and evaluation, mitigation and management of impacts from a proposed development and its reasonable alternatives (UNEP EIA Training Resources Manual, 2002); and*

- *"a governance instrument [which] introduces rules [...], assigning particular roles and responsibilities to actors, [...]aiming to steer actors' behaviours towards greater environmental awareness, leading to the incorporation of environmental values in proposed activities and plans" (Arts et al., 2012).*

*Source: various*

and other issues need to be taken into account when applying it. There are numerous definitions of EIA available. Box 2.1 lists a sample (following UNESCAP, 2003 and Arts *et al.*, 2012).

EIA aims at achieving a number of things as follows (adapted from UNEP, 2002a):

- to provide decision-makers with an analysis of all aspects of the environment so that decisions can be made based on as nearly complete and balanced information as possible;
- to assess and present those effects that are not adequately addressed by cost-benefit analysis or other technical assessments (including *e.g.* risk assessment);
- to provide information to the public on a proposal;
- to formalise the consideration of alternatives to a project proposal so that the least environmentally harmful means of achieving the given objective can be chosen; and
- to improve the design of new developments and safeguard the environment through the application of measures to avoid and mitigate impacts.

## 2.2 Principles of EIA

In addition to overall aims and objectives, principles for the application of EIA have also been defined. These have been summarised by the International Association of Impact Assessment (IAIA, 1999) in terms of basic principles and operating principles. Basic principles mean that EIA should be (IAIA, 1999, p3):

*Purposive*: the process should inform decision-making and result in appropriate levels of environmental protection and community well-being;

*Rigorous:* the process should apply "best practicable" science, employing methods and techniques appropriate to address the problems being investigated;

*Practical*: the process should result in information and outputs which assist with problem solving and are acceptable to and able to be implemented by proponents;

*Relevant*: the process should provide sufficient, reliable and usable information for development planning and decision-making;

*Cost-effective*: the process should achieve the objectives of EIA within the limits of available information, time, resources and methods.

*Efficient:* the process should impose the minimum cost burdens in terms of time and finance on proponents and participants consistent with meeting accepted requirements and objectives of EIA;

*Focused*: the process should concentrate on significant environmental effects and key issues; *i.e.*, the matters that need to be taken into account in making decisions;

*Adaptive*: the process should be adjusted to the realities, issues and circumstances of the proposals under review without compromising the integrity of the process, and be iterative, incorporating lessons learned throughout the proposal's life cycle;

*Participative*: the process should provide appropriate opportunities to inform and involve the interested and affected publics, and their inputs and concerns should be addressed explicitly in the documentation and decision-making;

*Interdisciplinary*: the process should ensure that appropriate techniques and experts in the relevant bio-physical and socio-economic disciplines are employed, including use of traditional knowledge as relevant;

*Credible*: the process should be carried out with professionalism, rigour, fairness, objectivity, impartiality and balance, and be subject to independent checks and verification;

*Integrated*: the process should address the interrelationships of social, economic and biophysical aspects;

*Transparent*: the process should have clear, easily understood requirements for EIA content; ensure public access to information; identify the

factors that are to be taken into account in decision-making; and acknowledge limitations and difficulties.

*Systematic*: the process should result in full consideration of all relevant information on the affected environment, of proposed alternatives

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**Box 2.2: EIA procedural stages and what they mean**

*Screening*: to determine whether or not a proposal should be subject to EIA and, if so, at what level of detail.

*Scoping*: to identify the issues and impacts that are likely to be important and to establish terms of reference for EIA.

*Generation of baseline data*: to document the status quo and to establish the basis for assessing the environmental impacts of the proposal.

*Examination of alternatives*: to establish the preferred or most environmentally sound and benign option for achieving proposal objectives.

*Impact analysis and impact prediction:* to identify and predict the likely environmental, social and other related effects of the proposal.

*Mitigation and impact management*: to establish the measures that are necessary to avoid, minimize or offset predicted adverse impacts and, where appropriate, to incorporate these into an *environmental management plan* or system.

*Evaluation of significance*: to determine the relative importance and acceptability of residual impacts (*i.e.*, impacts that cannot be mitigated).

*Preparation of an environmental impact statement (EIS) or report*: to document clearly and impartially impacts of the proposal, the proposed measures for mitigation, the significance of effects, and the concerns of the interested public and the communities affected by the proposal.

*Review of the EIS*: to determine whether the report meets its terms of reference, provides a satisfactory assessment of the proposal(s) and contains the information required for decision-making.

*Decision-making*: to approve or reject the proposal and to establish the terms and conditions for its implementation.

*Follow-up:* to ensure that the terms and conditions of approval are met; to monitor the impacts of development and the effectiveness of mitigation measures; to strengthen future EIA applications and mitigation measures; and, where required, to undertake environmental audit and process evaluation to optimise environmental management.

*Source: adapted from IAIA (1999)*

and their impacts, and of the measures necessary to monitor and investigate residual effects.

Furthermore, there are operating principles. According to these EIA should be applied (IAIA, 1999, p4):

- As early as possible in decision-making and throughout the life cycle of the proposed activity;
- To all development proposals that may cause potentially significant effects;
- To biophysical impacts and relevant socio-economic factors, including health, culture, gender, lifestyle, age, and cumulative effects consistent with the concept and principles of sustainable development;
- To provide for the involvement and input of communities and industries affected by a proposal, as well as the interested public; and
- In accordance with internationally agreed measures and activities.

The EIA process is understood to consist of a number of distinct stages. These are introduced in Box 2.2.

## 2.3 EIA origin and development

EIA first developed in the USA with the National Environmental Policy Act (NEPA, 1969) being the first legislation internationally that included requirements for assessing the environmental impacts of a wide range of Federal 'actions', covering projects, policies, plans and programmes. A key reason for its introduction was growing concerns about the quality of the environment in 1960, following the works of *e.g.* Aldo Leopold, in particular his book "A Sand County Almanac" from 1949 and Rachel Carson, through her book "Silent Spring" from 1962. Concerns were fed by increasingly visible effects of new technologies and ever-larger development schemes *e.g.* major motorway projects, such as the New York West Side Highway project in the US, and major industrial developments, as well as general land degradation and contamination. In this context, it was recognised that the economic appraisal techniques that had already been used

for several decades *e.g.* benefit cost analysis, and that were applied to development proposals, did not consider environmental and social impacts of major projects.

NEPA was signed by the then US president Richard Nixon on 31st December, 1969. Its intention was to use EIA as an 'action-forcing' mechanism. It was hoped that it would change the way in which government decisions were made. Subsequently, many other countries started introducing EIA, including Canada and Australia in 1973 and 1974, respectively. In Europe, European Union (EU) Directive 85/EC/337 made EIA for projects a requirement in all EU member states which, at the time, included fifteen member states and now 28.

Furthermore, many other countries started introducing EIA, including Pakistan in 1983 - Pakistan Environmental Protection Ordinance (PEPO). The Pakistan Environmental Protection Act 1997 (PEPA'97) replaced PEPO. EIA was then strengthened further through the 2000 EIA Review Rules. Provinces have released their own legislation. Generally speaking, EIA in Pakistan is developed at national, provincial and local levels of decision-making.

The development of EIA can be said to have culminated in Principle 17 of the Rio Declaration on Environment and Development (United Nations Conference on Environment and Development, 1992). This states that (http://www.un.org/documents/ga/conf151/aconf 15126-1annex1.htm):

> *"Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority."*

Over the past 40 years, EIA has also evolved significantly, both in terms of theory and practice. In the early stages of EIA, only biophysical

impacts were considered (*e.g.* air and water quality, *flora* and *fauna*, noise, climate and water). Increasingly, other aspects were then also considered, for example, social, health, and economic aspects. While understanding of procedures and methods, as well as effectiveness *criteria* has greatly improved since the early days of EIA, there is still scope to further improve the instrument. In particular, in current practice EIA is still often used in a more reactive, rather than pro-active way, and its impact is usually moderate, only (see *e.g.* Arts, *et al.* 2012). There are indications, though, that effectiveness has been improving significantly over the past more than 40 years in many countries and systems (Fischer, 2009; Phylip-Jones and Fischer, 2013).

The development of EIA can be summarised in a number of time periods, as follows:

1. Introduction and early development (1970-1975): Foundations of EIA laid in the US National Environmental Policy Act (NEPA); subsequently adopted by other countries, first by Australia and Canada; basic EIA procedure and methods developed; this still applies today;

2. Increasing applications and advancement of theory (mid-1970s to early 1980s): emergence of more sophisticated methods (*e.g.* based on quantitative modelling) and guidelines; impacts considered were extended to include social aspects; public enquiries and reviews triggered innovations in EIA; the instrument was beginning to be used in developing countries *e.g.* China, Thailand and the Philippines;

3. Process strengthening and improved integration into planning processes; further increase of application (early 1980s to early 1990s): EIA practice and experiences starting to be reviewed; EIA frameworks were subsequently updated and increased efforts for improving integration with other processes were made *e.g*, project appraisal, land-use planning; ecosystem and cumulative effects were considered and increased attention was given to monitoring and follow-up; numerous

other countries started to adopt EIA, including *e.g*, Pakistan and the European Community; development banks also started formulating requirements;

4. Increased integrated strategic and sustainability orientation (early '90s to date): EIA enshrined in international agreements; rapid growth in international training, capacity- building and networking; development of strategic environmental assessment (SEA) of policies, plans and programmes which has increasingly been seen to be distinct from project EIA; EIA applied in all OECD countries and large number of developing and transitional countries; and

5. Revival of interest in effectiveness of project level EIA (since 2010), based in particular on 40 years of NEPA and 25 years of European EIA Directive (special issue of the Journal of Environmental Assessment Policy and Management; 2012-14). Increasing research on the effectiveness of EIA systems and their different components, including public participation, quality of EIA reports and others; renewed efforts to strengthen EIA systems, their legal and institutional framework, quality of EIA reports, review mechanism, consultants accreditation and EIA education (Fischer, *et al*., 2007).

## 2.4 Different types of impacts considered in EIA

An environmental impact can be understood as a change to the environment, which can be both, adverse (negative) or beneficial (positive), and which is wholly or partially resulting from human activities (*e.g.* construction, combustion, transport), products (*e.g.* cars, computers, furniture) or services (*e.g.* education, catering, retailing).Impacts can be short, medium or long-term, reversible or irreversible, and permanent or temporary (Morris and Therivel, 2001). There are several types of impacts, including direct, indirect, cumulative, synergistic and residual. These are further explained in Box 2.3.

**Box 2.3: Types of impact to be considered in EIA**

- <u>Direct impacts</u>: impacts of an action, intervention or of a specific project that occur in the same space and time. Also known as primary impacts, they are the direct consequences that a project has on the environment;

- <u>Indirect impacts</u>: impacts of a chain of activities associated or induced by a project that often occur later in time, affecting a broader area, but that are nevertheless reasonably foreseeable;

- <u>Cumulative impacts</u>: result from the incremental effects of an action when added to other past, present and reasonably foreseeable future actions. Cumulative impacts could result from a number of minor impacts that individually have minor significance, and may therefore not require an EIA. If assessed cumulatively, however, the impacts could have a higher significance and then require an EIA;

- <u>Synergistic impacts</u>: impacts that result from the interaction among impacts of a project, or from the interactions among impacts of several projects within a same area that may be greater than their simple sum; and

- <u>Residual impacts</u>: the impacts that remains after implementation of the project and all associated mitigation and other environmental management measures.

*Source: Gazzola and Fischer (2007); see also Nunn (1979) and European Commission (1999).*

## 2.5 Purposes, objectives, scope and effectiveness of EIA

EIA is needed for a wide range of reasons and its application is often thought of in terms of delivering certain benefits. Generally speaking, if applied in a transparent, rigorous and unbiased way, EIA is thought to be able to (following Gazzola and Fischer, 2007, p46; see also Fischer, 1999a and Dusik *et al.*, 2003):

- support decision-making and the formulation of development actions to achieve environmentally sound and sustainable development;
- strengthen project planning processes, helping to reconcile environmental, social and economic objectives and supporting more environmentally sustainable outcomes;
- save time and money by avoiding costly mistakes and environmental impacts that require expensive mitigation or remedial measures; and
- improve good governance and build public trust, by providing key stakeholders the

opportunity to participate in the project planning process before a decision is made.

Besides the specific historical reasons described above, another reason why EIA was developed is a perceived failure of traditional project assessment or appraisal techniques to take environmental impacts into account. Generally speaking, without the application of EIA, projects may result in:

- significant negative environmental change;
- negative social effects;
- higher development costs; and even in
- a failure to deliver the project.

In line with a growing understanding of environmental processes and problems, since EIA was first applied over 40 years ago, impacts have become ever more complex and further reaching in their potential consequences. In practice, in most countries throughout the world, EIA is still applied primarily to prevent or minimise the adverse effects of major development proposals, such as power stations, dams and reservoirs,

industrial complexes, motorways, airports and others. More limited forms of EIA can be used to ensure that smaller scale projects conform to appropriate environmental standards or site and design *criteria*. Such projects include *e.g.* road realignments and upgrading, minor changes within existing developments or more small scale dredging.

An effective application is necessary in order for EIA to result in the benefits that are supposed to accrue, as described above. In this context, effectiveness has been defined as "*something that works as intended and meets the purpose for which it was designed*" (Sadler, 1996, p.37). Evaluating the effectiveness of EIA thus usually aims at establishing whether EIA is adding value to project planning processes. Elements and principles for EA effectiveness have been developed by a number of authors. They are summarised in Box 2.4 (following Gazzola and Fischer, 2007).

## 2.6 Different legal, administrative and policy EIA frameworks, internationally

Every EIA system is unique and is the result of particular sets of legal, administrative and political circumstances (Wood, 2003). Subsequently, a few legal, administrative and policy frameworks for EIA will be considered in countries where EIA is formally applied. The existence of formal requirements should mean more than simply mentioning the possibility of applying EIA in a particular system. Legislative or administrative

requirements should be in place, clearly explaining when EIA is required and what it should involve.

Reviews of EIA systems worldwide have shown that there are a number of ways and formal arrangements through which EA processes are applied to decision-making (see *e.g.* Sadler, 1996; Barker and Wood, 1999; Wood, 2003). Individual arrangements are the results of different institutional, legal and policy frameworks. These define context-specific rules and activities for EIA in different countries. As mentioned earlier, there are now far more than 100 countries that have introduced EIA requirements formally (Lee and George, 2000). Also, certain countries, *e.g.* federal countries, may have state or provincial EIA requirements. Examples include the USA, Canada, Australia, Germany, Spain and Pakistan. Subsequently, a few systems are briefly described, following Wood (2003) and Gazzola and Fischer (2007):

- USA: the foundations of EIA lay in the US's 1969 National Environmental Policy Act (NEPA) which is considered the Magna Charta of EIA. More than 30 states have introduced other forms of EIA or have enacted "little NEPAs", with the California system being one of the most comprehensive (see Fischer, 2007). In practice, most NEPA-based assessments apply to projects;
- Canada: Together with Australia and New Zealand, Canada was a frontrunner to follow the USA's example; all ten provinces and

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### Box 2.4: EIA effectiveness elements

EIA is effective when it:
- includes proper and suitable methods for assessing impacts;
- includes the formulation of alternatives, selection of a proposed alternative, and mitigation of adverse impacts;
- includes the placement of appropriate weight on environmental impacts relative to economic and technical factors;
- is fair and provides opportunities for public participation before a decision is made;
- is central and contributes to decision-making;
- is applied flexibly to the various stages of the EIA process; and
- takes into account environmental and socio-economic factors.

*Source: Gazzola and Fischer (2007); based on Ortolano et al. (1987), CEARC (1988), Sadler (1996), Glasson (1999)*

both territories now have their own EIA systems. Informally established in 1973 and subsequently developed further, the Canadian Environmental Assessment Act was proclaimed in 1995, and subsequently amended several times (Wood, 2003). The Act includes provisions for considering cumulative environmental effects, mediation, follow-up, consideration of trans-boundary effects and the encouragement of public participation (Wood, 2003);

- Australia: First introduced in 1974, Australia's EIA system subsequently evolved further and in 1999 a new system was introduced, through the Environment Protection and Biodiversity Conservation Act (EPBC). The aim was to complement the legislative and administrative procedures that the six Australian states and two territories had in place. The EPBC Act includes provisions for SEA and the holding of inquiries (Wood, 2003);

- New Zealand: EIA was first introduced in 1974 on the basis of a cabinet minute and reformed in 1991 by the Resource Management Act, subsequently amended several times. The Act introduced EIA as a central element in decision-making and promotes the sustainable management of natural and physical resources. EIA is defined as a comprehensive and flexible tool, as it applies to all projects at the appropriate level of detail, as well as to those policies and plans that are prepared under the Act;

- EU: The European Union (EU) has currently 27 member states that have to comply with Directive 85/337/EEC on the assessment of effects of certain public and private projects on the environment, known as the EIA Directive. This requires an EIA to be carried out prior to the authorisation of development projects likely to have significant environmental effects. It was initially introduced to ensure that all Member States were equally subjected to the same development restraints and conditions (Weston, 1997). But, once adopted, its main objective became the protection of the environment and quality of life. The EIA Directive was amended three times and became codified by Directive 2011/92/EU. It applies to two lists of projects. Annex 1 projects require EIA for all cases. Annex 2 covers development projects that are subject to various *criteria* and thresholds set by individual Member States. Consequently, although the procedural and methodological approaches are to a certain extent common to all Member States, the way in which the Directive is enforced and the type of projects it applies to varies across the EU (Sheate, 1996). For more information, see http://ec.europa.eu/environment/eia/eia-legalcontext.htm.

## 2.7 Context-specific elements that enable effective EIA application

There are certain context-specific elements that enable effective EIA application. Following Fischer (2005), these include:

- Providing formal requirements, clear provisions and competences to conduct and effectively consider EIA;
- Establishing clear, transparent and consistent value frames and expectations;
- Considering and influencing traditional decision-making approaches;
- Establishing a clear focus— addressing the right issues at the right time;
- Clearly defining roles of assessors and planners;
- Achieving a willingness to cooperate in integration;
- Acknowledging and dealing with uncertainties; and
- Providing appropriate funding, time and support.

Each of these is subsequently described in further detail.

### 2.7.1 Providing formal requirements, clear provisions and competences to conduct and effectively consider EIA

Formal requirements are the basis for EIA to be applied in a consistent manner (Sadler, 1996).

Furthermore, explicit provisions to consider assessment results in decision-making show commitment and are likely to be a key condition for effective EIA. Without formal requirements and provisions, EIA is bound to be "toothless" and highly sensitive to political struggles and power games. Formal requirements give certainty to the actors involved in EIA and project planning processes (Partidario, 1997; Fischer, 2002). Provisions in the form of clear and established guidance help EIA to be routinely and confidently applied (following Wilburn *et al.*, 2004). Furthermore, provisions for regular internal reporting on EIA processes will help decision-makers and other actors to learn from experiences, thus advancing knowledge. Formal requirements should ask for EIA to take results of other prior assessments (*e.g.* of SEA) to be taken into account (**See**: Tomlinson and Fry, 2002). For Canada, Hazell and Benevides (1997) found that assessments that were legally required by the 1991 Farm Income Protection Act were "superior" to those prepared under the Federal Cabinet Directive in that they were more effectively leading to a better consideration of the environment in decision-making. Another important aspect for effective EIA is an allocation of clear competences, which may not always be easy to achieve if *e.g*, decision-making power is split between different administrations.

### 2.7.2    Establishing clear, transparent and consistent value frames and expectations

Clear goals that are coming out of a common belief system provide guidance for EIA. In this context, common expectations of what EIA should achieve are important. Faludi (2000) suggested that "planning doctrines" or "paradigms" can act as normative or "value" frames (also called "policy frames" by Schön and Rein, 1994). In this context, mega-objectives for planners and assessors are needed. If there is no consensus on underlying goals, planning has been said to mean "*endless argument, and reasoned choice becomes difficult*" (Faludi, 2000, p.315). The existence of sustainable development strategies and links to existing environmental

objectives that are accepted by all actors have been shown to be particularly useful (Wilburn *et al.*, 2004).

### 2.7.3    Considering and influencing traditional decision-making approaches

Compartmentalised organisational structures and bureaucratic prerogatives may be in the way of effective EIA application (see, for example, Diamantini and Geneletti, 2004). Therefore, careful consideration of decision-making traditions is of crucial importance for effective EIA application. Achievement of a full commitment by actors and stakeholders is, however, likely to take some time. In order to avoid frustration about initial EIA "failures", it is therefore important that actors involved in EIA processes are made aware of any potential problems and uncertainties.

### 2.7.4    Establishing a clear focus - addressing the right issues at the right time

A clear focus is important for the effective application of EIA. The problem of boundary setting in planning processes was recognised as early as the 1950s. Simon (1957) established that there is often ambiguity about the boundaries of the problem for which a solution is to be found. In order to overcome confusion and disagreement with the choice and form of alternatives, clear "framing" of the issues to be considered in an EIA is needed (Valve, 1999). Effective framing should help to create situations in which EIA actors do not only struggle to define the issues to be addressed, but are actually dealing with the question what can be done to address them. In this context, the definition of clear and relevant tasks is of great importance.

### 2.7.5 Clearly defining roles of assessors and planners

It should be possible to overcome cognitive limitations, at least to some extent, if environmental assessment (including EIA and SEA) systems are put into place that clearly allocate tasks to different tiers of decision-making (See also: Chapters 14 and 15 on SEA). In this context, the role of the assessor and planner may be more clearly defined. Policy situations are

marked by a low degree of knowledge and concreteness. Here, planners may find themselves as policy mediators, supporting a "*wide debate on overall objectives and values*". In plan situations, planners may find themselves acting as "*entrepreneurs, advocating values and norms, reflecting those formulated in higher tier policies*". In project and programme situations, there is often a high degree of knowledge and concreteness. Planners may therefore act as technicians, using previously defined stakeholder values in multi-criteria analysis and cost-benefit analysis (Leknes, 2001; Fischer, 2003).

### 2.7.6 Achieving a willingness to cooperate in integration

While integration is at the heart of any balanced decision-making, so far there is no clear evidence as to whether integration improves the position of "the environment" or whether it rather waters down "weaker" aspects (See: Kidd and Fischer, 2007). Integration requires trust and "*acceptance for the need to compromise, which may involve concessions from all sides*" (German Presidency of the EC Council, 1999, p1). Insufficient political will and a limited societal support base are barriers to the effective application of EIA (Sadler and Verheem, 1996). These barriers will take time to overcome. Only if administrations, agencies, politicians and other decision-makers consider themselves as *real* actors in the PPP process, is it likely that they are going to be willing to get fully involved. Power relationships need to be identified, as integration is likely to bring actors with differing powers together and those issues that are supported by powerful interests often receive more attention. Furthermore, clear communication of assessment results is important, as participants' awareness of how their decisions can influence the environment can increase (See: Kaljonen, 1999; PIARC, 1999). In this context, experts need to present their findings in a way that makes sense to the policy-maker (Alton and Underwood, 2003; Cherp and Antypas, 2003). Organisational and political support and positive attitudes will increase the willingness to cooperate in integration and are

important building blocks of effective SEA systems (See: Sadler, 1996; Elling, 1998; Fischer, 2002).

### 2.7.7 Acknowledging and dealing with uncertainties

It is important that actors involved in EIA are made aware of and acknowledge that uncertainties and unforeseeable impacts are likely to occur in all EIA situations. Furthermore, all actors need to recognise that information about the effects of alternatives and the possibilities of mitigation are often going to be incomplete (Niekerk and Voogd, 1996).

### 2.7.8 Providing appropriate funding, time and support

Appropriate funding, time and support are of essential importance for being able to conduct EIA in a meaningful manner. Sufficient time needs to be made available in the interest of reliable results and effective consultation and participation. Appropriate support mechanisms help PPP makers and assessors to deliver an effective and efficient EIA process. Support can be provided, for example, by suitable agencies, centres of expertise or coordination units (German Presidency of the EC Council, 1999, point 12). Other possibilities include advisory bodies that are jointly established by several ministries or departments, bringing together different networks of experts and different sectors. Finally, education and training are important.

## 2.8 Practical exercise

Students are to research other decision-making support tools and find out how they work, including *e.g.* cost-benefit analysis – CBA, multi-criteria analysis – MCA, life-cycle-assessment – LCA, technology assessment, risk assessment, generic modelling tools and others; students should prepare a table as to how these differ from EIA.

# 3    Decision making theory and practice

This chapter is sub-divided into six parts. First, EIA's role as an advocacy instrument in decision-making and recent integration attempts are discussed. Secondly, the roles of actors interacting in and through EIA are identified. Thirdly, organisational behaviour is explored. Decision-making models are introduced and influences on effective decision-making are established. Finally, EIA as part of the decision-making process is elaborated on. The main sources this chapter draws on include Fischer *et al.* (2008; chapter 10 by Posas and Fischer: 93-114), Morrison-Saunders and Fischer (2006) and UN University (2006d).

## 3.1    EIA's role to act as an advocacy instrument in decision-making and recent integration attempts

The original purpose of EIA, following the US NEPA from 1969, was to support the consideration of the biophysical environment in decision-making for development proposals. In this context, Gibson (2001, p29) noted that EIA:

> *"has generally been viewed as a means of adding environmental considerations into predominantly financial, technical and political decision-making processes, encouraging some adjustments to the usual objectives in the interests of avoiding serious environmental harm".*

EIA is not only a simple environmental protection tool, but an instrument for strengthening environmental management processes. Furthermore, over the past 40 years, EIA has been followed by the development of many other forms of impact assessment, including, for example, health impact assessment, social impact assessment, risk assessment and others. Since the beginning of the 1990s, EIA has also increasingly been used at strategic levels of decision-making. Here, it has become known as strategic environmental assessment (SEA).

Over the past 20 years, discussions have intensified on whether EIA should not only focus on biophysical (and in this context, human health) aspects, but also take account of social and economic considerations. In this context, there has been a growing interest in more integrated forms of assessment. This has led to the development of sustainability assessment (SA), which seeks to integrate economic, social and environmental components.

Emerging evidence on whether integration in assessment leads to more balanced decisions suggests that in many situations it may be preferable to

**Figure 3.1: Actors interacting in EIA**



**DEVELOPERS**

Public sector developers
(e.g. Highways Agency)

Private sector developers
(e.g. multinational
corporations)

**AFFECTED PARTIES**

Statutory bodies
(e.g. Countryside
Commission, Environment
Agency)

Non-statutory bodies
*Environmental*
•International/national
(e.g. Greenpeace, CPRE)
•Local groups, the public
*Economic*
•National (e.g. unions)
•Local groups, the public

**REGULATORS**

Supra-national
(e.g. Commission of European
Communities)

National
(e.g. Department of the
Environment, Transport, etc.)

Local
(e.g. County and District planning
authorities)

**FACILITATORS**

Consultants
(environmental, planning, etc.)

Advisers, advocates

*Source: Posas and Fischer, 2008; adapted from Glasson et al. (1994)*

keep EIA as an advocacy environmental assessment instrument. This was shown and discussed by *e.g.* Morrison-Saunders and Fischer (2006) for EIA and Tajima and Fischer (2013) for SEA. Similarly, Pope *et al.* (2004) argued that integration through sustainability assessment:

> *"can be seen to overly promote the prevailing economic agenda and thereby undermine 30 years' worth of hard-won environmental policy gains".*

The greatest concern from those who advocate the consideration of environmental aspects through EIA is that environmental impacts are becoming increasingly traded-off for socio-economic gains. In fact, the increasing emphasis on integrated assessment is seen by some (Kidd and Fischer, 2007):

> *"as part of an incremental erosion of the environmental focus within the field of impact assessment as environmental concerns are increasingly subordinated to broader sustainability and governance debates".*

Putting it somewhat more bluntly, Dovers (2002) asserted that:

> *"environmental and social issues matter, until it matters economically".*

Along similar lines, the Environmental Protection Authority (EPA) of Western Australia suggested that:

> *"traditional thinking is generally based on the model which sees the economy as the main game, with social and environmental issues peripheral" (EPA, 2004).*

Integrated forms of impact assessment may, therefore, simply serve to promote dominant economic perspectives over broader sustainability and environmental concerns (Scrase and Sheate, 2002). Integration of different substantive (economic, social and environmental) aspects through EIA therefore has to be seen with some scepticism. This will be discussed further in chapter 16.

## 3.2 Actors interacting in and through EIA

EIA is a decision-making support instrument which acts as a communication platform on which numerous actors come together and interact. Regulators set the overall framework and

monitor compliance with EIA legislation. Developers need to apply the instrument and are supported by facilitators (*i.e.* consultants and advisors). Furthermore, those potentially affected are given an opportunity to comment or, if they feel impacts are unacceptable, to object. Figure 3.1 shows the actors coming together in and through EIA (following Posas and Fischer, 2008; adapted from Glasson *et al*., 1994). These include the developers and their facilitators (consultants and other advisors). Furthermore, it includes the affected parties (*e.g.* statutory bodies and the general public). Finally, it includes those setting the rules for planning and EIA, *i.e.* the regulators.

## 3.3    Organisational behaviour

Organisational behaviour is understood as the study of human behaviour in organisational contexts. The focus is both, on individual as well as group behaviours (including processes and actions; see: Brooks, 2003). The study of organisational behaviour developed in the management sciences. It however, has roots in many traditional disciplines, including psychology, social psychology, sociology, anthropology, political science and economics.

There are different dimensions of organisational behaviour that can be allocated to micro, macro, and meso scales. Micro themes are psychological principles that govern the exercise of leadership, motivation, decision-making, negotiation, and creativity. Macro themes consist of sociological, cultural and institutional factors shaping organisational structures and systems, inter-organisational relationships, and networks. Finally, in between the micro and macro scales are "meso" factors, including teamwork, group dynamics, and organisational culture (London Business School, 2007). There are three overarching themes in organisational management, including (Brooks, 2003):

- the management of change,
- communication, and
- conflict.

These three areas influence an organisation's competitiveness and ability to meet its objectives. Overall, developing a good understanding of organisational behaviour should enable those in charge of an organisation or, in the case of EIA, of a decision process to,

> "*explain and predict human behaviour in organisations and even control it if appropriate*" (Brooks, 2003, p2).

Generally speaking, a good understanding of organisational behaviour can help decision-makers to optimise conditions for smoother processes and more effective outcomes. Subsequently, a selected number of theories and models that are relevant for EIA will be introduced. These include theories of motivation and goal setting as well as SMART metrics. Furthermore, organisational learning and the role of power are explored. Political processes and knowledge on how to support conflict resolution are discussed and factors for the successful construction of an environmental problem are introduced.

### 3.3.1    Motivation, goal setting theory and SMART metrics

Theories of motivation include Maslow's hierarchy of needs. Developed in 1943, this model of human motivation is based on a pyramid, which has physiological needs (food, water, shelter, and clothing) at the bottom of the hierarchy, followed by security needs, love and belonging needs, esteem needs, and finally at the top of the pyramid growth needs. The lower needs are the most powerful and instinctive. Maslow's pyramid helps explain why people, especially those in marginal circumstances, are likely to support options and alternatives that will help them meeting their basic needs. With regards to EIA, what is of particular interest is that people affected by projects may have an interest in safeguarding the environment, because they depend on it for their basic needs (*i.e.* air, water, food, and shelter). Figure 3.2 shows Maslow's pyramid.

**Figure 3.2: Maslow's pyramid of needs**



Self-actualisation — Morality, Creativity, Spontaneity, Lack of prejudice

Esteem — Self esteem, confidence, Achievement, respect

Love/belonging — Friendship, family

Safety — Security, employment, health, family, resources, property

Physiological — breathing, water, food, sleep
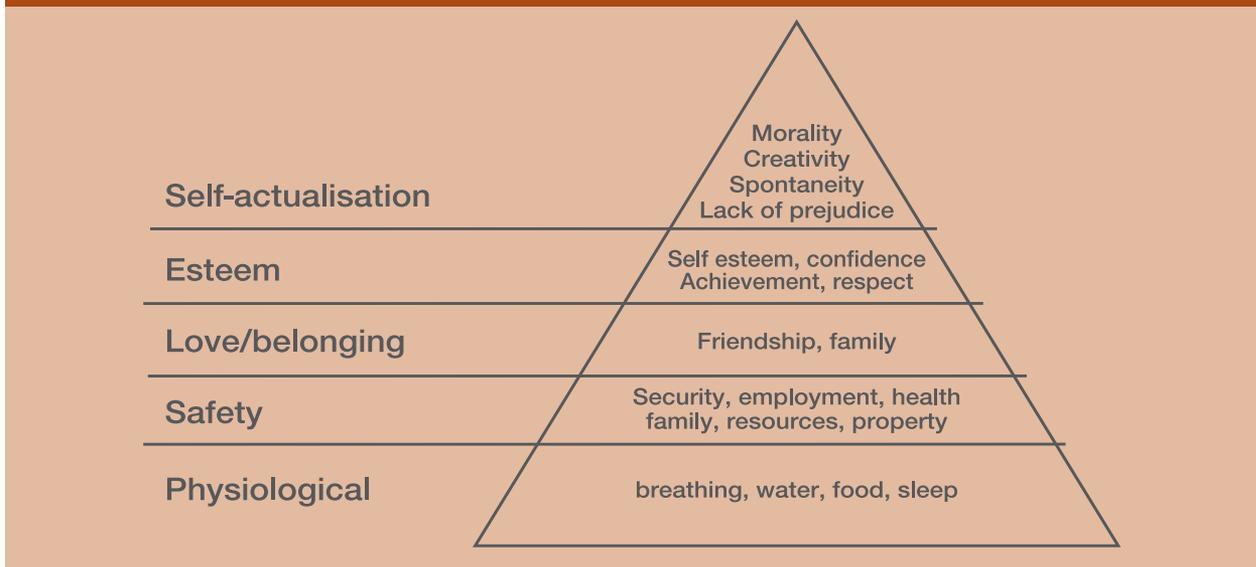
*Source: following Maslow, 1943*

Goal-setting theory provides for another motivation-related model, which was developed first over 50 years ago by Locke. This concept thinks of goals as being motivators. Five areas should be considered when setting goals, namely:

1. goal clarity;
2. level of challenge;
3. commitment (buy-in);
4. feedback; and
5. task complexity.

Understanding these five areas can help making EIA processes more effective. Feedback is seen to be a particular important motivator. Commitment is connected with the presence of values in many processes, including cultural, religious and others. This implies that people are likely to perform better with regards to a goal if this is consistent with their own values and personal standards. Finally, recognition and improved reputation is an important motivational factor.

In management, the acronym SMART is frequently used. This stands for goals and objectives that are Specific, Measurable, Attainable (or Agreed), Relevant (or Realistic) and Time-bound. The ideas on goals and motivation presented in this section should be born in mind when designing EIA objectives, follow-up, monitoring and evaluation criteria. They can help to motivate collaborators and relevant stakeholders.

*3.3.2 Organisational learning*

In recent years, enabling individual, organizational and wider social learning has increasingly been portrayed as being one of EIA's main roles. In this context, many authors have drawn on Kolb's work who saw learning as a continuous process of experience, reflection, and action. His model (See: Figure 3.3) is based on the belief that people learn through their experiences. Kolb's model led on to studies on cognitive styles. These styles deal with the way information is organised and processed. Subsequently, four cognitive styles were identified that are linked to the phases of Kolb's cycle. These are (Brooks, 2003, p35):

- the activist (linked to concrete experimentation);
- the reflector (reflective observation);
- the theorist (abstract conceptualisation); and finally
- the pragmatist (active experimentation/testing)".

To date, empirical evidence for the importance of learning has been generated mostly for strategic

environmental assessment (SEA; See: *e.g.* Jha-Thakur *et al*. 2009; Fischer *et al*. 2009). At a more conceptual level, learning and EIA have been discussed by *e.g.* Diduck and Mitchell (2003) and Sinclair *et al.* (2008).

Individual cognitive styles (these may be established through specific questionnaires) have implications for teams and on placing people in the right (*i.e.* fitting) roles, in line with the needs of an organisation and the environment. When teaching EIA, it is useful to bear in mind the different learning styles of students. In EIA practice, for somebody who is in a facilitating role, it might also be important to bear in mind different learning styles and Kolb's learning cycle to facilitate learning processes for different actors and groups.

While there is no question that individuals constantly learn, organisations sometimes do not appear to learn and to cope in a dynamic environment. Argyris and Schön (1978) brought the debate on organisational learning to a different level when they started to distinguish between single loop and double loop learning. They observed that most organisations appear to be stuck in a process of single loop learning which takes goals, values, frameworks and strategies for granted. Double loop learning, by contrast, involves greater questioning of both, the organisation's objectives and methods. Double loop learning is necessary to identify errors and correct them. In order for double loop learning to happen, however, individuals and groups need

> *"to be willing to discuss sensitive issues openly and to confront differences of views and seek ways of clarifying vague and ambiguous ideas and data"* (Brooks 2003, p256).

Evaluating spatial plan SEA practices in the UK, Germany and Italy, Fischer *et al*. (2009) established the types of learning happening through SEA. They found that while basic single loop, instrumental learning, and here in particular knowledge acquisition and comprehension, was routinely happening, there was little evidence for any transformatory, double loop learning (See: Figure 3.4).

### 3.3.3 Making EIA an effective instrument - the role of power

Different sources of power have been identified. Following French and Raven (1959) these include:
- Coercive power (threat of disciplinary action or sanction);
- Reward power (being rewarded with a benefit);

**Figure 3.3: Kolb's learning cycle**
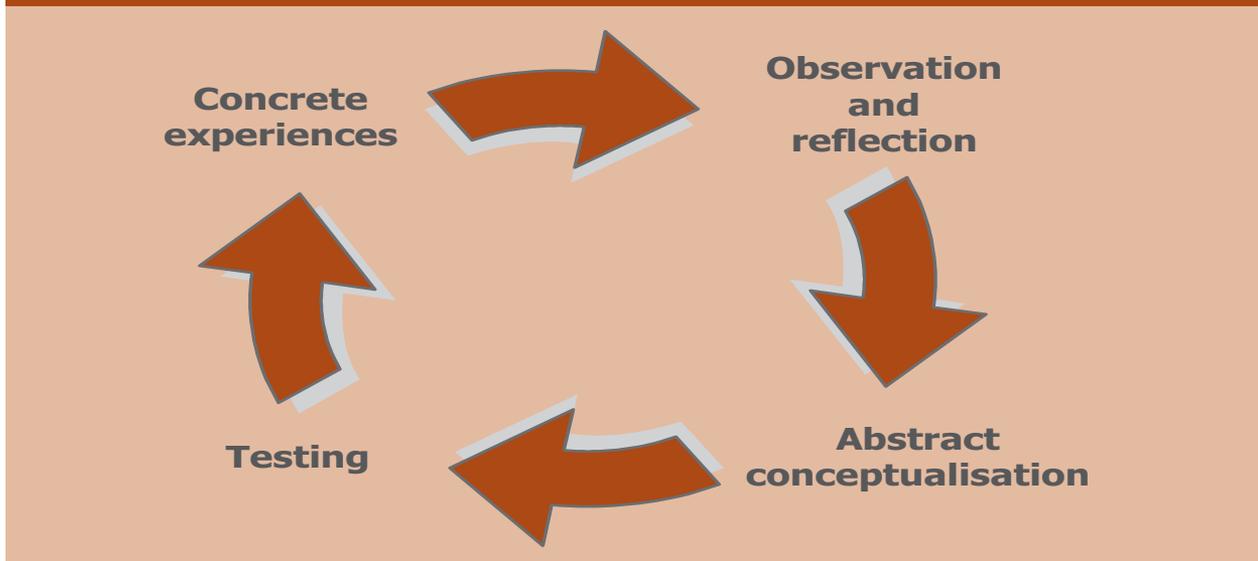


*Source: Posas and Fischer (2008); adapted from Brooks (2003)*

**Figure 3.4: Possible types of learning happening through SEA**

| Level of understanding | Individual | Organisational | Social | Types of Learning | Transformatory Learning ------------------- Instrumental Learning |
|---|---|---|---|---|---|
| Evaluation<br><br>Synthesis | Know why<br>Questioning underlying principles<br>Changing values and behaviours | Know why<br>Integrating principles into Organisational culture Changing norms and practices | Know why<br>Changing values and behaviours | Know why<br>Double Loop Learning | |
| Analysis | Know how<br>Adjusting the Plan | Know how<br>Adjusting the Plan | Know how<br>Adjusting responses to Plan | Know how<br>Single Loop Learning | |
| Application | Adjusting SEA Process | Adjusting SEA Process | Adjusting input to SEA Process | | |
| Comprehension | (Development of individual/organisational capacity– initially likely to be a few 'experts') | | | | |
| Knowledge acquisition | (Legal/administrative/political procedures)<br><br>(Familiarity of terms and concepts)<br>Know that | | | | |

*Source: Fischer et al. (2009)*

- Expert power (possessing special skills or knowledge);
- Legitimate or position power (holding a formal position); and
- Referent power or charismatic authority (admiration or respect for an individual).

Further sources of power include *e.g.* control of knowledge and information, control of boundaries, control of technology, control of the informal organisation, and interpersonal alliances (Morgan, 1986).

Robbins (1984) identified bases of power as means to exert influence. These include control of budgets and rewards, persuasion, rules and procedures, physical presence or threat, and charisma.

For the application of effective EIA, it is important to know where power lies, as this determines what can be accomplished. In order for EIA to have an impact on decisions, it should be a strong legal instrument. In this context, it is

important to remember that even a well conducted EIA and participation process is

> *"not a substitute for the regulatory power, political will, and money required to get things done" (Beierle and Cayford 2002, p.62).*

Most economic development and *e.g.* infrastructure authorities are powerful bodies relative to others. In EIA, it can be important to have those powerful players involved from the early stages of the process. It is also important to remember, however, that a vital role of EIA often is to give a voice to less powerful stakeholders and interests. This also requires having a good understanding of power relationships to start with.

### 3.3.4 Political processes and knowledge on how to support conflict resolution

An understanding of political processes and knowledge on how to support conflict resolution are important when applying EIA as it is often

conducted in situations of conflict and in the presence of power differences. Generally speaking, politics can be described as:

> *"a process of bargaining and negotiation that is used to overcome conflicts and differences of opinion"* (Daft, 1992, p.403).

Conflict often occurs when at least one party feels its interests have been frustrated. Conflict often arises due to:

- difference in status;
- scarcity of resources (*e.g.* budget);
- dependency on others;
- the existence of winners and losers; and
- cultural differences.

Conflicts can be avoided or accommodated and EIA may play an important role in this. Furthermore, if conflicts cannot be easily avoided or accommodated, compromise may be necessary. Collaboration in order to resolve conflict is often seen as the most preferable solution. Factors likely to influence how to best handle conflicts include (Brooks, 2003, chapter 8):

- the time available to resolve the conflict;
- the level of importance of the issue stimulating the conflict;
- whether one of the styles is more suitable to the circumstances; and
- issues of commitment, motivation and precedence.

Since the early 1980s, EIA has been perceived as "*a learning and negotiation process between multiple actors*" (Fischer 2003a, p.156) and recent studies have called "*resolving conflict among competing interests*" (Beierle and Cayford 2002, p.15) as one of the five most important social goals of the EIA public participation processes. Politics and conflicts are intrinsic to the EIA process, which is both scientific and technical, and also firmly embedded in a political and social context. Particularly for controversial projects, conflict can be a significant issue in EIA. Effective

communication strategies are therefore increasingly seen as important for managing and facilitating EA's 'multiple negotiation processes' between stakeholders and decision makers (Gustavo and Partidario, 2006).

### 3.3.5 Factors for the successful construction of an environmental problem

Hannigan (2006) outlined six factors for successful construction of an environmental problem, including:

- Scientific authority and validation of claims;
- Existence of 'popularisers' who can bridge environmentalism and science;
- Media attention in which the problem is 'framed' as novel and important;
- Dramatization of the problem in symbolic and visual terms;
- Economic incentives for taking positive action; and
- Recruitment of an institutional sponsor who can ensure both legitimacy and continuity.

For issues that may not have powerful advocates, such as particulate levels in city air, knowledge of the factors may assist in helping to give stronger credibility or drawing attention to them. While an EIA process may not necessarily be doing all these things, bearing them in mind may help communicate the importance of an issue both, among decision-makers and the public.

In public participation processes, it might be helpful to structure communication along some of these lines, *i.e.* mention scientific authorities and their claims, reference popularisers and media attention to specific issues, consider how to discuss problems in symbolic and visual terms.

## 3.4 Decision-making models

One of the main purposes of EIA is to act as a decision-making aid, and as a consequence it is often defined as a 'systematic decision support process' (*i.e.* Fischer, 2007, p.xiii). Though frequently 'the decision' in EIA is portrayed as occurring between the EIA review and post decision-making stages, in reality it consists of

| **Box 3.1: Decisions made throughout the EIA Process** | |
|---|---|
| *EIA stage* | *Questions requiring decisions* |
| *Screening* | Is the project one for which an EIA is necessary? |
| *Scoping* | What environmental impacts need to be examined? |
| *Prediction* | What is the size, magnitude or extent of the impacts? |
| *Assessment* | Is the impact significant? |
| *Mitigation* | What can be done to reduce the impact? |
| *Review* | Are the assessment and the environmental statement adequate? |
| *Decision* | Should the project be authorised to proceed? |
| *Monitoring and auditing* | Was the prediction of impacts accurate and do the mitigation measures work? |

*Source: based on Weston (2000, p.186)*

many implicit and explicit decision moments (Pischke and Cashmore, 2006) that cover the entire process. In fact, EIA is understood to influence decisions in three main ways, including (Fischer 2007, p.17-19):

- providing better information;
- enabling attitudes and perceptions to change through participation and involvement; and
- changing established routines over a longer period of time.

In theory, decisions are made via an uninterrupted linear process that results in rational solutions.. Yet in practice, things do not always go that way. Subsequently, four key models of decision-making that are of relevance for EIA are therefore explored. Then the various influences on decisions that assessors should be aware of are discussed. Finally, some generic decision aids that may be helpful to anyone involved with EIA processes are considered (See: Box 3.1).

### 3.4.1 Four key decision-making models of relevance for EIA

There are four key decision-making models that are of relevance for EIA. These include:

- the rational model;
- the bounded rational model;
- the garbage can model; and
- the political or coalition approach to decision-making.

In the first – *the rational* – model, decision-making is understood as a rational, linear process that will produce rational outcomes. It is used to explain microeconomic behaviour and is the accepted model in many disciplines up to the present. The steps in rational decision-making are as follows (Brooks, 2003, p.36):

1. identifying a problem that requires a decision;
2. gathering information and materials that will help solve that problem;
3. `generating potential solutions to the problem; and
4. making a rational choice, selecting the best solution, and then implementing it.

The rational model is a logical normative model. The main difficulties with it lie not with the model's process, but rather with its underlying assumptions. Thus, the model implies that a person will:

> *"always make a rational decision based on the ability to evaluate all the alternatives and effectively calculate the potential success of each alternative (Brooks, 2003, p.36)."*

In addition, it suggests that the decision is being made in a stable, slow-moving environment and that the decision-maker has ample time to gather all the information, reflect on all the alternatives,

and reach a rational solution. The logical steps in the model are reminiscent of the EIA process.

In practice, some routine decision processes may nearly follow a rational approach (Butler, 1991). Quite a number of decisions (including many in EIA) however, face more pressures and unknowns than this model's assumptions allow for.

This is why the concept of *bounded rationality* was introduced by Simon (1957). This addresses the rational model's potential weaknesses and incongruence with many decision-making contexts, which are not benefiting from unlimited time and perfect information. The bounded rationality model has been shown to be more consistent with the way those driving and managing processes behave (Brooks, 2003). In reality, there are often time pressures and imperfect information, causing decision-makers to find solutions that will 'satisfice'. These may not necessarily be the best solutions, though. While the rational model can at times explain more routine decisions, the bounded rational model is more suited to explain unfamiliar, non-routine, and potentially contentious issues (Butler, 1991). Its six explicit assumptions are listed in Box 3.2.

The third model is the '*garbage can model*'' (Cohen *et al*., 1972), which is different from the two rationality based models in that it is not a sequence of steps, starting with a problem and ending with a solution. Rather, this model proposes four independent streams, which include problems, solutions, participants, and choice opportunities. An organisation acts as a 'garbage can' in which these streams flow. A decision will be made when problems and solutions can be connected during a time when there are choice 'opportunities' (to be made by individuals). This model is more random and likely to be of relevance for volatile processes or environments (Brooks, 2003). Butler (1991) notes that organisations following this model exhibit several features, including:

- ambiguity in the decision-making process;
- difficult to determine cause and effect relationships; and
- fluid participation (*i.e.* turnover of participants).

The garbage can model can represent an apt description of government policy-making. According to Kingdon (1995) in order for a policy to be successfully implemented, there needs to be a policy window in which problems, policy, and politics converge (See: also Fischer, 2004). The garbage can model and Kingdon's policy window concept are often invoked in the context of higher levels of decision-making, *i.e.* in the context of policy SEA (World Bank, 2005).

Finally, the *political or coalition model* of organisational decision-making was put forward by Cyert and March in 1963. They viewed the process of organisational decision-making as

## Box 3.2: Assumptions of the bounded rational model

1. Managers respond to problems rather than going out of their way to find them.

2. Cognitive limits exist in the search process - human mind is limited in comprehension of problem.

3. Time pressures frequently apply (decisions have to be made with incomplete information).

4. Disjointed, incremental decision-making often occurs, not a smooth, continuous, rational process.

5. Intuition and judgment may have to be the basis for making a decision rather than computation.

6. Satisficing (satisfactory and 'will do') solutions rather than optimal solutions are arrived at.

*Source: Adapted from Butler (1991, p.47)*

**Figure 3.5: Contingency model of organisational decision-making**
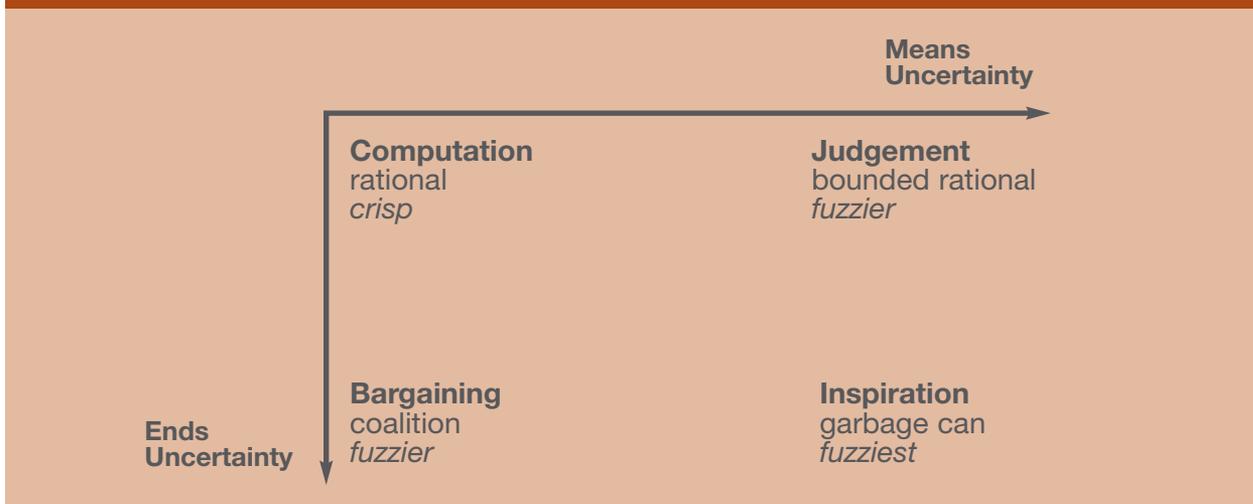


*Source: Posas and Fischer (2008), based on Butler (1991, p.59) and adapted from Thompson and Tuden (1956)*

*"involving shifting coalitions of interests and temporary alliances of decision-makers who can, for the purposes of a decision, come together and sufficiently submerge their differences to make a decision" (Butler, 1991, p51).*

A coalition may be formed for just one decision, though some *quid pro quo* and bargaining is likely to be involved. This kind of decision-making has been known to occur in government contexts.

### 3.4.2 Choosing the right methodological approach to running EIA

As was explained above, different decision theories and models may be applicable to different decision-making situations. In particular, the structuredness of a specific decision-making situation may help to define an associated acting strategy. This has been said to depend on the uncertainty of (a) objectives (*i.e.* what it is that is supposed to be achieved); and of (b) the means or methods to achieve something. The contingency model of organisational decision-making (Thompson and Tuden, 1956) charts the four decision-making models introduced above and assigns them to a specific decision-making situation. In this context, it suggests the type of organisational context for which all of them might be appropriately applied (Figure 3.5).

Models of decision-making, particularly the rational model, are closely tied to much of the recent theory debates on EIA, including the structure or flexibility debate mentioned above. EIA's procedural origins are rooted in rational planning theory, which was developed in the mid-1950s and extensively discussed and spread in the late 1960s and early 1970s (See: Faludi, 1973; Fischer, 2003). Some authors have used this understanding to argue that EIA processes should be flexible rather than rational or rigidly structured. One criticism that could be made of this debate, however, is the relatively poor level of articulation of which elements of the process should be flexible. A second criticism relates to the lack of rigorous testing of whether a flexible approach gives better results and in what contexts (Fischer, 2007).

Philosophically, the rational model and the deviations from it have sparked debate around Habermas' notions of 'communicative rationality' and 'ideal speech' which reflect rational normative ideals. Habermas' contextual ideals are notoriously difficult to attain due in large part to the existence of power disparities among actors (Flyvbjerg, 2001). In the philosophical and EIA literatures, Habermas' ideas are typically contraposed to Foucault's conceptions of power (*i.e.* Flyvbjerg, 2001; Fischer, 2003a), though Healey (2004) goes a long way in establishing the

complementarities of these two philosophers' ideas. In this regard and relating to EIA being seen as a rational technical vs. deliberative instrument (Owens *et al.*, 2004), there has been much discussion of the role of power and values in the EIA process and associated decision-making (Richardson, 2005; Connelly and Richardson, 2005; Wilkins, 2003). Friction between communicative planning theory based on Habermas' ideas (See: Healey, 1996; 1999) and rational planning theory has been continuing to influence the EIA world and is still an important element of the professional debate (See: Fischer, 2003a; Tewdwr-Jones and Allmendinger, 1998). More care in use of terminology may help sharpen and clarify the debates. For example, people often use the term 'rational' when they really mean 'systematic', a term which ultimately does not invite the same level of controversy.

## 3.5    Influences on effective decision-making

The model of bounded rationality introduced above identified some of the key constraints on decision-making and rational approaches towards it, including time pressures and incomplete information. Hammond *et al*. (2002) identified uncertainties, risk tolerance, and links to future choices as critical factors that influence decisions. Brooks (2003, p.37) singled out what he called 'cognitive biases' as compromising "*the rationality and objectivity of decision-making*". Cognitive biases are distortions in thinking that can develop in an individual's cognitive structure over time and are influenced by beliefs, attitudes, values, and the person's own personality. Cognitive dissonance means there is inconsistency between a person's beliefs and actions. While this may be observed in practice, cognitive biases are more common and less noticeable for most people. Common cognitive biases include *e.g.* the illusion of control, where an individual believes he or she can handle a complex problem but in fact cannot. Furthermore, they include *status quo* biases, *i.e.* a tendency to prefer that things stay relatively the same. Also, they include the so-called 'bandwagon effect'

and 'groupthink', representing a tendency to do or believe the same things as others do. Finally, they include what has been called 'professional deformation', namely a tendency to look at things only according to the conventions of one's profession, forgetting broader points of view. Cognitive biases can thus decrease the quality of decisions and decision-making.

Decision-making is inherent in and frequently required throughout the EA process. Decisions must be made relating to project scope, approval, implementation, evaluation and follow up, among others. EIA is a specific 'systematic decision support process' (Fischer, 2007, p.xiii) aimed at (a) helping reduce or mitigate negative environmental impacts, (b) enhancing environmental opportunities, where possible, and (c) producing more environmentally and socially sustainable outcomes. But there are also other more generic aids for decision-making that can be utilised by all parties in the EIA process. A few of these from organisational behaviour and management will be introduced below, following discussion of criteria for effective decision-making processes.

Hammond *et al*. (2002), in their book *Smart Choices*, propose that an effective decision-making process fulfils six criteria. These are presented in Box 3.3.

They then introduce a 'PrOACT approach' which relates to the Problem, Objectives, Alternatives, Consequences, and Trade-offs of decision-making situations and that looks similar to a traditional EIA approach. They devise strategies for decision-making that are connected with the consideration of uncertainty, risk tolerance, and linked decisions.

## 3.6    EIA as part of the decision-making process

Following on from what has been said above, EIA is part of a larger process of decision-making to approve major proposals. The resulting decision is based on information from a number of different

**Box 3.3: Six criteria for an effective decision-making process**

An effective decision-making process:

- Focuses on what is important;

- Is logical and consistent;

- Acknowledges both subjective and objective factors and blends analytical and intuitive thinking;

- Requires only as much information and analysis as is necessary to resolve the particular dilemma;

- Encourages and guides the gathering of relevant information and informed opinion; and

- Is straightforward, reliable, easy to use, and flexible.

*Source: adapted from Hammond et al. (2002, p.4)*

sources. In the context of decision-making, a large number of trade-offs are normally made. In this context, a balance should be struck between various benefits and costs. Environmental, economic and social elements should be weighed, and uncertainties and arguments over the significance of risks and impacts should be addressed. In this context EIA plays an important role. The different factors that will be of importance in the final approval of a proposal include:

- findings of significant impact contained in the EIA report;

- inputs from economic and social appraisals; and

- other external pressures or political inputs to decision-making.

As discussed above, EIA is not the only assessment instrument used in decision-making. Rather, it is usually applied next to economic and other (social, equality and others) appraisal. In practice, this means that the decision made involves trade-offs and may not represent the most environmentally friendly choice. Frequently, environmental considerations carry less weight than economic issues (See: Fischer, 2003a). An important question in this context is whether EIA should be neutral or rather act as an advocacy instrument for the environment. The predominant view is that the role of the EIA practitioner is to (following UN, 2006c):

- *"provide a clear, objective statement of the environmental impacts and their mitigation;*

- *bring the feasible alternatives and the environmentally preferred option to the*

*attention of decision-makers; and, more arguably*

- *give contestable advice on the environmental acceptability of the proposal (for example, whether it can be justified in the circumstances)".*

EIA should enable the input of a wide range of external views and interests into the development project planning process. In this context, it is important that many development proposals, in particular those that are large scale, are controversial and encompass a wide range of issues on which opinion can be divided.

## 3.7    Practical element

Students should discuss how public decisions are made in Pakistan; furthermore, a role-play should be conducted around decision-making; the suggestion here is to focus on tourism development in a hypothetical country. While the concrete outline is for the lecturer to prepare, a possible case could be organised as follows (following a personal communication with Aleh Cherp from Central European University in 2008):

- Think up a hypothetical country, where one part is fairly well developed and the other is not; prepare a map with features (mountains, coastline, archaeological sites, sensitive environments, such as wetlands or deserts, towns and infrastructure).

- Use an assumed interest of a developer to build a number of big hotels near the coastline as the basis for your case study; the developer wants to have the hotels near

- the coast in an environmentally sensitive area in the less developed part where a large proportion of people leading traditional lifestyles (indigenous people) live.
- Divide the student cohort into different groups which represent national ministries of *e.g.* economic development, environment, indigenous people and infrastructure.
- Each of the student groups should discuss the developer's proposal from the point of view of the ministries they represent and should think of 'counter' or amended suggestions, keeping in mind the importance of the developer investing in the country.

- Spokespersons' of the ministries are then to get together and discuss the development and their own 'counter' / amended suggestions in front of all students and try to come up with a solution that everyone can agree on. The lecturer is to take on the role of the country's president, who needs to be convinced!
- All students are to reflect on the exercise in terms of issues of decision processes, power and environmental issues; how could EIA have facilitated this process?

# 4    Main environmental problems the international community and Pakistan are faced with and instruments for environmental integration

This chapter is sub-divided into six sections. First, physical, biological and social aspects of the environment are explored. Then, drivers for environmental change are introduced. Existing and emerging environmental threats are elaborated on before principles for environmental integration are established. In this context, ecosystem services are also covered. Finally, different tools and instruments for environmental integration are introduced. The main sources this chapter draws on include Fischer *et al*. (2008; chapter 7 by Gazzola: 58-69), UNEP (2012), and the UNEP's Millennium Ecosystem Assessment (2005).

## 4.1    The environment: physical, biological and social aspects

The term environment is usually understood to include physical, biological and social environments. The physical environment refers to the earth/atmosphere system, the biological environment to the biosphere or ecosphere (also called living environment), and the social environment to the individuals living in a certain area. All three environments are interlinked and are affected heavily by economic activities. Environmental problems often occur because society fails to appreciate the interrelationships between the three environments. Subsequently, the three environments are explored further. All three of these can be divided into 'micro' and 'macro' level environments, with the former representing localised aspects within *e.g.* a specific land parcel, and the latter representing wider regional or even globalised aspects.

*4.1.1    The physical environment*
The physical environment includes three components:
(1)  lithosphere, *i.e.* the solid inorganic part of the earth's surface;
(2)  atmosphere, *i.e.* the gaseous layer of air surrounding the earth; and
(3)  hydrosphere, *i.e.* the various waters on and in the earth's surface.

The physical environment is the basis for both, biological and social environments and the three components are closely interlinked with each other. They are further described below.

*Lithosphere*: The lithosphere is the earth's crust together with the underlying rigid part of the earth's mantle. It is thin beneath the oceans and thick under the continents. The continents have common structural features, including shields, folded mountains and plains (Klein, 2002).

- Shields are exposed areas of ancient, stable continental rocks. They are often buried by younger sediments. Shield areas have mineral potential, the extraction of which has led to many environmental problems.
- Folded mountains develop through collision of continental plates. The collision forces sedimentary rocks upwards and folds develop. Mountain areas are subject to a range of economic uses, including *e.g.* mining, forestry and hydroelectric power production. Furthermore, they tend to be popular for tourism. These activities have deteriorated many mountain areas.
- Plains are composed of sediments eroded from nearby shields or mountains and deposited in sedimentary basins. The sediments of plains can contain commercially valuable resources, including *e.g.* coal, petroleum and building materials, such as limestone and sandstone. Furthermore, plains are important for agriculture, industry and human settlements, all of which are impacting on them.

*Atmosphere*: This is the layer of gases surrounding the earth, which is being retained by the earth's gravity. The atmosphere consists of 78% nitrogen and 20.95% oxygen. Furthermore, 0.93% of the atmosphere is made up by argon, 0.04% by carbon dioxide and some further traces of other gases. In addition, the atmosphere consists of 1% water vapours. Oxygen and nitrogen are essential for any life on earth. Oxygen is absorbed by animals and humans during respiration in order to generate energy through combustion and metabolism. Additionally, oxygen also takes the form of ozone, which protects the biosphere from excess ultraviolet radiation. Nitrogen is a basic unit of life which can be found in DNA (genetic material),

proteins and amino acids. The atmosphere's nitrogen levels are maintained by a complex cycle, through processes of de-nitrification (putting nitrogen into the air) and nitrogen fixation (the conversion of gaseous nitrogen into ammonia, nitrite and nitrate). Human activities disrupt nitrogen cycles, causing *e.g.* eutrophication and ozone depletion. Carbon dioxide and other gases are very important, despite their small volume (0.04%). Carbon dioxide is essential for life on earth, because of its role in photosynthesis and contributions to the natural greenhouse effect. From time to time sulphur dioxide, oxides of nitrogen, hydrogen sulphide and carbon monoxide become constituents of the atmosphere, causing pollution, photochemical smog, global warming and acid rain.

*Hydrosphere*: The hydrosphere includes water from the oceans, seas, rivers, lakes, ground water, water vapour and droplets, as well as the water contained in the living elements of the biosphere. As much as 97% of the world's water is in the oceans, which support large populations of marine plants and animals. Despite the small amount of fresh water (*i.e.* 3%), terrestrial *flora* and *fauna* survive due to the natural recycling of water through the hydrological cycle. This includes evaporation, condensation and precipitation. While the hydrological cycle is a closed cycle (*i.e.* human activities cannot deplete the entire system), excessive withdrawal from run-off or ground water can create local shortages. Due to the intensity of human water usage globally there are water quality and quantity problems worldwide.

### 4.1.2    The biological environment

The biological environment is also called the living environment. This incorporates aspects of the lithosphere, atmosphere and hydrosphere and is referred to as the biosphere, which includes soil, plants and animals, ecosystems and biomes.

- Soil is linking abiotic (non-living) and biotic (living) components and consists of a mixture of mineral and organic matter, air and water.

Compositions vary in time and place. Understanding the characteristics of a specific type of soil can help deciding what type of activity an area of land can best support. This is known as land capability or land suitability (For more information, see: Food and Agriculture Organisation - FAO, "Land evaluation for development", available at http://www.fao.org/docrep/U1980E/U1980E00.HTM).

- Plants and animals: All plants have common characteristics. Terrestrial plants are connected with the soil by their roots. Besides providing stability they allow plants to absorb moisture and nutrients, supporting growth. Photosynthesis is the process by which light energy is converted into chemical and food energy. This process is of fundamental importance to animal and human life on earth. Agricultural activities and deforestation are reducing the amount of photosynthesis taking place. This is one of the causes for the rise of carbon dioxide levels, thus contributing to global warming. Different plants have different physical needs. These are related to a combination of different aspects and include climate, in particular temperature and precipitation. Furthermore, they include water, *i.e.* precipitation evapotranspiration (the sum of evaporation and plant transpiration) and soil moisture. Soil is important with regards to its texture, fertility, acidity and maturity. Finally, other biotic factors play an essential role, through *e.g.* allelopathy, the phenomenon by which an organism produces bio-chemicals that influence other organisms, and animal activities. Animals and humans are heterotrophic, *i.e.* they depend on green plants (food) to survive. Most animals are motile, *i.e.* they are capable of spontaneous movement. This is important, because it allows them to look for those environmental conditions that are most suited to their needs. Many animals can migrate, if necessary. While animals can adapt in order to survive *e.g.* severe environmental conditions, there are also restrictions due to their dependence on plants.

- Ecosystems and biomes: The term ecosystem refers to the combination of biotic and abiotic components (following Tansley, 1935). There are terrestrial and aquatic ecosystems. The former incorporates continental *flora* and *fauna* and the land surface they occupy. The latter refers to salt-water and freshwater communities, including those in coastal and interior wetlands. Ecosystems are inhabited by different types of organisms, depending on the area's physical conditions and geography. Ecologists use the term habitat to define areas where certain species can be found. Organisms fulfil certain ecological roles and in turn often depend on specific ecological niches. A habitat may, thus, indicate where certain species live, including whom they interact with and by which species they are constrained by. Within a specific niche, an organism makes use of the set of conditions that are best suited to its survival. Changes in these conditions can threaten its survival, as well as potentially the integrity of the whole ecosystem. Groups of ecosystems that define landscapes, including those made by humans, form larger regional units which are called biomes. Biomes can be terrestrial and aquatic and represent a developed community of plants and animals. These depend on certain environmental conditions in a given time and space. Terrestrial biomes include tropical rain forests, tropical deciduous forests, tropical savannahs, deserts, Mediterranean scrub forests, temperate grasslands, temperate mix forests, boreal forests, mountains, and tundra. There are transition zones between biomes with characteristics of both. These transition zones are called eco-tones. Aquatic biomes are divided into marine and freshwater communities. Depending on their depth or proximity to the shore, they can be further subdivided into eco-zones.

### 4.1.3    The social environment

The term 'social environment' encompasses organisations of individuals and populations. In this context, how species and individuals react to one another is of importance as well as how they grow. A population is usually defined as a group of organisms of the same species which occupies a given space (Odum, 1989). It can be described in terms of density, dispersion (*i.e.* random, uniform or clumped), age distribution, genetic fitness or persistence. Population growth rates are the net result of births, deaths and their distribution over a certain geographical area (*i.e.* their dispersal). With regards to forms of growth, organisms are divided into r-strategists and k-strategists. The former include organisms, such as insects and small mammals. These have a reproductive strategy that allows them to respond to changing conditions that favour them. They are characterised by small size, with relatively short lifespans during which they produce large numbers of offspring. The latter are usually large organisms, including humans and large mammals. They have relatively long lives and produce only a limited number of offspring. They invest considerable time and energy providing for the survival of these off-springs, so that they can ensure the continuation of the species. They survive best under stable environmental conditions. Human populations are often portrayed as going through a series of sequential stages of development, including (Molnar and Molnar, 2000):

(1)  high stationary;
(2)  early expanding;
(3)  late expanding;
(4)  low stationary; and
(5)  declining.

Each of these stages can be associated with certain socio-economic and cultural changes *e.g.* migration, industrialisation, urbanisation and technological progress. Changes result in changing relationships between society and the environment, and increasing degrees of complexity. Between 1999 and 2013, 98% of the world's major population growth has occurred in the developing world, *i.e.* in nations that are already facing serious socio-economic and environmental problems. In Pakistan alone, during these 14 years, the population has grown from about 131M to over 180M. Understanding the relationship between population growth and environmental deterioration is key for tackling today's environmental problems. The combination of exponential population growth with the advances in technology that have increased the demand for resources has radically changed the relationship between human beings and their life-supporting environment.

## 4.2    Drivers for environmental change

The main drivers for environmental change are connected with population growth and economic development, mainly through the pressures these exert with regards to energy, transport, urbanisation and globalisation. The global human population reached seven billion in 2011. It is expected to grow further to reach ten billion by 2100 (UN, 2011).

There are several reasons for the growing population. While global birth rates remain above the global replacement fertility rate, fertility is declining in almost all countries. At the global level, the crude birth rate fell from 37 births per thousand in 1950–1955 to 20 per thousand in 2005–2010 (UN, 2012). Furthermore, the number of children per woman declined from 4.9 in 1950–1955 to 2.6 in 2005–2010 (UN 2011). Epidemiological advances mean that global average life expectancy has increased dramatically over the past five decades; from 47 years in 1950-1955 to 65-68 for men and 70 for women in 2005-2010 (UN, 2009a).

Birth rates have been observed to decline following falling death rates and increased economic development. However, in most countries or societies there is a period of rapid population growth when birth rates remain high. This has been described as 'demographic transition' period which is shown below in figure 4.1

**Figure 4.1: the demographic transition**
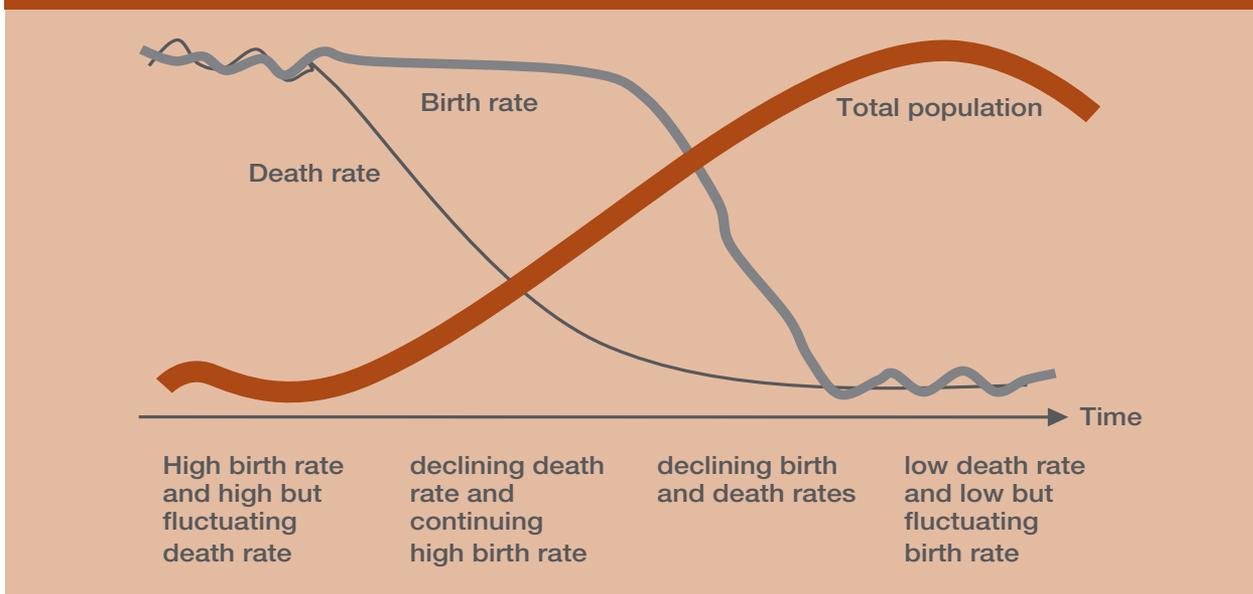


*Source: UN, 2012, p7*

Migration is another aspect of this demographic transition. This is characterised by a shift from rural to rural migration at early stages of the demographic transition to rural-urban migration and also international migration at later stages of the transition. According to the UN (2012), migration may have the following direct environmental impacts:

- "*rural-rural migration produces direct household impacts on natural resources, often through agricultural expansion;*
- *rural-urban migration and associated livelihood changes are often accompanied by changing patterns of energy use and increased meat and dairy consumption, which can intensify land pressures in productive rural areas; and*
- *international migration, with remittances sent home, can have a direct impact through land-use investments or an indirect impact through increased meat, dairy and material consumption*".

While in 1950 below 30% of the world population lived in urban areas (only New York and Tokyo had populations of more than 10 million people) in 2010 this had grown to 50%. Also, in 2010 there were 20 cities with populations of over 10 Million,

predominantly in Asia and Latin America. In 2013, Karachi had around 23 Million inhabitants and is expected to grow to over 26 Million by 2025. Another mega-city in Pakistan is Lahore which had around 8 million inhabitants in 2013. Recently, urban growth rates have been high in both Asia and Africa, with highest rates being observed in middle-sized cities (Montgomery 2008). Despite these numbers, however, only 0.5% of the world's land surface area is currently occupied by urban settlements with over 37% of the surface being used for agricultural production purposes (Foley *et al.* 2011).

A rising human population and associated increased economic activities are seen as the reason for many environmental problems related to water, air, soils, and *fauna* and *flora*. With regards to water, overall, humans use more than a quarter of terrestrial evapotranspiration for growing crops. More than half of the accessible water run-off is used for this purpose (Postel *et al.,* 1996). Climate change has been said to have led to an increase in water scarcity, in particular in Africa and the Middle East. The ensuing crisis has been said to be worsening with growing populations (Sowers *et al.* 2010). During the 20th century, global economic output grew by a factor

of more than 20 (Maddison 2009). This was accompanied by growing raw material extraction, and increasing levels of emissions (fluid and gaseous) that are often harmful to the environment. While some have hypothesised that environmental degradation decrease with increasing income levels (See the so-called 'environmental Kuznets curve', shown in Figure 4.2). In reality, processes do not always seem that simple with some environmental degradation persisting even in highly developed economies.

Another aspect with regard to environmental impacts associated with population growth and economic development is a change in food consumption, described by Popkin (2002) as the nutrition transition. He described this in terms of three states:

- decreased occurrence of famine with rising incomes;
- the emergence of chronic diet-related diseases due to changes in activity and food consumption patterns; and
- behavioural change where diet and activity levels are better managed for prolonged healthier lives.

In order to reduce the environmental impacts of the increased production of goods and services,

technology plays an important role, in particular for increasing efficiencies. However, to date a problem has been that technological advances have not been enough to offset the impacts of population growth and the increase of production and consumption. Therefore, some behavioural changes by humans are also seen to be vital for reducing environmental impact.

The three major economic sectors in terms of energy consumption (IEA, 2011) are:

- manufacturing (33%);
- households (29%); and
- transport (26%).

## 4.3    Existing and emerging environmental threats

As explained above, growing populations, economic development and the lack of sufficient technological advancements to increase efficiencies to levels needed have radically altered the relationship between the environment and society. This has led to an increasing number of conflicts (Redclift, 1991). Many environmental observers today suggest that society wants more from the environment than what the environment can provide. This generates numerous environmental problems, some of which have

**Figure 4.2: Environmental Kuznets curve**
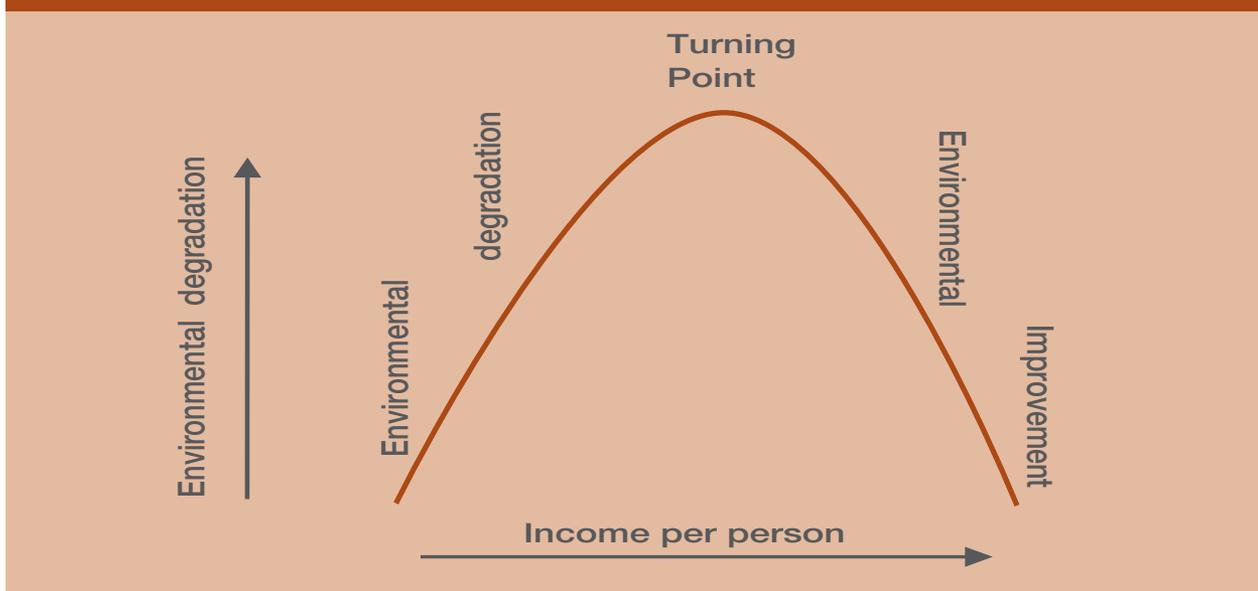


*Source: UNEP,2012, p12*

already been described above. Main global environmental problems are discussed here.

### 4.3.1 Land resources

The world's land area covers 29% of the earth's surface and not all of it is suitable for human habitation. It currently supports over seven billion people and provides for mineral resources, sustains agriculture, supports urban and industrial development, absorbs waste and provides space for recreation. If these activities are not appropriately planned and managed, or if the limits of the land's ability to handle them are not acknowledged, significant negative environmental impacts and problems can occur (Odum, 1975). Three groups of human activities that create pressure on land can be distinguished (Kemp, 2004):

1. Resource extraction and depletion, including the deliberate removal and redistribution of materials through mining and quarrying; depletion can occur inadvertently, *e.g.* as a result of poor planning or unsuitable land-use in the case of soil erosion;
2. Urbanisation, infrastructure development and waste disposal; including general urban sprawl, transport infrastructure - roads, airports and pipelines, sanitary landfill and hazardous waste disposal; and
3. Forestry and agriculture can disturb *flora* and *fauna*, if not done sustainably; furthermore, industrial harvesting of fish can destroy marine habitats; finally, there is general wildlife and habitat destruction.

Suitable policy initiatives and spatial or land-use planning can help the environment to be taken into account. This can be particularly effective if enforceable legislation is implemented. In this context, environmental assessment can play a crucial role.

### 4.3.2 Wildlife

A wide range of contemporary human activities alter ecosystems (Odum, 1989). Associated impacts on wildlife include:

● A loss of wilderness - while naturally, plant and animal communities within their abiotic environment are capable of responding to natural change, their ability to adapt is not infinite. Many ecosystems are altered, disrupted and fragmented by human activities;

● The destruction of habitats - natural change is an integral part of all habitats, but human interventions are causing habitat change and loss, particularly if no time for recovery is provided; and

● Biodiversity or biological diversity loss - this is one of the main consequences of human impacts on habitats due to human induced activities; biodiversity refers to the variety of life forms that inhabit the earth; biodiversity includes habitat diversity, plant and animal species diversity within various habitats and the genetic diversity of individual species. It can be measured in terms of the number of species or of the overall distribution or relative mix of species. Agriculture, industry and urbanisation are major threats to biodiversity.

There is worldwide concern for the current levels of habitat destruction and loss of biodiversity. Despite recent attempts at valuing ecosystem services, weighing the costs and benefits of maintaining and protecting the environment effectively remains elusive in the presence of the Gross Domestic Product (GDP) paradigm. GDP is an unsustainable way to measure sustainable development, as every accident, such as an oil spill (destroying wildlife and plants) ultimately counts as GDP growth, due to the clean-up operations. With regards to more information on the protection of wetlands, see the Ramsar Convention (http://www.ramsar.org). Furthermore, for the protection of wildlife, see the Convention on International Trade on Endangered Species of wild *fauna* and *flora* (http://www.cites.org).

### 4.3.3 Availability and quality of water

Water is essential for any society, no matter how developed or technologically advanced it is. While the amount of water on earth is constant, it

changes state and location regularly. Furthermore, it is naturally recycled because of the hydrological cycle. Human interferences are, however, affecting the efficiency of the hydrologic cycle and altering the availability and quality of water. Interferences include *e.g.* river damming and river flow regime changes. Also, increasingly, certain changes are said to arise from global climate change. This includes changes to precipitations, warming oceans and sea-level rise. Agricultural, industrial and domestic demands also affect the availability and quality of run off and groundwater. For more information on water quality, See:
http://www.unece.org/env/water/.

### 4.3.4    Drought, famine and desertification

Drought, famine and desertification can have disastrous impacts on societies. Drought is a permanent dryness and occurs when there is insufficient moisture to meet the needs of plants, animals and humans. Famine is a protracted food shortage that leads to widespread starvation, disease and death. Many factors can play a role in its occurrence, *e.g.* general poverty, civil unrest, and war. It can also be associated with inadequate food distribution or transport systems. Drought can be associated with famine, causing crops to die or reducing local food supply. Desertification is the degradation of land in arid, semi-arid and some dry sub-humid areas. It can be associated with natural environmental change (*e.g.* extended drought). Furthermore, ecologically inappropriate human activities can also be a major factor. Desertification is often associated with extended periods of drought, *e.g.* when land adjacent to tropical deserts become more and more arid until desert conditions prevail. Desertification is further explained in *e.g.* http://www.unccd.int.

### 4.3.5    Air and rain quality

The atmosphere consists of a mix of gases, liquids and solid particles in varying proportions. Furthermore, it has the ability to cleanse itself of solid, liquid or gaseous materials released into it. Pollution occurs when the atmosphere is unable

to cleanse itself of materials that have been added to it. Air pollution can impact human health, crops and buildings. At a global scale, there is a build-up of particulate matter or aerosols. The accumulation of human released carbon dioxide into the atmosphere has led to global warming. Additionally, the release of chlorofluorocarbons (CFCs) has led to a thinner ozone layer, exposing the earth's surface to excess solar radiation. At the local or regional level, air pollution in urban areas has caused health problems and has impacted on the quality of life.

Locally produced pollutants can cause wider regional or continental problems. This includes acid rain which occurs when sulphur dioxide emissions are carried downwind by atmospheric circulation, leading to environmental damage hundreds or even thousands of kilometres away from the pollution source. Acid rain (snow, hail, fog) and dry gases or soot and fly-ash lead to the deposition of acidic substances on the earth's surface. Acid gases, such as sulphur dioxide, are released into the atmosphere as a by-product of smelting processes, of the burning of coal and oil for *e.g.* thermal electric power stations, and for transport systems' internal combustion engines (see also the UNECE Convention on Long Range Transboundary Air Pollution protocol (1999), and the Gothenburg Protocol designed to abate acidification, eutrophication and ground level ozone by setting country-by-country emission thresholds to be achieved by 2010; http://www.unece.org/env/lrtap/ multi_h1.htm).

### 4.3.6    Ozone depletion and global warming

Ozone depletion describes the steady decline of the total amount of ozone in the Earth's stratosphere since 1980. Furthermore, there is a much larger seasonal decrease in stratospheric ozone at the Earth's polar regions (*i.e.* the ozone hole). CFCs (chlorofluorocarbons), halons and other contributory substances are commonly referred to as ozone-depleting substances (ODS). The ozone layer prevents most harmful wavelengths of ultraviolet light (UV light) from passing through the Earth's atmosphere. Ozone

depletion generated worldwide concern and led to the ban of CFCs and halons and of other ozone depleting chemicals, such as carbon tetrachloride and trichloroethane (also known as methyl chloroform). Increased UV exposure due to ozone depletion can cause skin cancer, damage to plants, and reduction of plankton populations.

Global warming consists of an increase of the average temperature of the earth's surface, air and oceans. According to the IPCC (Intergovernmental Panel on Climate Change), an unusual increase in global average temperatures has occurred since the mid-20th century. This is due to the increase of anthropogenic greenhouse gas emissions which is leading to the greenhouse effect. This describes the rise in temperature that the earth experiences because certain gases in the atmosphere trap energy from the sun. The increase in global temperatures causes sea-level rise, changes in precipitation patterns resulting in floods and droughts. Changes in the frequency and intensity of extreme weather events are also thought to occur. Other effects include changes in agricultural yields, glacier retreats, reduced summer stream flows, species extinctions and increase in diseases. Not all world regions are experiencing the same effect. In Europe, for example, global warming could lead to cutting off the gulf stream which would mean a drastic reduction in average annual temperatures in large parts of Europe (for further information, See: http://unfccc.int/2860.php).

### 4.3.7    Noise pollution
Noise pollution is connected with excessive levels of noise that may ultimately have an impact on human and animal health. Sources of noise pollution are often machines, including in particular motor vehicles, planes and trains. Next to the sources of noise, poor planning of settlements and infrastructures can be an important reason for noise pollution.

*"High noise levels can contribute to cardiovascular effects in humans, a rise in*

*blood pressure, and an increase in stress and vasoconstriction, and an increased incidence of coronary artery disease. In animals, noise can increase the risk of death by altering predator or prey detection and avoidance, interfere with reproduction and navigation, and contribute to permanent hearing loss"* (http://en.wikipedia.org/wiki/Noise_polluti on).

## 4.4    Principles for environmental integration
Given the dependence of humans on the earth as their life-supporting system, the importance of integrating the environment into human activities and decision-making has become widely acknowledged. There are different ways in which environmental integration can occur. These include environmental movements, environmental regulations, treaties and agreements and environmental tools, such as planning, management and assessment.

### 4.4.1    Environmental movements
Concerns for the environment grew, as the impact of human activities became clearer and their magnitude more significant. Concerns were raised by individuals and groups of concerned people with scientific, social and political agendas, generating the basis for environmental movements. The first environmental movement in modern times occurred in the 1960s and 1970s, resulting in the creation of new environmental organisations (*e.g.* Friends of the Earth and Greenpeace), the celebration of the first "Earth day" (April 22nd, 1970) and the publication of various books (Rachel Carson's 1962 "Silent Spring"; Paul Ehrlich's 1968 "The Population Bomb"; Aldo Leopold's 1949 "A Sand County Almanac"; Ian McHarg's 1969 "Design with Nature" and Meadows *et al.*'s 1972 "The Limits to Growth"). The origins of the modern day environmental movement go back more than 200 years earlier with the work of numerous individuals (See: Box 4.1).

Subsequently, environmental concerns were also brought forward through conferences and meetings (**See**: Box 4.2) as well as international agreements and protocols. The Kyoto Protocol, for example, is an agreement made under the United Nations Framework Convention on Climate Change (UNFCCC). It is an amendment to the international treaty on climate change and it assigns mandatory emission limitations for the reduction of greenhouse gas emissions to the signatory nations (See also: http://unfccc.int/2860.php).

The further development of the environmental movement witnessed a growing awareness of the scope and complexity of environmental issues, stressing the importance of understanding the economic and political components (Fischer and Hajer, 1999). This resulted in the concept of sustainable development, according to which development must occur in an economically and environmentally sustainable manner *i.e.* 'meeting the needs of the world's current population without jeopardising those of future generations'; (the definition of the World Commission from 1987). The concept of sustainable development is, however, not accepted among all environmentalists (Fischer and Hajer, 1999; Kemp, 2004; Berkhout, Leach and Scoones, 2003). On the one hand, the so-called technocratic environmentalists support the concept. They believe that using technology and managerial techniques, environment can be administered for the benefit of society. On the other hand, eco-centric environmentalists believe humans are not the only or most important species. Therefore, priority should not be given to human needs over the needs of other species. Those who embrace eco-centrism are often seen as unrealistic in their demands, because they

## Box 4.1: Precursors of environmentalism

James Hutton (1726-1797) and Charles Lyell (1797-1875): looked at the dynamic nature of the lithosphere, emphasising how it could contribute to environmental change;

Charles Darwin (1809-1882) and Alfred Russel Wallace (1832-1913): recognised the importance of gradual and cumulative change in plant and animal communities. Darwin, with his publication "On the Origin of Species" (1859) developed the theory of evolution, including the concept of natural selection, which was also a study on environmental change;

Thomas Malthus (1766-1834): studied the relationship between population growth and food supply;

Alexander von Humboldt (1769-1859): recognised that the environment was being changed by human activities;

Jean Jacques Rousseau (1712-1778) and Johann Wolfgang von Goethe (1749-1832): explored the relationship between society and nature at a cerebral level;

Henry David Thoreau (1817-1862): best known for his work "Walden" (1854), rejected materialism and studied nature to improve the quality and meaning of life. Through his observations he became aware of the concept of forest succession and subsequently advocated the creation of wilderness parks for the preservation of nature;

George Perkins Marsh (1801-1882): in 1864 he published "Man and Nature", where he included details of the impact of human activities on the environment;

John Muir (1838-1914): one of the first environmental activists to use writing and political contacts to promote the preservation of the western wilderness. He was a founding member and the first president of the Sierra Club;

Aldo Leopold (1878-1848): is regarded as the father of wildlife management and founding member of the Wilderness Society. He appreciated the interrelationships among the various components of the environment and considered the concept of ecosystem as central to the management of nature (see his book 'A Sand County Almanac', published in 1949);

Rachel Carson (1907-1964): author of the best-seller 'Silent Spring' (1962) drew attention to the environmental impact of chemicals.

*Source: after Gazzola, 2008, p 64*

| **Box 4.2: International environmental conferences** |
| :--- |
| <u>1972 United Nations conference on the human environment</u>, Stockholm: the need to acknowledge and tackle the growing threats to the environment was recognised through the signing of the Declaration of the Human Environment and the creation of the UN Environment Programme; |
| <u>1987 World Commission on Environment and Development (the Brundtland Commission):</u> sustainable development was introduced, which required development to be economically and environmentally sound; |
| <u>1992 UN conference on environment and development (the Earth Summit)</u>, Rio de Janeiro: a blueprint for sustainable development in the 21<sup>st</sup> century was produced, including the Rio Declaration, Convention on Climate Change, Convention on Biodiversity, Statement of Forest Principles and Agenda 21; |
| <u>Since then, UN conferences Rio +5; +10; +20</u> |

*Source: authors*

create a false equality amongst the components of the biosphere, ignoring that humans have technical and intellectual attributes that make them different from other living organisms (See also: Ntsime, 2004).

### 4.4.2 Environmental regulations, treaties, protocols and agreements

There are a number of environmental regulations, treaties, protocols and agreements that have been developed worldwide to support the consideration of the environment in development, including *e.g.* the outputs of the 1992 United Nations Conference on Environment and Development or NGO treaties, such as the Earth Charter which consisted of eight principles for sustainable development intended to parallel the Rio Declaration (**See:** http://www.earthcharter.org). Following Kemp (1994), treaties can be grouped according to various clusters:

- NGO cooperation and institution-building cluster, including treaties on technology, sharing of resources, poverty, communications, global decision-making and proposals for NGO action;
- alternative economy issues cluster, including treaties on economic models, trade, debt, consumption and lifestyles;
- major environmental issues cluster, including treaties on climate, forests, biodiversity, energy, oceans, toxic and nuclear waste;
- food production cluster, including treaties on sustainable agriculture, food security and fisheries; and

- cross-sectoral issues cluster, including treaties on racism, militarism, women's issues, population, youth, environmental education, urbanisation and indigenous peoples.

The commitment to treaties and protocols often refer to the time in which the summits or conferences took place. Climate change conventions tend to maintain a very high profile, due to the constant issues concerning global warming, while other types of environmental issues are progressing slowly (Redclift, 1991; Fischer and Hajer, 1999; Jordan, 2005). For comprehensive lists of environmental treaties, conventions and protocols, **See**:http://www.chanrobles.com/environmentreaties.htm

### 4.5 Environmental integration through different tools and instruments

There are different tools through which the environment can be taken into account. These include environmental planning, policy-making, management and assessment. Environmental planning aims to ensure all planning activities are preserving or enhancing environmental values or resources (www.fao.org/docrep/V8350E/v8350e0f.htm), encouraging, for example, sustainable development, green building technologies and the preservation of environmentally sensitive areas. Environmental planning is often closely linked with spatial or land-use planning.

Environmental policies represent statements of intentions or principles, defining a framework for action and for the setting of environmental objectives and targets. These can then be implemented through planning and their consistency and performances evaluated through environmental assessments. Any environmental planning, management or assessment system is usually framed by environmental policy.

Environmental management involves the management of all components of the bio-physical environment, with the purpose of conserving the environment for human development. It can be implemented through environmental management systems or standards, which attempt to reduce environmental impact as measured by some objective criteria. The ISO 14000 standard is widely used in environmental risk management. It is used in companies and administrations.

Environmental assessment (EA), consisting of environmental impact assessment (EIA), strategic environmental assessment (SEA), and more recently sustainability assessment (SA) and others is the most widely used instrument for the assessment of environmental impacts of development projects. EA is used throughout the world and is closely connected with environmental policy and planning. Furthermore, links with environmental management instruments are also essential.

## 4.6 The ecosystem services approach and its potential usefulness in EIA

The concept of ecosystem services has been developed for various reasons. Many of its advocates believe that valuing services in monetary ways is the only way to give environmental issues a voice that they otherwise don't have. In this context, they point out that many development decisions are made based on cost-benefit analysis and that any issues not represented in it loose out. Ecosystem services are thus meant to aid our understanding of the human use and management of natural resources (www.ecosystemservices.org.uk).

The main reason why ecosystem services are considered important is that human health and wellbeing depend upon them and the components that contribute to them - water, soil, nutrients and organisms. Ecosystem services are defined in various ways. The Millennium Ecosystem Assessment defined ecosystem services as follows (www.milleniumassessment.org):

- Supporting services:  These are necessary for the production of all other ecosystem services including soil formation, photosynthesis, primary production, nutrient cycling and water cycling;
- Provisioning services:  These are the products obtained from ecosystems, including food, fibre, fuel, genetic resources, bio-chemicals, natural medicines, pharmaceuticals, ornamental resources and fresh water;
- Regulating services:  These describe the benefits obtained from the regulation of ecosystem processes, including regulation of air quality, climate, water, erosion, water purification, disease, pest, pollination, natural hazards; and
- Cultural services:  These are the non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation and aesthetic experiences – thereby taking account of landscape values

Boxes 4.3 to 4.6 explain the four types of services in further detail (following UNEP – TEEB; http://www.teebweb.org/resources/ecosystem-services/):

## Box 4.3: Provisioning ecosystem services

- *Food:* Ecosystems provide the conditions for growing food. Food comes principally from managed agro-ecosystems but marine and freshwater systems or forests also provide food for human consumption. Wild foods from forests are often underestimated.

- *Raw materials:* Ecosystems provide a great diversity of materials for construction and fuel including wood, biofuels and plant oils that are directly derived from wild and cultivated plant species.

- *Fresh water:* Ecosystems play a vital role in the global hydrological cycle, as they regulate the flow and purification of water. Vegetation and forests influence the quantity of water available locally.

- *Medicinal resources:* Ecosystems and biodiversity provide many plants used as traditional medicines as well as providing the raw materials for the pharmaceutical industry. All ecosystems are a potential source of medicinal resources.

Source: *http://www.teebweb.org/resources/ecosystem-services/*

## Box 4.4: Regulating ecosystem services

- *Local climate and air quality:* Trees provide shade while forests influence rainfall and water availability both locally and regionally. Trees or other plants also play an important role in regulating air quality by removing pollutants from the atmosphere.

- *Carbon sequestration and storage:* Ecosystems regulate the global climate by storing and sequestering greenhouse gases. As trees and plants grow, they remove carbon dioxide from the atmosphere and effectively lock it away in their tissues. In this way forest ecosystems are carbon stores. Biodiversity also plays an important role by improving the capacity of ecosystems to adapt to the effects of climate change.

- *Moderation of extreme events:* Extreme weather events or natural hazards include floods, storms, tsunamis, avalanches and landslides. Ecosystems and living organisms create buffers against natural disasters, thereby preventing possible damage. For example, wetlands can soak up flood water while trees can stabilize slopes. Coral reefs and mangroves help protect coastlines from storm damage.

- *Waste-water treatment:* Ecosystems such as wetlands filter both human and animal waste and act as a natural buffer to the surrounding environment. Through the biological activity of microorganisms in the soil, most waste is broken down. Thereby pathogens (disease causing microbes) are eliminated, and the level of nutrients and pollution is reduced.

- *Erosion prevention and maintenance of soil fertility:* Soil erosion is a key factor in the process of land degradation and desertification. Vegetation cover provides a vital regulating service by preventing soil erosion. Soil fertility is essential for plant growth and agriculture and well-functioning ecosystems supply the soil with nutrients required to support plant growth.

- *Pollination:* Insects and wind pollinate plants and trees which is essential for the development of fruits, vegetables and seeds. Animal pollination is an ecosystem service mainly provided by insects but also by some birds and bats. Some 87 out of the 115 leading global food crops depend upon animal pollination including important cash crops such as cocoa and coffee (Klein *et al*. 2007).

- *Biological control:* Ecosystems are important for regulating pests and vector borne diseases that attack plants, animals and people. Ecosystems regulate pests and diseases through the activities of predators and parasites. Birds, bats, flies, wasps, frogs and fungi all act as natural controls.

Source: *http://www.teebweb.org/resources/ecosystem-services/*

## Box 4.5: Habitat or supporting ecosystem services

- *Habitats for species:* Habitats provide everything that an individual plant or animal needs to survive - food; water; and shelter. Each ecosystem provides different habitats that can be essential for the lifecycle of a species. Migratory species including birds, fish, mammals and insects all depend upon different ecosystems during their movements.

- *Maintenance of genetic diversity:* Genetic diversity is the variety of genes between and within species populations. Genetic diversity distinguishes different breeds or races from each other thus providing the basis for locally well-adapted cultivars and a gene pool for further developing commercial crops and livestock. Some habitats have an exceptionally high number of species which makes them more genetically diverse than others and are known as 'biodiversity hotspots'

*Source: http://www.teebweb.org/resources/ecosystem-services/*

## Box 4.6: Cultural ecosystem services

- *Recreation and mental and physical health:* Walking and playing sports in green space is not only a good form of physical exercise but also lets people relax. The role that green space plays in maintaining mental and physical health is increasingly being recognised, despite difficulties of measurement.

- *Tourism:* Ecosystems and biodiversity play an important role for many kinds of tourism which in turn provides considerable economic benefits and is a vital source of income for many countries. In 2008, global earnings from tourism summed up to US$ 944 billion. Cultural and eco-tourism can also educate people about the importance of biological diversity.

- *Aesthetic appreciation and inspiration for culture, art and design:* Language, knowledge and the natural environment have been intimately related throughout human history. Biodiversity, ecosystems and natural landscapes have been the source of inspiration for much of our art, culture and increasingly for science.

- *Spiritual experience and sense of place:* In many parts of the world natural features such as specific forests, caves or mountains are considered sacred or have a religious meaning. Nature is a common element of all major religions and traditional knowledge, and associated customs are important for creating a sense of belonging.

*Source: http://www.teebweb.org/resources/ecosystem-services/*

The Institute for Environmental Management and Assessment (IEMA) explains the potentially beneficial role of making ecosystem services one of the inputs into EIA (**See**: http://www.iema.net/readingroom/e-briefings/considering-ecosystem-services-environmental-impact-assessment). They explain that the consideration of ecosystem services in EIA can help increase the understanding of secondary and cumulative effects on ecosystems and the services they provide to society and identifying issues that may otherwise have been missed.

## 4.7 Practical element

Groups of students should reflect on specific environmental problems in Pakistan and how they are being aggravated or not by human activities - directly, *i.e.* construction, as well as indirectly, *i.e.* climate change. Green Living Association: http://www.greenlivingasc.org/?p=1 and World Bank (2006b). *Pakistan Strategic Country Environmental Assessment*, http://siteresources.worldbank.org/SOUTHASIAEXT/Resources/Publications/448813-1188777211460/pakceavolume2.pdf.

# 5 Environmental Policies, Legal and Administrative Framework for EIA in Pakistan

This chapter introduces environmental policies, as well as the legal and administrative framework for EIA in Pakistan. It is divided into eight sections. First, a brief review of the National Conservation Strategy and Environmental Policy is provided. EIA related provisions within the Federal and Provincial Environmental Protection Acts and Review of IEE and EIA Regulations are then introduced. This is followed by an overview of the EPAs' guidelines, policy and procedure for EIA report preparation and checklist. Finally, the administrative setup and environmental tribunals as well as problems in enforcement of EIA related legal provisions are outlined.

## 5.1 Environmental Policies

### 5.1.1 National Conservation Strategy

Pakistan's National Conservation Strategy (NCS) was formulated in 1992 in collaboration with the IUCN. Numerous experts from various backgrounds pertaining to the natural and built environment contributed to the formulation of this policy. The process involved consultations with some 3000 stakeholders from various walks of life over a period of three years through several workshops funded by the Canadian International Development Agency (CIDA) and the UNDP. While taking stock of the natural, human and financial resources, institutional capacity and considering the gravity of environmental and socio-economic challenges facing the country, the strategy identified the following three main objectives:

- Conservation of natural resources;
- Sustainable development; and
- Improved efficiency in the use and management of resources.

Its operating principles aspire to:

- Achieving greater public partnership in development and management;
- Merging environment and economy in decision-making; and
- Focussing on durable improvements in the quality of life (GoP/IUCN, 1992).

Moreover, it presents reviews of policies, legal instruments and programmes related to the environment existing at the time of formulating this strategy. It

identifies and recommends 14 core areas for priority implementation (Box 5.1).

The Strategy further identifies 68 specific programmes pertaining to these priority areas and suggests a seven-level strategy for its implementation. The main emphasis of the Strategy is its implementation through the people of Pakistan, including: Individuals, corporate sector, government organisations, political leadership and NGOs. It aims at raising their awareness and involving them in various programmes. Significant tasks and resources required for implementation have also been identified.

More importantly, the NCS recognises the significance of EIA in assessing potential adverse environmental impacts of development projects and its role in making informed decisions. It suggests that large development projects should undergo EIA at an early stage of the project planning process to identify suitable sites and types of facility prior to making any decisions. It further suggests that EIA should be incorporated in government planning cycles to minimize environmental deterioration and identify appropriate mitigation measures. Public participation in EIA has been especially emphasised and considered compatible with the cultural and socio-political norms of Pakistani society. By and large, this 405 page document is one of the most comprehensive and well thought-out strategies of the country. This can prove to be a good source of learning for the students.

A mid-term review of the NCS, however, revealed that it has significantly raised environmental awareness and has helped strengthening public and civil society institutions. But it was not operating adequately as a national sustainable development strategy due to lack of implementation capacity. It has been suggested that "improvements to the environment over the longer term are likely to come about through a combination of poverty reduction and economic improvements" (IUCN, 2000, p.2). The review recommended the preparation of NCS2 and a National Sustainable Strategy.

**Box 5.1: Core programme areas recommended by the NCS for priority implementation**

1. *Maintaining soils in cropland*
2. *Increasing irrigation efficiency*
3. *Protecting watersheds*
4. *Supporting forestry and plantations*
5. *Restoring rangeland and improving livestock*
6. *Protecting waster bodies and sustaining fisheries*
7. *Conserving biodiversity*
8. *Increasing energy efficiency*
9. *Developing and deploying renewables*
10. *Preventing and abating pollution*
11. *Managing urban wastes*
12. *Supporting institutions for common resources*
13. *Integrating population and environment programmes*
14. *Preserving the cultural heritage*

*Source: GoP/IUCN, 1992*

### 5.1.2    National Environmental Policy

Pakistan's National Environmental Policy was framed in the year 2005. It recognises that environmental issues pertain to the loss of biodiversity, deforestation, air, noise and water pollution. The policy aims at protecting, conserving and restoring the environment of the country in order to improve the quality of life of its citizens and advocates sustainable development. To achieve its aims, the policy establishes five objectives, including:

(i)    conservation, restoration and management of natural resources;
(ii)   integration of environmental consideration in policy-making;
(iii)  capacity-building of institutions and stakeholders;
(iv)   meeting the international obligations; and
(v)    raising environmental awareness though community mobilisation (GoP, 2005).

The policy provides sectoral and cross-sectoral guidelines to the federal, provincial and local governments for managing the existing as well as potentially expected environmental problems relating to several environmentally sensitive and important development sectors. These are listed in Table 5.1.

| Table 5.1: Sectoral guidelines provided in the National Environmental Policy, 2005 | |
|---|---|
| **Sectoral Policy Guidelines** | **Cross-sectoral Policy Guidelines** |
| ● Water supply and management | ● Poverty and environment |
| ● Air quality and noise | ● Population and environment |
| ● Waste management | ● Gender and environment |
| ● Forestry | ● Health and environment |
| ● Biodiversity and protected areas | ● Trade and environment |
| ● Climate change and ozone depletion | ● Environment and local governance |
| ● Energy efficiency and renewables | ● Natural disaster management |
| ● Agriculture and livestock | |
| ● Multilateral agreements | |

*Source: GoP, 2005; for further detail see: http://www.mocc.gov.pk/*

The sectoral guidelines provide lists of specific tasks - further policies, programmes, rules/regulations, environmental quality standards, *etc.*, to be undertaken for effective management of natural resources and addressing environmental concerns relating to each of the sectors. It is important that the policy suggests key instruments to be employed to achieve its objectives. Most of the instruments are akin to the objectives of the policy itself. In addition, it suggests economic and market-based instruments and public-private-civil society partnership. Moreover, the promotion of SEA as a tool for integrating environment into decision-making in the country and inclusion of the concept of participatory approaches and practices in the curriculum of environmental education and training programmes are some of the key suggestions.

Furthermore, the policy proposes an implementation and monitoring the framework. This includes an "Action Plan" to be prepared by the Ministry of Climate Change (formerly Environment) along with preparation of plans and programmes by all the relevant Ministries and Departments for its implementation. For effective coordination of the policy implementation, establishment of a Federal level "National Environment Policy Implementation Committee" is also suggested. The proposed Committee is composed of the following nineteen members, including its Chairman and Secretary:

● Six Secretaries of relevant Federal Ministries (Environment, P and DD, Finance, Industries, Food/Agriculture and Livestock, Health);
● Secretaries of all the Provincial/AJK/Northern Areas (Gilgit Baltistan) Environment Departments;
● Three representatives from Corporate Sector/Chambers of Commerce and Industry;
● Three representatives from Civil Society Organisations; and
● Director General Environment, Ministry of Climate Change formerly known as Federal Ministry of Environment.

Overall, this tries to be a holistic policy. How far the implementation committee is succeeding in achieving its policy objectives has not yet been fully explored.

## 5.2 Environmental legislation

Pakistan's Constitution (Eighteenth Amendment) Act 2010, grants provincial governments exclusive powers to legislate on the subject of environmental pollution and ecology (Pastakia/NIAP, 2012). As a consequence of this amendment, provinces are in the process of making various laws to ensure environmental protection. Provincial Environmental Protection Acts shall be introduced later in this section. It is pertinent to mention here that Federal Environmental Laws/Regulations shall remain effective but within the jurisdiction of Federal Area including Islamabad Capital Territory (ICT)

which is not included in any province. Concerning legal provisions for EIA, the Pakistan Environmental Protection Ordinance (PEPO) 1983 was the first legal instrument introducing EIA in the country (GoP, 1983). Being an ordinance, it was replaced by the Pakistan Environmental Protection Act (PEPA) 1997 (GoP, 1997a). There was, however, a need to have detailed regulations to facilitate enforcement of various steps or activities involved in the EIA process. For this purpose, the Pak-EPA (Review of IEE and EIA) Regulations 2000 were promulgated. The following two sub-sections introduce these two environmental legislations, mainly focussing on the provisions pertaining to EIA.

### 5.2.1    Pakistan Environmental Protection Act

The Pakistan Environmental Protection Act (PEPA) 1997 has been the core legislation for EIA in the country. Prior to approval by the then Parliament, consultative meetings and seminars were held to solicit views of stakeholders from academia, industry, environmental NGOs and the public (Nadeem, 2010). Under section 12 of PEPA, no proponent can initiate construction or operation of a project, likely to cause adverse environmental effects, prior to submission of an initial environmental examination (IEE) or an environmental impact assessment (EIA) whatever is deemed necessary by the concerned EPA, and its approval thereof (GoP, 1997a). According to the Act, IEE means a preliminary environmental review is needed to determine whether the proposed project is likely to cause adverse environmental effects and necessitates an EIA. The Act defines EIA as "an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigatory and compensatory measures, formulation of environmental management and training plans and monitoring arrangements, and framing of recommendations as such other components as may be prescribed" (GoP, 1997a, p.2).

EPA is also authorised to impose conditions of approval, require re-submission of EIA or 'reject the project as being contrary to environmental objectives'. However, if an EPA admits an IEE or EIA as complete, it "shall communicate its approval or otherwise within four months, failing which it shall be deemed to have been approved to the extent to which it does not contravene the provisions of PEPA or any other relevant rules/regulations" (GoP, 1997a). Contravening any provision of the Act shall be considered a punishable offense with a fine of up to one million Rupees. If contravention continues, an additional fine of up to one hundred thousand Rupees per day shall be taken under section 17 of this Act.

The Federal Government has been empowered under section 20 of PEPA to establish as many Environmental Tribunals as it considers necessary. Any aggrieved person including project proponents may file an appeal with the Environmental Tribunal under section 22 against the decision of EPA within 30 days of the date of communication of the decision/order. The person may also appeal to the High Court against the sentence/order of the Environmental Tribunal, but again within 30 days of its communication. An overview of the IEE/EIA related sections and provisions of PEPA 1997 is presented in Box 5.1.

Some sections of the PEPA provide for other aspects such as additional fine, action against offenses made by corporate bodies and government agencies, delegation of power by the Federal Government to any provincial government or agency and the powers to make rules/regulations for the implementation of international agreements and national environmental quality standards, *etc.*

| **Box 5.2: IEE/EIA related sections and provisions of PEPA, 1997** | |
|---|---|
| Section 12 | Requires initial environmental examination (IEE)/EIA of projects likely to cause adverse environmental effects. |
| Section 12(a)(b)(4) | Govt. Agency to review IEE/EIA and accord approval within 4 months. |
| Section 12 (3) | Review of EIA to be carried out with public participation. |
| Section 17 (1) | Provides for penalty up to one million rupees in case of violation of IEE/EIA requirement with an additional fine of one hundred thousand rupees per day in case of continuing contravention. |
| Section 17 (4) | Provides for an additional fine commensurate with the amount of monitory benefits, if any, accrued by proponent. |
| Section 20 | Authorises Govt. to establish Environmental Tribunals. |
| Section 22 | Aggrieved person may file an appeal with Environmental Tribunal within 30 days of the communication of decision. |
| Section 23 | Aggrieved person may file an appeal against the order of the Environmental Tribunal to the High Court within 30 days. |
| Section 26 | Federal Govt. may delegate any of its or Federal Agency's powers to any Provincial Govt., Local Council or Local Authority. |

*Source: GoP, 1997a*

### 5.2.2 Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulations

These Regulations were made as the main instrument to effectuate the IEE and EIA related provisions of the 1997 PEPA. In fact, the IEE/EIA related provisions of PEPA became operational after the promulgation of these Regulations (Nadeem and Hammed, 2008). Regulations 3 and 4 require an IEE or EIA of projects falling in any category listed in Schedule-I and II (see also boxes 7.3 and 7.4 in chapter 7). Regulation 6 authorises the Federal Agency to issue guidelines for preparation of an IEE/EIA. Detailed provisions of the Regulations are discussed in relevant sections later in this curriculum. Main provisions of the Regulations pertaining to the IEE/EIA filing, review, approval and monitoring are presented in the Box 5.2. These help to comprehend the process and the minimum number of days allocated to each step or activity at a glance. By the time of writing this curriculum, Provincial EPAs' were in the process of formulating IEE/EIA Regulations for their respective jurisdictions. As

an interim arrangement, Pak-EPA's Regulations were being followed. The Environment Protection Departments (EPAs) of Punjab and Balochistan, however, succeeded in amending PEPA 1997. The respective Provincial Assemblies/Governments had approved and notified their Provincial Environmental Acts. The Provincial Environmental Protection Councils were also being established with the respective Chief Minister as its Chairperson.

While the AJK EPA was already operating under the AJK Environmental Protection Act 2000, Sindh and Gilgit-Baltistan EPAs/relevant departments have yet to present environmental protection acts to their respective assemblies. The following section presents amendments made in the Pakistan Environmental Protection Act 1997 to adopt it as the Punjab Environmental Protection Act 1997 also known as the Punjab Environmental Protection (Amendment) Act, 2012 (Box 5.3) and the Balochistan Environment Protection Act 2012 (Box 5.4).

**Box 5.3: Legal provisions for IEE/EIA review, approval and monitoring in Pakistan**

| | |
|---|---|
| Regulation 8 | Filing of an IEE and EIA- ten paper copies and two electronic copies. |
| Regulation 9 | Preliminary scrutiny within 10 days of filing of an IEE/EIA |
| Regulation 10 | Public participation by seeking comments on the EIA report and arranging a public hearing after publishing notices in two newspapers but not earlier than 30 days from the date of publication of notices. |
| Regulation 11 | Review of IEE by EPA within 45 days and of the EIA within 90 days. EPA may constitute a committee of experts and should also consider comments of stakeholders. |
| Regulation 12 | Communication of decision by EPA to the proponent. |
| Regulation 13 | Conditions of approval also stating that the project shall be designed and constructed, and mitigation measures adopted in accordance with the IEE/EIA. |
| Regulation 14 | Request by the proponent for confirmation of compliance of the conditions of approval accompanied by an Environmental Management Plan. EPA may carry out site/plant inspection and confirm compliance within 15 days of request. |
| Regulation 17 | Approval shall be valid for commencement of construction for a period of 3 years. Upon commencing construction within three years, validity of approval shall extend that time for a further period of three years. |
| Regulation 18 | Authorised staff of EPA entitled to enter and inspect the project site, building, plant etc. during construction and operation of project for verification of the implementation of conditions of approval. Proponent is bound to ensure full cooperation. |
| Regulation 19 | Proponent required to submit report of completion of construction. In addition, proponent shall submit annual monitoring report with respect to conditions of approval. |

*Source: Derived from the Pak-EPA's (Review of IEE and EIA) Regulations, 2000 (GoP, 2000).*

**Box 5.4: Main amendments related to IEE/EIA made in the PEPA 1997 by the Punjab Govt.**

| | |
|---|---|
| Section 17 (1) | Provides for penalty up to [five million] rupees in case of violation of IEE/EIA requirement with an additional fine of one hundred thousand rupees per day in case of continuing contravention. |
| Section 26 | Govt. of Punjab may delegate any of its or of the Provincial Agency's powers to any Govt. Agency, Local Council or Local Authority. |
| Section 2 (xxxviia) | NEQS have been substituted by the Punjab Environmental Quality Standards (PEQS). |

*Source: GoPb, 2012*

**Box 5.5: IEE/EIA/SEA related sections and provisions of the BEPA, 2012**

| | |
|---|---|
| Section 13 (1) | Regulates the conditions, methods and procedure according to which assessment of environmental impacts (strategic assessment) or SEA of plans and programmes shall be carried out. |
| Section 13 (2) | Government at all levels of administration and in every sector shall incorporate environmental considerations into policies, plans programmes and strategies. |
| Section 15 (1) | Requires IEE/EIA of projects likely to cause adverse environmental effects. |
| Section 15 (a)(b)(4) | Government Agency to review IEE/EIA and accord approval within 4 months. |
| Section 15 (3) | Review of EIA to be carried out with public participation. |
| Section 25 (1) | Provides for penalty up to one million rupees in case of violation of IEE/EIA requirement with an additional fine of one hundred thousand rupees per day in case of continuing contravention. |

| Section 25 (2) | Provides for an additional fine commensurate with the amount of monetary benefits, if any, accrued by proponent. |
| --- | --- |
| Section 28 | Authorises Government to establish Environmental Tribunals. |
| Section 30 | Aggrieved person may file an appeal with Environmental Tribunal within 30 days of the communication of decision. |
| Section 31 | Aggrieved person may file an appeal against the order of the Environmental Tribunal to the High Court within 30 days. |
| Section 34 | Government of Balochistan may delegate any of its or of the Provincial Agency's powers to any Government Agency, Local Council or Local Authority. |

*Source: GoB, 2013*

The Government of Punjab has increased the amount of penalty from one million Rupees to five million Rupees on violation of IEE/EIA requirement. On the other hand, Balochistan Government has made SEA/consideration of environmental impacts of provincial policies, plans and programmes a mandatory requirement. This is a very important and much needed addition to the Environmental Protection Act. Hopefully, other Provincial Governments as well as the Federal Government shall also make SEA a mandatory requirement. One may expect that the Provincial SEA and EIA regulations would be formulated soon.

## 5.3    Pak-EPA's Guidelines for IEE/EIA

Prior to the enactment of the PEPA in December 1997 and Review of IEE and EIA Regulations 2000, the Pakistan Environmental Protection Agency published a comprehensive set of guidelines known as "The Pakistan Environmental Assessment Package" in November 1997. In addition to the policy and procedures for the filing, review and approval of environmental assessment, it included the following:

● Guidelines for preparation and review of environmental reports;
● Guidelines for public consultation;
● Guidelines for sensitive and critical areas; and
● Guidelines for preparing environmental reports of 8 specific sectors.

The overall purpose is said "*to facilitate environmentally sound proposals by minimising*

*adverse impacts and maximising benefits to the community*" (GoP, 1997b). This document establishes necessary and very detailed procedures and specific responsibilities of proponents and officials of responsible authorities. The proponent is not allowed to start any construction work relating to the project until the responsible authority issues environmental approval for that project. Duties of the responsible authority are as described in the Pak-EPA's Review of IEE and EIA Regulations 2000. Lists/schedules of projects requiring an IEE or EIA along with necessary forms for approval and agreement with the proponent and EPA are also included. Most of the guidelines, including schedules of projects that were described in this document were, later on, made part of the IEE/EIA Regulations. The four guidelines are further described and discussed in chapters 8, 9 and 11 of this curriculum.

### 5.3.1    Guidelines for sensitive and critical areas

Sensitive and critical areas refer to ecosystems and sites of archaeological or cultural significance. Ecosystems mainly include wildlife reserves, national parks and forests or game reserves. Archaeological sites include monuments, building and cultural heritage or world heritage listings. The guidelines identify sensitive and critical areas of the country, as well as relevant legislation, and provide guidance to prospective proponents, concerned officials and other stakeholders so that "*the proposed projects are planned and sited in a way that protects the*

*values of sensitive and critical areas*" (GoP, 1997e).

The following procedure should be adopted prior to environmental approval of any project situated near any notified sensitive and critical areas:

a)  The proponent/EIA consultant should identify whether the site for the proposed development is within the precincts, or 200 feet, of a protected archaeological site or monument as listed/notified by the Government (also provided in the guidelines);

b)  If it is an archaeological site that appears to be of importance, but the site is not listed, the proponent/consultant should discuss the site with the relevant conservation authority;

c)  If the site falls within the boundaries of a protected area/archaeological site or monument, then depending on its

classification the relevant conservation authority will determine whether the development is prohibited or allowable with certain conditions;

d)  Concerned conservation authorities shall inform the responsible EPA about the assessment of the significance of the likely impacts of the proposed project. The EPA will then decide the level of reporting required in the light of the advice from the archaeology department; and

e)  It is the responsibility of the concerned EPA to coordinate with the relevant conservation authority to ensure that identified impacts and proposed mitigation measures detailed in the EIA report are well based, and accordingly frame the conditions of environmental approval so as to protect the values and assets of listed area.

| Table 5.2: Legislation related to conservation of ecosystem in Pakistan | |
|---|---|
| **Wildlife Protection** | 1. West Pakistan Ordinance, 1959<br>2. Sindh Wildlife Protection Ordinance, 1972<br>3. Punjab Wildlife Act, 1974<br>4. Balochistan Wildlife Protection Act, 1974<br>5. NWFP Wildlife Act, 1975<br>6. Islamabad Wildlife Ordinance, 1980<br>7. Export and Control Order, 1982 |
| **Forest Conservation** | 1. Forests Act, 1927<br>2. Punjab Forest Act, 1913<br>3. NWFP Hazara Forest Act, 1936<br>4. Punjab Plantation and Maintenance of Trees Act, 1974<br>5. Cutting of Trees (Prohibition) Act, 1975<br>6. NWFP Management of Protected Forests Rules, 1975<br>7. NWFP Forest Development Corporation Ordinance, 1980 |
| **Land Use Location** | 1. Punjab Soil Reclamation Act, 1952<br>2. Punjab Local Government Ordinance, 2001<br>3. Punjab Land use (Classification, Reclassification and Redevelopment) Rules, 2009<br>4. Balochistan Local Government Act, 2010<br>5. Sindh Local Government Ordinance, 2012<br>6. Khyber Pakhtunkhwa Local Government Act, 2012 |
| **Fisheries Protection** | 1. West Pakistan Fisheries Ordinance, 1961<br>2. Balochistan Sea-Fisheries Ordinance, 1970<br>3. NWFP Fisheries Rules, 1976<br>4. Territorial Waters and Maritime Zones Act, 1976 |

*Source: GoP, 1997e, p.7*

Another very important part of these guidelines is the list of various laws relevant to the conservation of the ecosystems in Pakistan. Some of these laws require environmental clearance before starting construction of a project. An updated list is presented in the Table 5.2.

## 5.4 Environmental guidelines and checklists by Provincial EPAs

Some of the Provincial EPAs in the country have formulated sub-sectoral guidelines to assist the public and private sector proponents/departments, environmental consultants and EPA staff involved in reviewing the environmental reports. The Khyber Pakhtunkhwa EPA (KPK-EPA) has taken the lead in this respect and formulated 22 sub-sectoral guidelines (Box 5.4). The Balochistan EPA could, so far, formulate only one sub-sectoral guideline on dairy farms and slaughter houses. Other EPAs are still in the process, while following these guidelines as an interim arrangement.

The guidelines are also being used as screening criteria to ascertain whether an IEE or an EIA is required for a specific project. That is why, all the proponents are obliged to fill in the environmental impact assessment form and provide the following information (KPK-EPA, 2004):

a) Provide information on the project;
b) Determine applicability of IEE or EIA;
c) Describe the physical, biological and social environment;
d) Assess potential impacts and applicable mitigation measures; and
e) Provide undertaking to the EPA on mitigation measures and compliance.

Specific impacts of each type of project and mitigation measures have been identified in the relevant guidelines. Environmental assessment checklists containing several questions have been provided in each set of guidelines. The checklists are quite comprehensive and contain both qualitative and quantitative criteria. Figure 5.1 shows a section of the 15-page long checklist.

### Box 5.6: Sub-sectoral environmental guidelines and checklists by KPK-EPA

1. Brick kiln units
2. Construction or expansion of bus terminal
3. Carpet manufacturing units
4. Canal cleaning
5. Flour mill
6. Forest harvesting operations
7. Forest road constructions
8. Housing schemes
9. Marble units
10. Petrol and CNG stations
11. Poultry farms
12. Rural schools and basic health units
13. Sanitation schemes
14. Solid waste management
15. Stone crushing units
16. Sound plantation
17. Tourist facilities in ecologically sensitive areas
18. Tube-well construction for agriculture and irrigation purposes
19. Urban areas road construction
20. Watercourses construction and lining
21. Water reservoirs in arid zones
22. Water supply schemes

*Source: Pak-EPA Website, 2013*
*(http://www.environment.gov.pk/info.htm)*

## 5.5 Administrative set up for implementation of EIA related legal provisions and guidelines

Environmental Protection Councils, Ministries and Departments for formulation of environmental policies, Acts *etc.* exist at both the Federal and Provincial levels in Pakistan. These oversee and facilitate their enforcement in the country. Prior to the establishment of EPAs, the functions of environmental protection/pollution control *etc.* were exercised by various ministries/organisations since 1975, as a follow-up of Stockholm Declaration of 1972 (*e.g.* former Ministry of Environment in the Federal Area and Environmental Pollution Control Organisation in the Punjab Province).

**Figure 5.1: A section of the environmental assessment checklist for stone crushing units**

Stone Crushing Units

| No: | Version: B | Date: 21 May 2004 | Page 13 of 15 |
|-----|------------|-------------------|---------------|

### Section IV:     Impact Assessment

| Potential Negative Environmental Impacts | Tick, if relevant | Mitigation Measures | Tick, if proposed | Monitoring |
|---|---|---|---|---|
| Siting | ☐ | Station is not located within ___ m of any educational institution or health facility | ☐ | |
| Traffic | ☐ | Plant is located such that ingress of heavy vehicles does not block the traffic | ☐ | |
| Noise and Dust | ☐ | Dust containment enclosures will be provided for: | | |
| | | Primary Crusher discharge area | ☐ | |
| | | Vibratory screen | ☐ | |
| | | Product storage hoppers | ☐ | |
| | | Belt Conveyors | ☐ | |
| | ☐ | Dust suppression system will be installed for: | | |
| | | Spray on the stones while unloading from the truck/dumper | ☐ | |
| | | Spray at the primary crusher feeder chute | ☐ | |
| | | Spray at the secondary/tertiary crusher inlet chute/hoppers | ☐ | |
| | | Spray at the transfer points from one belt conveyor to another | ☐ | |
| | | Spray at crusher discharge points | ☐ | |
| | | Payload area of trucks will be covered by tarpaulins when transporting crush to prevent fall out of fines and emissions of dust | ☐ | |
| | | Noise wall will be built | ☐ | |
| | | Evening and late night operation of material and product trucks will be avoided | ☐ | |
| Wastewater | ☐ | Volume and strength reduction of the effluent is to be achieved by preventing mixing of waters from washing activities and processing activities | ☐ | |
| | | Liquid effluent is to be treated by sedimentation process meaning subjecting the effluent to flow through settling tanks | ☐ | |
| | | Effluent is to be treated by coagulation that is adding any coagulant to the settling tanks | ☐ | |
| | | Effluent is to be treated by coagulation and filtration | ☐ | |
| Occupational safety | ☐ | Workers will be provided with protective equipments | ☐ | |

*Source: Pak-EPA Website, 2013 (http://www.environment.gov.pk/info.htm)*

Afterwards, the EPAs established under the PEPO 1983, have been entrusted with the task of implementing several environmental protection, conservation and improvement measures including EIA related legal provisions following their respective Environmental Protection Acts, Regulations and Guidelines within their jurisdictions.

The Pak-EPA (Federal) was established in 1984. It is attached to the Ministry of Climate Change. It is responsible for implementing the PEPA 1997 within the Islamabad Capital Territory and the areas not included in any province. It is also entrusted with the duty to coordinate with line departments/agencies of the Federal Government as well as the Provincial EPAs especially for those

projects which extend within the jurisdiction of more than one EPA (*e.g.* National Highways). Its organisational set up mainly comprises directorates of EIA/Monitoring, Lab/NEQS, and Legal/Enforcement as well as technical and other support staff *etc.* The Environment Section of Planning Commission is also responsible for ensuring that environment considerations are included in the national plans and public sector development projects.

The Punjab-EPA was created in July 1987. It was the first provincial EPA in the country. Both, the Sindh EPA (SEPA) and KPK-EPA were established in 1989. The third EPA was created in 1992 in Balochistan (BEPA). Azad Jammu and Kashmir Environmental Protection Agency (AJK-EPA) was established in July 1998. The most recent EPA that emerged during October, 2007, in the country belongs to Gilgit-Baltistan (GBEPA). The EPAs are attached with their respective Environment Protection Department/Ministry and the names and combination of departments/ministries vary from province to province. Hence, the country has seven EPAs. The EPAs have EIA responsibilities. The Federal EPA is responsible for implementing the IEE/EIA related requirements, grant IEE/EIA approval and carry out compliance monitoring of the conditions of approval. Environmental monitoring equipment/laboratories are also provided but at a limited scale, together with technical staff. However, most of the EPAs have their field offices at District level working in association with District/Local Governments. In addition, environment sections have been created in the Provincial Planning and Development Departments to ensure environmental considerations in public sector development plans and projects (also **See**: Section 15.5.2).

## 5.6    Environmental Tribunals

The Federal and Provincial Environmental Protection Acts authorise governments to establish Environmental Tribunals (**See**: Box 5.1 and 5.4). These have the same powers as are vested in the Court of Session under the Code of

Criminal Procedure, 1898 (Act V of 1898). Their powers and functions include but not limited to:

- trial all punishable offences under the Environmental Protection Act;
- entertain complaints of environmental offences lodged by the environmental protection agency or any aggrieved person;
- issue bail able warrant for the arrest of any person against whom reasonable suspicion exists, of them having been involved in contraventions punishable under the law;
- take action against a complainant upon making a false complaint, if proven. The Tribunal may direct the complainant to pay to the person complained against compensatory costs up to one hundred thousand rupees; and
- entertain appeals of any person aggrieved by any order or direction of the concerned Provincial Agency (GoP, 1997a; GoPb, 2012; GoB, 2013).

As indicated in Box 5.1, an aggrieved person may file an appeal against the order of the Environmental Tribunal to the concerned High Court within thirty days of the communication of such order or sentence.

Initially, the Environmental Tribunals' Rules 1999 were notified for the appointment of a Chairperson and two members with at least one technical member. The Punjab (Lahore) and Sindh (Karachi) Environmental Protection Tribunals were established in 1999, whereas, the KPK (Peshawar) and Balochistan (Quetta) Environmental Protection Tribunals were established in 2005. Earlier, the Punjab and Sindh Tribunals had been dealing with the cases of Islamabad, KPK and Balochistan respectively. Working of these Tribunals varied due to lack of financial resources and delayed appointment of Chairpersons, members and support staff (**See**: NIAP/IUCN, 2012). After the devolution of environmental pollution and ecology to the provinces, each province is now making its own rules (*e.g.* GoPb, 2012a). Under the respective Provincial Environmental Protection Acts, a

Government may establish as many Environmental Tribunals as it considers necessary (GoPb, 2012; GoB, 2013).

## 5.7 Problems in Implementation of EIA related Provisions of Environmental Protection Acts/Regulations

A study on the impact of constitutional amendments on environmental protection legislation also including an analysis of laws in force and assessment of implementation issues, conducted as a part of NIAP, revealed several problems facing EPAs in the implementation of the laws described above (Pastakia/NIAP, 2012). Following are some of the key issues related to the implementation of EIA related provisions:

- Fines and fees collected pertaining to IEE/EIA, environmental reports and laboratory analysis should be deposited in separate account;
- IEE/EIA Regulations 2000 need to be revised including Schedules I and II with the addition of further categories (even some small scale projects) should be required to undergo an IEE or at least an environmental report;
- DG EPA should have the power to stop (temporarily or permanently) project activities and to impose fines on the spot;
- Provisions on selection of the members of Environmental Tribunal should be amended;
- Penalties/pollution charges are low and need to be revised on the basis of environmental impact of offence rather than type of offence;
- Certain types of discharges/emissions are not included in the NEQS. Discharge from processes and the receiving sources are not taken into account;
- Sectoral guidelines for environmental reports need to be reviewed and amended or improved;
- Guidelines and codes of conduct, such as accreditation mechanisms for environmental/EIA consultant should be formulated;
- Environmental audits should be required for all types of projects (industrial, commercial)

having significant environmental impacts during operation, regardless of project size; and

- Strategic Environmental Assessment of policies, plans and programmes need to be introduced in the country (Pastakia/NIAP, 2012).

Other studies found some other weaknesses of the current EIA system, including inadequate technical and financial resources, weak coordination among the EPAs and line departments/agencies of the government and other stakeholders, poor quality of EIA reports, weak public participation, weak implementation of mitigation measures as well as post EIA monitoring (World Bank, 2006; Nadeem and Hameed, 2008; Nadeem, 2010, Nadeem and Fischer, 2010; Saeed *et al*. 2012). Despite these weaknesses, the existence of EIA in Pakistan is positive and some organised efforts are underway to improve the EIA system and the practice (**See**: NIAP, http://www.niap.pk/).

## 5.8 Practical element

Students should review the literature with regards to evidence provided on the effectiveness, successes and problems of the Pakistani legislative context for EIA. In addition, students may be given scenario based exercises to determine clauses of IEE/EIA regulations followed or violated by certain projects.

# 6    EIA requirements by international development banks and organisations

This chapter first introduces EIA requirements by the World Bank and the Asian Development Bank. Then, requirements of other organisations are summarised. Social and environmental safeguard policies of literally all development organisations include requirements for EIA and SEA.

## 6.1    Introduction

Many countries have guidelines in place on how to apply EIA which is usually prepared by the overseeing authority. They are normally also responsible for ensuring compliance with EIA requirements. When guidelines are not available, ToRs are developed that often refer to guidelines prepared by other countries (those that have *e.g.* the same national language) or international agencies. The *IIED Directory of Impact Assessment Guidelines* provides for a list summarising those guidelines (see http://pubs.iied.org/pdfs/7785IIED.pdf). This directory also contains guidelines from development banks, bilateral and multilateral-donors, inter-governmental and UN organisations. Furthermore, the World Bank (1991) has released an *Environmental Assessment Sourcebook*. What is important is that usually World Bank and other Development Bank standards have to be met when project are financed by them.

In many jurisdictions, more than one set of EIA procedures may thus be applicable to a specific development proposal. In this context, a possible lack of coherence between different requirements can lead to confusion, friction and possibly uncertainty. According to the UN University (2006e), "*problems commonly occur when:*

- *countries receive aid from a number of donors, each having its own prescribed assessment process; or*
- *a proposal is trans-boundary in nature, requiring compliance with EIA procedures in two or more countries, states or levels of government (Espoo Convention).*"

The Working Party of the Development Assistance Committee of the OECD developed a practical guide for aiding both, officials in bilateral donor agencies and their counterparts in developing countries for co-ordinating their activities. It summarises the various EIA procedures used by the different agencies and provides two key means of promoting coherence:

- a framework Terms of Reference for the EIA of development assistance projects; and
- a comprehensive checklist for managing EIA.

The UN University (2006e) suggests that "*In developing countries experience has shown a number of underlying conditions will determine whether and how an EIA system is instituted. These are interrelated and reinforcing, and include:*

- *a functional legal regime;*
- *sound administration and flexible policy-making;*
- *stakeholder understanding of the aims of the process and its potential benefits;*
- *political commitment;*
- *institutional capacity for implementation;*
- *adequate technical capacity, data and information;*
- *public involvement; and*
- *financial capacity.*"

## 6.2  World Bank

The World Bank has well-established EIA procedures in place. These are used in their lending activities and development projects undertaken by the countries borrowing money. While requirements may vary slightly, overall development banks follow a more or less standard procedure for the preparation and approval of an EIA report. This follows the traditional EIA stages as introduced in this curriculum. Borrowing countries are normally responsible for the preparation of EIAs. It is through these requirements that EIA has been introduced in many developing countries.

The World Bank has environmental and social safeguard policies in place. These are about minimising the adverse effects of its projects. Furthermore, the use of SEA is propagated as part of a strategy to promote long-term sustainability and integration of the environment into sector programmes and macro policies. Cornerstones of the World Bank Environment Agenda are shown in Table 6.1. In 2012, the World Bank also published their Environment Strategy. This is based on three main aspects, namely a green, clean and resilient environment.

The International Finance Corporation (FC), which is part of the World Bank Group, has also

| Table 6.1: The World Bank Environment Agenda | |
| --- | --- |
| **Policy** | **Aims** |
| Do-No-Harm | To mitigate the potential adverse effects of the Bank's investment projects on the environment and vulnerable populations, **EIA** procedures and safeguard policies are applied. In many cases, these have contributed to better project design and environmental management plans have helped to improve project implementation. |
| Targeted Environmental Assistance | To foster long-term environmental sustainability and improve conditions in developing countries, designated Bank projects target the following areas: sustainable natural resource management, including watershed protection and biodiversity conservation; pollution management and urban environmental improvements; environmental institution and capacity-building, and global environmental actions, in accordance with international environmental conventions and commitments. |
| Mainstreaming the Environment at the Level of Policy and Programmes | To integrate environmental concerns at the macro level, the Bank has reviewed the policies of the energy-, rural development- and other sectors, established an environmental framework for its country assistance strategies and intends to make greater use of **SEA** at the programme and regional level. |

*Source: UN University (2006e), citing World Bank (1999: 8-10)*

released a range of performance standards. Standard 1: Assessment and Management of Environmental and Social Risks and Impacts is of particular relevance with regards to EIA. The associated Guidance Note 1: 'Assessment and Management of Environmental and Social Risks and Impacts' (http://www.ifc.org/wps/wcm/connect/b29a46004 98009cfa7fcf7336b93d75f/Updated_GN1- 2012.pdf?MOD=AJPERES) refers to the application of both, EIA and SEA several times.

## 6.3 Asian Development Bank: EA requirements and guidelines

While discussing environmental problems and poverty in Asian countries, Lohani *et al.* (1997, p.4) suggested that "*the EIA has an important role to play in resolving these environmental problems through its ability to contribute to environmentally sound and sustainable development. Developing countries in Asia have recognised the importance of incorporating EIA processes into development planning*". The Asian Development Bank (ADB) requires environmental assessment (EA) of all projects, programmes and sectoral development programmes financed by it. ADB's EA process starts as soon as the potential projects/programmes are identified for loaning, and covers all project components whether financed by ADB, co-financed, or Government financed. The level of environmental assessment (whether an IEE or EIA or SEA) is determined on the basis of the size of the project and the significance of potential environmental impacts. This section is based on ADB's Environmental Assessment Guidelines 2003 (ADB, 2003). The more recent Safeguard Policy Statement by the ADB (2009) includes extensive references to EIA and also refers to the usefulness of SEA (http://www.adb.org/sites/default/files/pub/2009/S afeguard-Policy-Statement-June2009.pdf).

### 6.3.1 Specialised Guidelines for EA

The ADB has formulated specialised guidelines for environmental assessment. These suggest methods and approaches that might be used in the conduct of a specific aspect of the

environmental assessment as well as the potential environmental impacts and mitigation measures for specific types of projects. It has been suggested environmental considerations be integrated into the country's development strategy and programme as well as SEA of individual policies, plans and programmes. The guidelines may be used for the following purposes pertaining to various levels and aspects of EA:

- Country Environmental Analysis;
- Determination of the Environment Category;
- Environmental Management Plan;
- Environmental Assessment of Programme Loans;
- Environmental Assessment of Sector Loans;
- Environmental Assessment of Financial Intermediation Loans and Equity Investments;
- Public Consultation and Information Disclosure;
- Environmental Standards and Emission Levels;
- Social Dimensions;
- Environmentally Responsible Procurement;
- Cultural Heritage;
- Strategic Environmental Assessment;
- Cumulative Effects Assessment in Environmental Assessment;
- Managing and Administering an Environmental Assessment Study;
- Economic Analysis in Environmental Assessment;
- Multilateral Environmental Agreements; and
- Environmental Auditing.

In the next section, ADB's categorisation of projects for determining the level of required EA and the basic EA requirements for project loans are discussed.

### 6.3.2 Categorisation of projects for determining the level of EA

All the project loans and investments are categorised to determine EA requirements. Categorisation is done using Rapid Environmental Assessment (REA). For this purpose categorisation forms have been developed. "REA

uses sector-specific checklists developed and based on the ADB's past knowledge and experience. These checklists consist of questions relating to (i) the sensitivity and vulnerability of environmental resources in project areas, and (ii) the potential for the project to cause significant adverse environmental impacts". The checklists have been appended with the ADB's guidelines (ADB, 2003).

Following are the four main categories:
**Category A:** includes the projects which may have the potential to cause significant adverse environmental impacts. A detailed EIA is required for all such projects.

**Category B:** includes the projects which may have a comparatively lesser degree of adverse environmental impacts than those of the Category A projects. An IEE is required for such projects. If the IEE identifies significant adverse environmental impacts then an EIA will be required.

**Category C:** includes the projects which may not have the potential to cause adverse environmental impacts. Neither an IEE nor an EIA is required for such projects but possible environmental implications would remain under continuous review.

**Category FI:** includes projects involving a credit line through a financial intermediary or an equity investment in a financial intermediary. It is, however, required to apply environmental management systems.

This categorisation is used to prepare project screening lists as shown in Table 6.2.

The ADB's guidelines suggest that EIA should be undertaken as part of the feasibility study. "The EIA team should work closely with the technical planning and design group to ensure that environmental considerations are integrated into the project design. Representatives of the executing agency should participate as members of the environmental assessment team. Their participation in the field work, public consultations and report writing will increase their understanding of environmental issues and will help build institutional capacity in EIA" (ADB, 2003, p.15). Table 6.3 illustrates the basic environmental assessment requirements for project loans.

### Table 6.2: Sample categorisation of projects

| Category A | Category B | Category C | Category FI |
|---|---|---|---|
| ● Dams and reservoirs | ● Agro-industries | ● Forestry research and extension | ● Credit lines |
| ● Forestry and production projects | ● Rural electrification | ● Rural health services | ● Equity investments |
| ● (large-scale) | ● Electrical Transmission | ● Marine research | |
| ● Industrial plants (large-scale) | ● Urban water supply and sanitation | ● Family planning programme | |
| ● Irrigation | ● Rural water supply and sanitation | ● Microfinance projects likely to have minimal or no adverse impacts | |
| ● drainage, and flood control (large-scale) | ● Irrigation and drainage (small scale) | | |
| ● Mineral development (oil and gas) | ● Watershed projects | | |
| ● Port and harbour development | ● Renewable energy | | |
| ● Thermal and hydropower development | | | |

*Source: ADB, 2003*

| Table 6.3: Environmental assessment requirements for project loans | |
|---|---|
| **Category** | **Basic Environmental Assessment Requirements** |
| A. Projects with potential for significant adverse environmental impacts | - EIA<br>- Public consultation (at least twice)*<br>- EIA report to be prepared<br>- Environmental management plan and budget to be prepared<br>- SEIA to be circulated to the Board 120 days prior the Board consideration<br>- SEIA to be disclosed to public<br>- EIA available to public on request |
| B. Projects judged to have some adverse environmental impacts but of lesser degree and/or significance than category A | - IEE<br>- Public consultation<br>- IEE report to be prepared<br>- For projects deemed to be environmentally sensitive<br>(i) SIEE to be circulated to the Board 120 days prior to Board consideration<br>(ii) SIEE to be disclosed to public<br>(iii) Environmental management plan and budget to be prepared<br>- IEE available to public on request<br>- if it is not circulated, the SIEE is normally to be attached as a core appendix to the RRP |
| C. Projects unlikely to have adverse environmental impacts | No IEE or EIA<br>- Environmental implications to be summarised in the RRP |

*Source: ADB, 2003*

(SEIA- summary environmental impact assessment; SIEE- summary initial environmental examination; RRP- Report and Recommendations to the President)
* Public consultation required at least twice during EIA (i) once during the early stages of EIA field work; and (ii) once when the draft EIA report is available, and prior to loan appraisal by the ADB.

### 6.3.3 Environmental impact assessment process for category A projects
The EIA team is required to follow these steps (ADB, 2003, p.15):
i. "Coordinate with the government concerned and environment agencies;
ii. Prepare project description, define the study area, collect environmental baseline data, prepare site maps, and other relevant maps for the study area;
iii. Identify potential environmental impacts based on the information obtained on the proposed project and the baseline environmental conditions of the study area;
iv. Identify alternatives and analyse the environmental impacts of each alternative and propose measures to avoid or prevent impacts;
v. Estimate the magnitudes of environmental impacts and assess the significance of the impacts;
vi. Recommend environmental mitigation measures and estimate the mitigation costs;
vii. Prepare an EMP to be implemented by the executing agency during project implementation, operation and abandonment;
viii. Prepare the EIA and SEIA reports;
ix. Conduct public consultation and ensure information disclosure; and develop plans for public consultation and information disclosure during project implementation;
x. Assess the executing agency's capacity to undertake an environmental review of the environmental assessment report and EMP recommendations, and recommend measures

*for capacity-building, if necessary; and*

xi. *Ensure that the proposed project, with EIA and EMP implementation, conforms to the Government and ADB environmental assessment requirements, policies and regulations*".

The suggested outline/contents of the EIA report are presented in Box 6.1.

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**Box 6.1: Outline/contents of EIA report for the ADB funded projects**

Introduction

Description of the Project

Description of the Environment

Alternatives

Anticipated Environmental Impacts and Mitigation Measures

Economic Assessment

Environmental Management Plan

Public Involvement and Disclosure

Conclusions

*Source: ADB, 2003*

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## 6.4 EIA requirements of other development banks and organisations

There are numerous development banks and organisations that are active in Pakistan and other developing countries. All of these apply EIA and have associated requirements and guidelines in place. The Canadian International Development Agency (2004) has summarised environmental assessment policies and procedures for development assistance activities for numerous development banks and agencies, including those from Australia, Austria, Belgium, Canada, Denmark, the EC, Finland, France, Germany, Ireland, Italy, Japan, New Zealand, Norway, Sweden Switzerland, UK, US and others. Subsequently, a few of these are summarised.

In Australia (see http://www.acdi-cida.gc.ca/INET/IMAGES.NSF/vLUImages/ea%20summaries/ $file/Aus.pdf), development aid is driven by AusAID. In its activities, EIA is routinely applied according to the *Environmental*

*Assessment Guidelines for Australia's Aid Programme* from 1996.

In Canada, the Canadian International Development Agency (CIDA) has released environmental requirements and procedures (http://www.acdi-cida.gc.ca/acdi-cida/acdi-cida.nsf/eng/REN-218123433-NN8). This follows closely the national Canadian EA requirements.

In France, responsibility for official development co-operation is shared between the Ministry of Foreign Affairs, the Ministry of Co-operation (MC) and the French Development Fund (AFD), and Trade and Development. EIA requirements form an important part of their activities (**See**: http://www.acdi-cida.gc.ca/INET/IMAGES.NSF/vLUImages/ea%20summaries/$file/Fra.pdf).

In Germany, responsibility for development co-operation is with the Ministry for Economic Co-operation and Development (BMZ). Furthermore, the Society for International Co-operation (GIZ) fulfils an important role. EIA is interpreted as follows (http://www.acdi-cida.gc.ca/INET/IMAGES.NSF/vLUImages/ea%20summaries/$file/Ger.pdf): '*The assessment focuses on the direct and indirect effects on human health (including occupational health aspects) and the natural environment as well as social and cultural aspects, such as the consequences of resettlement and influences on local populations or cultural monuments*.' (p.4). Generally speaking, requirements follow traditional EIA stages closely.

Dutch development assistance is the responsibility of the Ministry of Foreign Affairs (see http://www.acdi-cida.gc.ca/INET/IMAGES.NSF/vLUImages/ea%20summaries/$file/Net.pdf). Here, generally speaking, EIA in development co-operation has to comply with the EC EIA Directive. In this context, the Dutch EIA Commission plays an important role. A Dutch policy document published in 1990 and subsequent new policy documents set poverty alleviation as the main

policy objective for development cooperation. Environmental assessment is considered an important contribution to sustainable development.

In the USA, the National Environmental Policy Act (NEPA), which came into effect on January 1, 1970, has required all agencies of the United States Government to integrate environmental factors into their decision-making processes, including the United States Agency for International Development (USAID). Requirements are summarised by http://www.acdi-cida.gc.ca/INET/IMAGES.NSF/vLUImages/ea%20summaries/$file/US.pdf.

In Sweden, development co-operation is driven by one Agency, namely SIDA, (Swedish International Development Co-operation Agency) which was formed in 1995. The use of EIA is advocated through three main assessment steps, including screening, initial and in-depth assessment (http://www.acdi-cida.gc.ca/INET/IMAGES.NSF/vLUImages/ea%20summaries/$file/Swe.pdf ).

In Japan, development co-operation is implemented by the Japan International Co-operation Agency (JICA). This Agency is responsible for technical assistance, and the Overseas Economic Co-operation Fund (OECF), which administers development loans. JICA uses a system of

'environmental consideration' in its activities, which includes screening and scoping, and which may lead to Initial Environmental Examination (IEE), a pre-EIA or a full EIA (http://www.acdi-cida.gc.ca/INET/IMAGES.NSF/vLUImages/ea%20summaries/$file/Japan.pdf).

In the UK, the body responsible for development assistance is the Department for International Development (DFID). Environmental Assessment procedures closely follow those applied nationally, *i.e.* a traditional EIA process is followed (http://www.acdi-cida.gc.ca/INET/IMAGES.NSF/vLUImages/ea%20summaries/$file/UK.pdf).

Generally speaking, there are only few differences between the requirements of different organisations and World Bank as well as Asian Development practice can be seen as a proxy for procedures of other development organisations. EIA core elements tend to be very similar and follow a standard EIA approach as outlined in sections 6.2 and 6.3.

## 6.5    Practical element

Students to go to World Bank / Asian Development Bank / international development organisations' websites and summarise what they find on EIA i.e. how these institutions are attempting to promote good practice.

# 7    Screening/project categorisation and scoping

In this chapter, screening is described first. Next, checklists for screening and project categorisation for Initial Environmental Examination (IEE) and EIA under Pakistani regulation are introduced. Thirdly, the rapid environmental assessment (REA) checklists of the ADB are presented. This is followed by an introduction to the purpose, objectives and guiding principles of scoping. Ways of undertaking scoping and in this context, the role of the public, as well as criteria of good practice are introduced next. Then, types of impacts are established before and finally baseline data needs are explored. The main sources this chapter draws on include the Asian Development Bank (2003i; iii), Environmental Law Alliance Worldwide (2012), Fischer *et al.* (2008; chapter 13 by Fischer and Phylip-Jones: 136-142), European Commission (1999), and Government of Pakistan (GoP, 1997c).

## 7.1    What is screening and how is it done?

Screening is the first stage of the EIA process which results in a key EIA decision being made, namely to either conduct the assessment, based on the likely significant impacts, or not to conduct it in the anticipated absence of such impacts. Screening itself requires a procedural approach, as it is conducted for many potential development projects.

In order to carry out screening, some basic information about the development proposal along with the environment in which it is set is required. This means that some basic baseline data on *e.g. flora* and *fauna*, water, air and soil quality also needs to be available. The effort (in terms of time and other resources) for screening is likely to depend on the specific type of proposal, the specific legal requirements for screening and the understanding of potential environmental impacts. If it is based on a project type checklist, it can be done quickly. If, on the other hand, it is done on a case-by case basis, it may take some more time. In the latter case, at times, a screening report may look similar to a full EIA report. Box 7.1 shows the two main screening approaches as used in most EIA systems worldwide.

**Box 7.1: Main EIA screening approaches**

- prescriptive or standardised approach in which development proposals that either require or are exempt from EIA are listed in legislation and regulations; and
- discretionary or customised approach in which proposals are screened on an individual or case-by-case base, using indicative guidance.

*Source: authors*

Screening will result in some projects requiring further assessment and others being screened out which in many systems is the majority of proposals. While there are exceptions, in many countries only major proposals are considered to give rise to significant environmental impacts. These impacts may potentially affect *e.g.* human health, endangered species, protected areas, fragile ecosystems, biological diversity, the quality of air and water, or the livelihood of communities.

The outcome of a screening process can have different outcomes. What exactly is possible or permitted is prescribed in the specific requirements of an EIA system. According to the UN (2006f), the following four outcomes are possible:
● no further level of EIA is required;
● a full and comprehensive EIA is required;
● a more limited EIA is required (preliminary or initial assessment); or
● further study is necessary to determine the level of EIA required *e.g.* an initial environmental evaluation or examination (IEE).

If an EIA is found to be necessary, screening provides the basis for scoping. This establishes the key impacts and alternatives to be considered in assessment, thus providing for the terms of reference for an EIA. While many EIA systems have formal screening and scoping procedures in place, some leave the specifics to either the proponent or the authority dealing with the EIA. At times, screening and scoping stages may also overlap in order to have greater certainty about whether potential impacts are significant enough to justify conducting a full EIA.

It is usually the proponent's responsibility to prepare a screening report, often with support of the responsible authority. At times, it is also the authority itself that completes screening. What is of great importance is that screening should be done as early as possible in the development of the proposal in order for the proponent and other stakeholders to be aware of possible EIA

**Box 7.2: Specific methods used in screening**

● legal (or policy) definition of proposals to which EIA does or does not apply;
● inclusion list of projects (with or without thresholds) for which an EIA is automatically required;
● exclusion list of activities which do not require EIA because they are insignificant or are exempt by law (*e.g.* national security or emergency activities); and
● establishing criteria for case-by-case screening of proposals to identify those requiring an EIA because of their potentially significant environmental effects.

*Source: UN, 2006f*

obligations. It is also important that screening is applied systematically and consistently, so that the same decision would be reached if others did the screening. There are some specific methods applied to screening, which reflect prescriptive and/or discretionary approaches. These are shown in Box 7.2

Both, prescriptive and discretionary approaches to screening fulfil important roles and are often used in combination. For example, for projects that are on the borderline of a prescriptive threshold it makes sense to also have some discretionary freedom for deciding whether an EIA was required. For example, a threshold for new highways' EIA of ten kilometres in length would mean a new road of 9.95 kilometres would not require one, if there was no possibility to apply some discretion.

Many EIA systems use project lists to screen proposals. Most of these are inclusionary lists, describing project types and size thresholds (thresholds may vary between projects). Any proposed project that is of the type specified and falling within the defined thresholds would automatically require an EIA to be conducted. Exemption checklists are also known, which would include projects that are known not to give rise to significant environmental impacts.

Inclusion lists differ between countries and international organisations with regards to content, comprehensiveness, threshold levels and other specific requirements for application. Internationally, reference is often made to two lists, namely (according to UN, 2006f):

- Annexes I and II of the European EIA Directive, which lists projects subject to mandatory EIA and non-mandatory EIA; and
- Annex E of the World Bank Operational Directive on EA, which is illustrative and provides a framework for screening.

The World Bank (1993) reported that these lists are a reliable aid to the classification of proposals into one of three categories:

- "*projects requiring a full EIA because of their likely environmental effects;*
- *projects not requiring a full EIA but warranting a further level of assessment; and*
- *projects not requiring further environmental analysis*".

It is important that screening lists are not static, but that they need to be revised in the light of the experiences gained. Also, environments may be changing and new demands may arise which should lead to an adaptation of lists. Screening lists should always be designed having a certain system or jurisdiction in mind. Transferability to other systems requires adaptation.

## 7.2    Checklists for screening and project categorisation for IEE / EIA under Pakistani regulation

The Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulations 2000 (GoP, 2000) specify projects requiring EIA, as well as those requiring a leaner IEE (Initial Environmental Examination). A proponent of a project from a category listed in Schedule I needs to prepare an IEE. One listed in Schedule II needs to prepare an EIA. Furthermore, for those projects not listed in either schedule I or II, no IEE or EIA need to be conducted, provided the project is unlikely to cause an adverse environmental effect. Also, for those projects that are not listed in either schedule I or II, but for which the Federal Agency has issued guidelines for construction and operation, an application for approval needs to show how these guidelines have been complied with. Furthermore, the Federal Agency may ask a proponent to prepare an IEE or EIA. Schedule 1 is listed in Box 7.3 and schedule 2 in Box 7.4. With regards to Pakistani practice, keeping in mind the concerns of the EPAs, it is expected that categories of some projects shall be shifted based on scale or capacity of project from Schedule I to II, along with an additional few more categories in forthcoming Provincial IEE/EIA Regulations (for further detail, see: Pastakia/NIAP, 2012).

## Box 7.3: IEE/EIA Regulations: Schedule I list of projects requiring an IEE

**A.   Agriculture, Livestock and Fisheries**
1.   Poultry, livestock, stud and fish farms with total cost more than Rs.10 million
2.   Projects involving repacking, formulation or warehousing of agricultural products

**B.   Energy**
1.   Hydroelectric power generation less than 50 MW
2.   Thermal power generation less than 200 KW
3.   Transmission lines less than 11 KV, and large distribution projects
4.   Oil and gas transmission systems
5.   Oil and gas extraction projects including exploration, production, gathering systems, separation and storage
6.   Waste-to-energy generation projects

**C.   Manufacturing and processing**
1.   Ceramics and glass units with total cost more than Rs.50 million
2.   Food processing industries including sugar mills, beverages, milk and dairy products, with total cost less than Rs.100 million
3.   Man-made fibres and resin projects with total cost less than Rs.100 million
4.   Manufacturing of apparel, including dyeing and printing, with total cost more than Rs.25 million
5.   Wood products with total cost more than Rs.25 million

**D.   Mining and mineral processing**
1.   Commercial extraction of sand, gravel, limestone, clay, sulphur and other minerals not included in Schedule II with total cost less than Rs.100 million
2.   Crushing, grinding and separation processes
3.   Smelting plants with total cost less than Rs.50 million

**E.   Transport**
1.   Federal or Provincial highways (except maintenance, rebuilding or reconstruction of existing metalled roads) with total cost less than Rs.50 million
2.   Ports and harbour development for ships less than 500 gross tons

**F.   Water management, dams, irrigation and flood protection**
1.   Dams and reservoirs with storage volume less than 50 million cubic metres of surface area less than 8 square kilometres
2.   Irrigation and drainage projects serving less than 15,000 hectares
3.   Small-scale irrigation systems with total cost less than Rs.50 million

**G.   Water supply and treatment**
Water supply schemes and treatment plants with total cost less than Rs.25 million

**H.   Waste disposal**
Waste disposal facility for domestic or industrial wastes, with annual capacity less than 10,000 cubic metres

**I.   Urban development and tourism**
1.   Housing schemes
2.   Public facilities with significant off-site impacts (*e.g.* hospital wastes)
3.   Urban development projects

**J.   Other projects**
Any other project for which filing of an IEE is required by the Federal Agency under sub-regulation (2) of Regulation 5

*Source: GoP, 2000*

## Box 7.4: IEE/EIA Regulations: Schedule II list of projects requiring an EIA

**A.   Energy**
1.   Hydroelectric power generation over 50 MW
2.   Thermal power generation over 200 MW
3.   Transmission lines (11 KV and above) and grid stations
4.   Nuclear power plans
5.   Petroleum refineries

**B.   Manufacturing and processing**
1.   Cement plants
2.   Chemicals projects
3.   Fertilizer plants
4.   Food processing industries including sugar mills, beverages, milk and dairy products, with total cost of Rs.100 million and above
5.   Industrial estates (including export processing zones)
6.   Man-made fibres and resin projects with total cost of Rs.100 M and above
7.   Pesticides (manufacture or formulation)
8.   Petrochemicals complex
9.   Synthetic resins, plastics and man-made fibres, paper and paperboard, paper pulping, plastic products, textiles (except apparel),printing and publishing, paints and dyes, oils and fats and vegetable ghee projects, with total cost more than Rs.10 million
10. Tanning and leather finishing projects

**C.   Mining and mineral processing**
1.   Mining and processing of coal, gold, copper, sulphur and precious stones
2.   Mining and processing of major non-ferrous metals, iron and steel rolling
3.   Smelting plants with total cost of Rs.50 million and above

**D.   Transport**
1.   Airports
2.   Federal or Provincial highways or major roads (except maintenance, rebuilding or reconstruction of existing roads) with total cost of Rs.50 million and above
3.   Ports and harbour development for ships of 500 gross tons and above
4.   Railway works

**E.   Water management, dams, irrigation and flood protection**
1.   Dams and reservoirs with storage volume of 50 million cubic metres and above or surface area of 8 square kilometres and above
2.   Irrigation and drainage projects serving 15,000 hectares and above

**F.   Water supply and treatment**
Water supply schemes and treatment plants with total cost of Rs.25 million and above

**G.   Waste Disposal**
1.   Waste disposal and/or storage of hazardous or toxic wastes (including landfill sites, incineration of hospital toxic waste)
2.   Waste disposal facilities for domestic or industrial wastes, with annual capacity more than 10,000 cubic metres

**H.   Urban development and tourism**
1.   Land use studies and urban plans (large cities)
2.   Large-scale tourism development projects with total cost more than Rs.50 million

**I.   Environmentally Sensitive Areas**
All projects situated in environmentally sensitive areas

**J.   Other projects**
1.   Any other project for which filing of an EIA is required by the Federal Agency under sub-regulation (2) of Regulation 5.
2.   Any other project likely to cause an adverse environmental effect

*Source: GoP, 2000*

## 7.3 The rapid environmental assessment (REA) checklists of the ADB

The Asian Development Bank (ADB, 2003iii) provides online access to a range of screening checklists that are called here 'rapid environmental assessment (REA)' checklists for the following sectors:

- Agro Industrial Projects
- Airports
- Buildings
- Chemical-based Industrial Projects
- Fisheries
- Forestry
- General
- Governance and Finance
- Hydropower
- Irrigation
- Mining Industry
- Petrochemical Industrial Projects
- Ports and Harbours
- Power Transmission
- Roads and Highways
- Sewage Treatment
- Solar Energy
- Solid Waste Management
- Thermal Power Plants
- Urban Development
- Water Supply
- Wind Energy

Each sector has associated checklists that are several pages long. All checklists start with instructions for the screening team, as follows:

(i) The project team completes the checklist to support the environmental classification of a project. It is to be attached to the environmental categorisation form and submitted to the Environment and Safeguards Division (RSES) for endorsement by the Director, RSES and for approval by the Chief Compliance Officer;

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and indigenous peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists; and

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Each of these checklists consists of a number of specific questions that help the screening team to decide whether significant impacts are likely. As an example, the forestry sector screening checklist is presented in Box 7.5.

## Box 7.5: Screening checklist for forestry sector

| Screening Questions | Yes | No | Remarks |
|---|---|---|---|
| **A. Project Siting** | | | |
| Is the Project area adjacent to or within any of the following environmentally sensitive areas? | | | |
| ● Cultural heritage site | | | |
| ● Protected Area | | | |
| ● Wetland | | | |
| ● Mangrove | | | |
| ● Estuarine | | | |
| ● Buffer zone of protected area | | | |
| ● Special area for protecting biodiversity | | | |
| **B. Potential Environmental Impacts** | | | |
| Will the Project cause… | | | |
| ● increase in soil erosion and siltation? | | | |
| ● increase in peak and flood flows? | | | |
| ● loss of downstream beneficial uses (water supply or fisheries)? | | | |
| ● impairment of ecological and recreational opportunities? | | | |
| ● impairment of beneficial uses of traditional forests? | | | |
| ● any loss of precious ecology? | | | |
| ● possible conflicts with established management policies? | | | |
| ● dislocation or involuntary resettlement of people? | | | |
| ● loss of downstream ecological and economic functions due to any construction of social infrastructure (*e.g.*, road, training or information centre, office or housing)? | | | |
| ● displacement of people or reduce their access to forest resources? | | | |
| ● disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups? | | | |
| ● uncontrolled in-migration, including the influx of workers and their followers, with opening of roads to forest area and overloading of social infrastructure? | | | |
| ● unnecessary loss of ecological value and decreased biodiversity by replacement of natural forest with plantation with limited number of species? | | | |
| ● technology or land use modification that may change present social and economic activities? | | | |
| ● ecological problems as well as community health and safety hazards due to land clearance prior to reforestation (*e.g.*, soil erosion, disruption of hydrological cycle, loss of nutrients, decline in soil fertility)? | | | |
| ● other ecological problems as well as community health and safety hazards (*e.g.*, pollution of water bodies from fertilizers, pesticides, and herbicides used in the plantation)? | | | |
| ● dangers to a safe and healthy working environment due to physical, chemical and biological hazards during project construction and operation? | | | |
| ● social problems and conflicts related to land tenure and resource use rights? | | | |
| ● social conflicts if workers from other regions or countries are hired? | | | |
| ● risks to community health and safety due to the transport, storage and/or disposal of materials such as explosives, fuel, pesticide and other chemicals during construction and operation? | | | |

| Screening Questions | Yes | No | Remarks |
|---|---|---|---|
| **Climate Change and Disaster Risk Questions**<br>The following questions are not for environmental categorisation. They are included in this checklist to help identify potential climate and disaster risks. | | | |
| ●   Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix I)? | | | |
| ●   Could changes in precipitation, temperature, salinity, or extreme events over the Project lifespan affect its sustainability or cost? | | | |
| ●   Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (*e.g.* high incidence of marginalised populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)? | | | |
| ●   Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (*e.g.*, increasing traffic or housing in areas that will be more prone to flooding, by encouraging settlement in earthquake zones)? | | | |

*Source: Asian Development Bank, 2003*

Each of the checklists is followed by an appendix on anticipated hazards and climate changes for different environments.

## 7.4    Scoping - Purpose, objectives, guiding principles

Scoping is the EIA stage at which issues, impacts and preliminary alternatives are determined that should be addressed at subsequent stages. It directly follows the screening stage and is a systematic exercise that establishes the boundaries and Terms of Reference (ToR) for the EIA. A quality scoping study reduces the risk of including inappropriate components or excluding components which should be addressed.

While scoping has been defined by many different terms, there is general agreement on what scoping seeks to achieve. The definition adopted in recent guidance on project EIA, developed for the European Commission, sets out its meaning in its broadest sense as follows:

> *"Scoping is the process of determining the content and extent of the matters which should be covered in the environmental information to be submitted to a competent authority for projects which are subject to EIA."*
> (European Commission, 2001)

Scoping relates to addressing the impacts and issues to be studied during the EIA process and, in addition, covered within the report submitted as part of that process. This EIA report will document both, the project and the environment in which it is to be located, together with descriptions and assessments of the likely consequences of the development on various environmental parameters.

Scoping involves decisions concerning what is likely to be significant impacts of a particular project, and what alternatives should be addressed (Wood, 2003; Weston, 2000; Glasson *et al.*, 1999). There are, therefore, elements of both, identification and prioritisation within scoping. Furthermore, there is a need to engage in the debate as to how significance might be defined.

There may be overlaps with the screening stage. Essentially, scoping takes forward the preliminary determination of significance made in screening to the next stage of resolution – determining what issues and impacts require further study. In doing so, scoping places limits on the information to be gathered and analysed in an EIA and helps to focus the approach to be taken.

In the early years of the development of EIA, little attention was given to scoping, resulting in a lack

of focus in most EIA reports. This made the EIA process slower, less efficient and less effective than might otherwise have been the case. In response, for the first time in 1978, the U.S. Council on Environmental Quality (CEQ) issued regulations, establishing "scoping" as a formal requirement for EIAs.

In introducing EIA systems into legislation, the European Union, in line with many other jurisdictions, initially omitted scoping as a specific requirement in the EIA Directive 85/337/EEC. Successive five-year reviews undertaken in 1992 and 1997, however, recommended the introduction of scoping as a means to strengthen its effectiveness. Subsequently, an amendment to the Directive (97/11/EC) introduced scoping as a non-mandatory step in the EIA procedure within the EU from 1999 onwards.

There are numerous scoping guidelines available online (**See** *e.g.* EC, 2001a).

### 7.4.1    Purpose of scoping

Scoping is a distinct, early stage within EIA which defines its proposed action, involves cooperating agencies, identifies what is and what is not important, and seeks to set time limits on associated studies. Furthermore, scoping is used to determine staff requirements of the assessment team, collecting background information, identifying other regulatory requirements and determining the range of alternatives to be considered. Public input in scoping helps to ensure that important issues are not overlooked when preparing the ToR and/or initiating the EA study. Box 7.6 explains the purpose of scoping.

Not all EIA systems make provision for the generation or review of alternatives during the scoping stage. These may follow, instead, from the issues that are identified as important. Consideration of alternatives during scoping is, however, clearly becoming accepted internationally as an EIA 'good practice' element.

While in scoping, significant effects are identified, subsequently these continue to be re-interpreted throughout an EIA study, as well as in the decision-making process, project implementation and monitoring. Unforeseen issues that require further consideration may arise in any of these phases. The work undertaken for an EIA on a particular issue (the impact of toxic effluent on aquatic species and human health, for example) may uncover further questions, some of which may become contentious later on in the process.

Scoping is completed when the detailed studies required in the EIA have been specified (*i.e.* when the ToR have been prepared), ultimately providing the foundations for an effective and efficient EIA process. When carried out systematically, scoping highlights the issues that matter and provides for a clear direction to the proponent on what is required. This increases the likelihood of an adequately prepared EIA report. It helps to avoid the problem of unfocused, voluminous reports and the attendant delay while their deficiencies are addressed and corrected. Scoping helps to make sure that resources are targeted on collecting the information necessary for decision-making and that they are not wasted on undertaking excessive analysis.

In so far as scoping involves the initial collection and analysis of information about the

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**Box 7.6: The purpose of scoping**

The purpose of scoping is:
- to identify the important issues to be considered in an EIA, Including the baseline and alternatives;
- to determine the appropriate time and space boundaries of the EIA;
- to establish the information necessary for decision-making; and
- to anticipate the significant effects and factors to be studied in detail.

*Source: Fischer and Phylip-Jones, 2008*

**Box 7.7: Key objectives of scoping**

The key objectives of scoping are to:
- inform the public about a proposal;
- identify the main stakeholders and their concerns and values;
- define reasonable and practical alternatives to be addressed;
- focus the important issues and significant impacts to be addressed by an EIA;
- define the boundaries for an EA in time, space and subject matter;
- set requirements for the collection of baseline and other information; and
- establish the Terms of Reference (ToR) for an EIA study.

*Source: Fischer and Phylip-Jones, 2008*

**Box 7.8: Guiding principles for carrying out the scoping stage**

Principles for carrying out the scoping stage include:
- to recognise scoping is a process rather than a discrete activity or event;
- to design the scoping process for each proposal, taking into account the environment and people affected;
- to start scoping as soon as sufficient information is available;
- to prepare an information package or circular explaining the proposal and the process;
- to specify the role and contribution of the stakeholders and the public;
- to take a systematic approach but implement flexibly;
- to document the results to guide preparation of an EIA; and
- to respond to new information and further issues raised by stakeholders.

*Source: Fischer and Phylip-Jones, 2008*

environment and actions that might affect it, it can be seen as a rational activity that has often in the past relied on the judgement and experience of professionals. The determination of what is likely to be 'significant' in environmental terms lies at the heart of scoping, and the public and other stakeholders base this not only on evidence-based impacts, but also on the perception of impacts. It is because of the political nature of the wider process that the importance of consultation and participation in scoping is now receiving increased emphasis (Weston, 2000).

Scoping involves two potentially mutually conflicting tasks. First, it is necessary to explore the potential relevance of as wide a range of issues (alternatives, impacts, approaches) as possible. However, scoping is also concerned with focussing the subsequent assessment process, and therefore 'scoping in' significant issues and 'scoping out' issues unlikely to be of relevance to the decision on the project. The consequences of balancing these two aspects are that scoping establishes the scope of additional studies, assists in staffing and scheduling of study activities, and promotes the compliance with all applicable legislative requirements within an integrated study and document (Marriot, 1997).

### 7.4.2 Key objectives, guiding principles, elements, multi-dimensional aspects and overall requirements for effective EIA scoping

The scoping exercise itself can vary in complexity and time taken. A comprehensive approach to scoping may be needed for large-scale proposals, which have a range of impacts that are potentially significant. In other cases, scoping will be a more limited and restricted exercise. Depending on the circumstances, the scoping exercise can be tailored to include some or all of the key objectives listed in Box 7.7.

There are a number of guiding principles for carrying out the scoping stage of EIA. These are summarised in Box 7.8.

The elements of scoping differ to some degree from EIA requirements established by different countries and international agencies. A comprehensive scoping process will include various distinct elements. These are summarised in Box 7.9.

Public involvement at the scoping stage is beneficial, as this may lead to all the significant issues being identified, local information about the project area be gathered, and alternative ways of achieving the project objectives to be considered. The terms of reference (ToR) for an EIA provide a means of responding to and checking against these inputs and should outline any specific public involvement requirements. Overall, scoping is a multidimensional problem, requiring consideration of various aspects. These are summarised in Box 7.10.

To be successful and of benefit to the overall assessment process, scoping requires commitment, participation, communication, information and flexibility. Box 7.11 explains what those involve.

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### Box 7.9: Elements for a comprehensive scoping process

Elements of a comprehensive scoping process include:
- the identification of the range of community and scientific concerns about a proposed project or action;
- the evaluation of these concerns to identify the significant issues (and elimination of those issues that are not important); and
- the organisation and prioritisation of those issues to focus the information that is critical for decision-making, and that will be studied in detail in the next phase of EIA.

*Source: Fischer and Phylip-Jones, 2008*

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### Box 7.10: Multidimensional aspects to be considered in scoping

Scoping may include a range of multi-dimensional elements, as follows:
- Scope of the assessment, including:
  - project alternatives;
  - design alternatives; and
  - justification for a policy, plan, programme, project.
- Scope of the project, including:
  - phases (development, operation, closure); and
  - components (dams, transmission lines, roads).
- Scope of issues, including:
  - project versus non-project issues;
  - range of environmental issues considered and their priorities (definition of "environment" has implications);
  - cumulative effects;
  - cultural perspectives; and
  context (sustainable development; equity).
- Scope of factors
  - temporal/geographic boundaries for individual issues/cumulative effects; and
  - range of projects/activities/events considered in cumulative effects.

*Source: Fischer and Phylip-Jones, 2008*

**Box 7.11: Overall requirements for successful scoping**

Overall requirements for successful scoping include:

- *Commitment* - agencies and organisations must be committed to the process of scoping and assessment;
- *Participation* - many decisions are based on value judgements and thus the involvement of the public is important to ensure that the public's value judgements are incorporated;
- *Communication* - among agencies, companies and the public;
- *Information* - the timing and level of information available to participants must be appropriate; and
- *Flexibility* - no one method for determining key issues is appropriate or effective in all circumstances.

*Source: Fischer and Phylip-Jones, 2008*

The format and detail of a scoping report varies. In principle, it should identify the content and extent of the information to be provided by the developer to the competent authority. In particular, it should always identify the types of environmental impacts to be investigated and reported in the environmental information.

It is important that the scoping process is well planned and managed, with a structured and carefully planned approach involving provision of information. Failing to manage the process could lead to tensions between different stakeholders' priorities at this early stage of the EIA process.

In Pakistan, the sectoral guidelines for preparing EIA of projects of different development sectors have been prepared for deciding on what issues should be included in an EIA (GoP, 1997d). The responsible EPA provides a typical list of steps for scoping and directs the proponent (if they contact the EPA early for thorough discussion with key stakeholders, assembling available information from concerned departments and agencies, consulting with possible affectees, considering alternatives, and identifying information gaps (Nadeem, 2010, p101).

## 7.5 How scoping is undertaken and the role of the public

Scoping may be undertaken in various ways, for example:

(1) by a developer or a developer's EIA Team. A draft Scoping Report is prepared and circulated among consultees before it is finalised and issued as the agreed terms of reference for the EA. The consultees may be just the environmental authorities or may include other interested parties and the general public; and

(2) by the competent authority or by an independent body such as an EIA Commission or a panel of EIA experts on behalf of the competent authority. The competent authority will then issue a scoping opinion to the developer which forms the terms of reference for the EIA. Prior to finalising the Scoping Opinion, the competent authority will consult the environmental authorities and may consult other interested parties and the general public.

In some countries, a developer may request a scoping opinion from a competent authority at the same time as requesting a screening decision. Such an approach can speed up the EIA process. However, the provision of a scoping opinion does not preclude the competent authority from subsequently requiring the developer to submit further information, if this is considered necessary. Scoping procedures normally involve some measure of consultation. In more developed systems consultation is extended widely to all interested parties including the general public. It may include publication of draft scoping reports for comment and even public hearings. In others, consultation is less extensive and focuses on seeking the views of the relevant environmental authorities.

It is imperative that all stakeholders in the process are fully aware of their responsibilities during this stage so that an efficient, effective and coordinated scoping stage is undertaken. Table 7.1 shows the possible roles in scoping of various stakeholders in the EIA process.

Involving the public in scoping helps to build confidence into the EIA process at all levels of decision-making. Often, the scoping process is the first major point of contact with the stakeholders who are affected by or interested in a proposal and its alternatives. It provides an important opportunity to inform them about the proposal and the EIA process, to understand their concerns and to set out the role and contribution of public involvement in decision-making. Experience indicates that where scoping responds to stakeholder and public inputs, even though it cannot always accommodate them, there is likely to be increased acceptance of the decision-making processes.

In Pakistan, the role of stakeholders in the scoping process is mentioned. However, the

### Table 7.1: Possible roles in scoping of different stakeholders

| Stakeholders | Possible Roles |
|---|---|
| Proponent/competent authorities | Know most about the proposal, and have a strongly developed view about the factors that will influence the site selection and other aspects of decision-making. It is common for the proponent or the competent authority to have responsibility for scoping. The scoping process helps them to recognise the perspective of others, to consider alternatives and concerns of those affected, and to make changes to the proposal, which will address these inputs. |
| EIA administering bodies | Generally establish and oversee statutory or procedural requirements for scoping. The requirements for scoping may cover the matters to be addressed, the people to be consulted, and the form of consultation. The administering body may issue terms of reference for the EIA, and/or review and approve the EIA report submitted by the proponent, checking it against the agreed scope. |
| Other responsible agencies | Contribute relevant information about specific issues and matters within their jurisdiction. This information may include specific legislative requirements, policy objectives, and standards, technical knowledge and expertise, and experience with similar projects or local conditions. Certain agencies other than the competent authority may also have the role of providing licences, permits, approvals or leases. Knowledge of these requirements is essential at the scoping stage. |
| EIA practitioners and experts | May act directly for the agencies involved or for the proponent as consultants retained for the EIA work, or they may function in an advisory or review capacity on behalf of scientific, NGO or professional bodies. Their involvement can be of particular value in providing specialist knowledge. |
| People affected by the proposal | Have a major role in identifying concerns and issues and providing local knowledge and information. Their views should be taken into account in choosing between alternatives, in deciding on the importance of issues, and in identifying mitigating measures, compensation provisions and management plans. Affected communities may need help in understanding the proposal, its alternatives, and their likely effects, and in organising and articulating their concerns to those involved in the EIA process. |
| Wider community | Will also provide information and views that are relevant to scoping. This grouping includes those indirectly affected by the proposal, and local, national and sometimes international NGOs and interest groups. Further information on undertaking a dialogue with stakeholders can be found in Section 3 – Public involvement. |

*Source: Institute for Environmental Management and Assessment, 2004*

**Box 7.12: EIA scoping consultation process**

1. Identify a list of organisations and individuals that are interested in the project and update this as the project develops.
2. Contact each consultee to request their help in scoping.
3. Send them information about the project in the form of an attractive leaflet or brochure. Give contact details for information and comment.
4. Make the leaflet widely available in local centres (libraries, town halls, mosques); possibly provide a copy to every household and business in the area.
5. Collate and analyse all responses and take them into account in planning the environmental studies.
6. Write back to each respondent thanking them for their help and explaining how their comments have been addressed.
7. If appropriate, arrange to telephone or meet them in person to discuss the issues they raise.
8. If there is substantial local interest, consider holding a public exhibition or a community meeting at which the project will be presented and staff will be on hand to answer questions.
9. If there are several groups with a common interest consider setting up a special forum for them to meet you at intervals.
10. If the EIA process is lengthy, issue a regular newsletter to keep consultees up to date with what is happening.
11. Always record the views expressed in consultations in the environmental report.

*Source: European Commission, 2001*

guidelines put the responsibility of formulating the terms of reference on the proponents. Stakeholders are rarely involved during scoping through the areas of concerns of affectees and concerned government departments are not truly reflected in EIA reports (Nadeem, 2010, p.101).

## 7.6    Criteria of good practice, methods and techniques

It is widely accepted good practice for the results of scoping to be presented as a formal report or letter. Such a document is valuable for any project and requires *e.g.* detailed ecological surveys, particularly where stakeholder-input is essential in defining terms of reference acceptable to all parties. A scoping report or letter may be used as the basis for applying for a formal scoping opinion.

Governments often establish criteria for deciding whether a negative effect is acceptable (*i.e.* insignificant) in terms of regulatory standards which reflect society's values. Examples include:

● *Legal and Policy Criteria* - policies stated in legislation, regulations and policy statements;
● *Functional Criteria* - consider how much

environmental systems are changed by project actions;
● *Normative Criteria* - based on the values society places on certain environmental features and qualities; and
● *Controversy* - an issue may also be considered because it is controversial.

An effective consultation process in scoping will follow a number of steps. These may look like those shown in Box 7.12 (following European Commission, 2001):

There are a variety of methods and techniques that can be utilised in order to define the scope of an EIA. Such methods range from quantitative to qualitative, and complex to simple. The following three main types of methods are frequently used in scoping (see also Fischer, 2007):

● Indicators, checklists, matrices;
● Public involvement methods; for example open houses, surveys, interviews, hotlines; and
● Group process techniques; for example group meetings, brainstorming, Delphi models.

## 7.7    Types of impacts to be identified

There are different types of impacts EIA needs to consider, representing a range of dimensions, including *e.g.* physical and non-physical, direct, indirect, cumulative and induced, short and long terms, local or regional/national/global, adverse and beneficial, reversible and irreversible, quantitative and qualitative, actual and perceived.

Non-physical impacts are, for example, socio-economic impacts. Impacts on cultural, religious and other values also fall into this category. Physical impacts include those environmental impacts that traditionally have been considered in EIA (*i.e. flora* and *fauna*, water, air, soils). Direct impacts are those impacts which are caused by the action and occur at the same time and place of the development. Indirect impacts are impacts on the environment, which are not directly connected with a project, but are rather the result of complex pathways. The following examples of indirect impacts are from the European Commission 1999 *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interaction:*

● a development changes the water table and thus affects a nearby wetland causing an impact on the ecology of that wetland;

● visual impact from the use of noise attenuation barriers as a mitigation measure; and

● the development of a project, which in turn, attracts ancillary developments.

Furthermore, cumulative impacts are described in the same guidelines as resulting from incremental changes caused by other past, present or reasonably foreseeable actions together with the project. Examples for cumulative impacts are:

● incremental noise from a number of separate developments;

● combined effect of individual impacts, *e.g.* noise, dust and visual, from one development on a particular receptor; and

● several developments with insignificant impacts individually but which together have a cumulative effect, *e.g.* development of a golf course may have an insignificant impact, but when considered with several nearby golf courses there could be a significant cumulative impact on local ecology and landscape.

Induced impacts can result from reactions between different impacts from one or several projects. For example (EC, 1999):

---

**Figure 7.1: Main impact of air pollutants related to spatial scale**

| Impact | PM | H\|M | $SO_2$ | $NO_2$ | NMVOC | CO | $CH_4$ | $CO_2$ | $N_2O$ |
|---|---|---|---|---|---|---|---|---|---|
| **POLLUTANT** | | | | | | | | | |
| **LOCAL** | | | | | | | | | |
| air quality | ██████████████████████████ | | | | | | | | |
| **REGIONAL** | | | | | | | | | |
| acidification | | | ███████████ | | | | | | |
| photochemical | | | | ████████████████ | | | | | |
| **GLOBAL** | | | | | | | | | |
| greenhouse effect | | | | ██████████████████████████████ | | | | | |
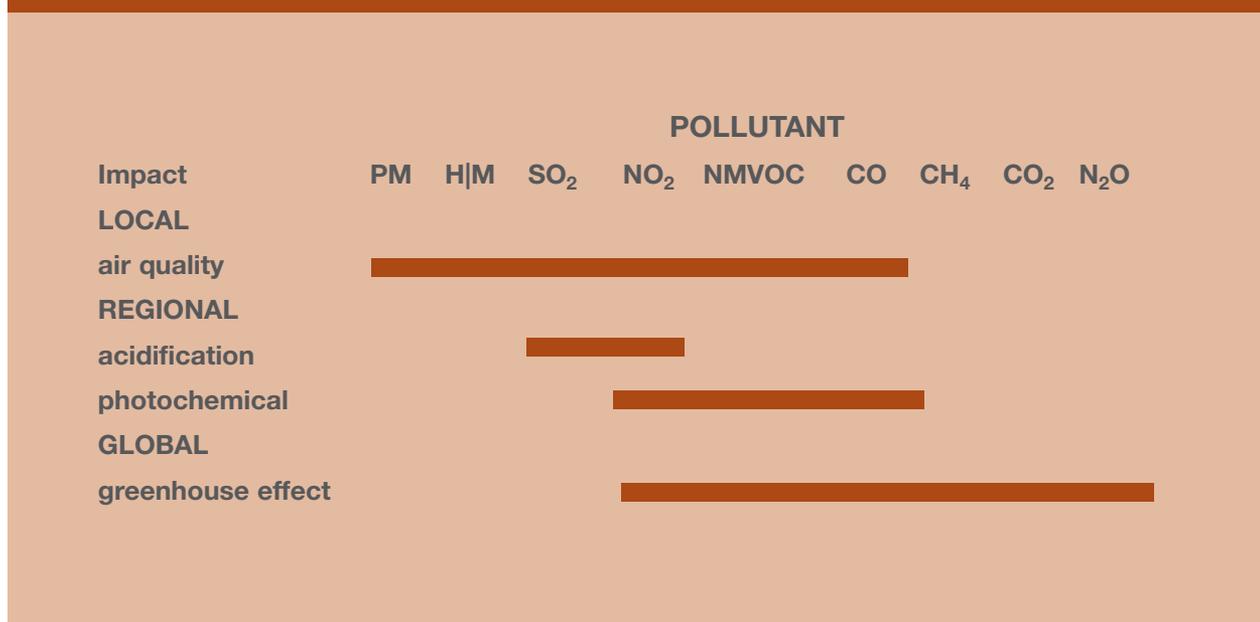
*Source: Fischer, 2006, based on EC (1999b: 78)*

- a chemical plant producing two streams of waste that are individually acceptable but react in combination producing highly significant levels of pollution;
- emissions to air from one project reacting with emissions from an existing development; and
- two major developments being constructed adjacent to one another and during overlapping time periods will have many interactive impacts, from land use issues to construction and operational noise.

Short term impacts may occur *e.g.* only during construction or may only lead to temporary environmental impacts of a few weeks or months. Long term environmental impacts can occur when particularly sensitive environments are affected. Marshlands, for example, take thousands of years to develop, so if these are destroyed, the impact is very long term.

Regarding the geographical scale of impacts, some may be purely local (*e.g.* land-take), while others can go way beyond the local scale. Carbon emissions for combustion engines, for example, have an effect on the global climate.

Adverse impacts are often thought of in terms of negative impacts. Beneficial impacts, on the other hand are normally thought of in terms of positive effects. In an ideal situation,

development should result in positive economic, social and environmental effects. Reversible impacts mean the original situation of the environment can be reinstated after *e.g.* construction activities. Irreversible impacts are seen as those that cannot be reversed in reasonable time scales. Taking the above mentioned example of marshlands, if those were destroyed, this would normally be considered an irreversible effect. Quantitative impacts are those that are measurable (*e.g.* amount of emissions). Qualitative impacts, on the other hand, are normally considered to be not (easily) measurable, but may still be very real, *e.g.* mental illnesses out of fear from a certain development, *e.g.* a nuclear power station. Finally, there are actual and perceived impacts which are not always in line. The estimated loss of life due to the nuclear industry is *e.g.* extremely low if compared with risks of other activities. Smoking tobacco poses a particularly high risk.

## 7.8 Establishing what baseline data need to be considered

The Asian Development Bank (ADB) provides a list of what baseline environmental information should be included in EIA (ADB, 2003, p.6). This includes physical resources, ecological resources, economic development as well as social and cultural resources. Box 7.13 shows examples for each of these.

**Box 7.13: Baseline environmental information that should be included in EIA**

(i) **Physical Resources**, for example:
- atmosphere (*e.g.* air quality and climate);
- topography and soils;
- surface water;
- groundwater; and
- geology / seismology.

(ii) **Ecological Resources**, for example:
- fisheries;
- aquatic biology;
- wildlife;
- forests;
- rare or endangered species;
- protected areas;
- coastal resources;

(iii) **Economic Development**, for example:
- industries;
- infrastructure facilities (*e.g.* water supply, sewerage, flood control);
- transportation (*e.g.* roads, harbours, airports, and navigation);
- land use (*e.g.* dedicated area uses);
- power sources and transmission; and
- agricultural development, mineral development, and tourism facilities.

(iv) **Social and Cultural Resources**, for example:
- population and communities (*e.g.* numbers, locations, composition, employment)
- health facilities;
- education facilities;
- socio-economic conditions (*e.g.* community structure, family structure, social wellbeing);
- physical or cultural heritage;
- current use of lands and resources for traditional purposes by Indigenous Peoples; and
- structures or sites that are of historical, archaeological, paleontological, or architectural significance.

*Source: Asian Development Bank, 2003*

As far as possible, baseline information should be presented in maps, figures, and tables. In this context, a detailed method should be provided on how information was gathered. This includes the specification of data sources.

## 7.9    Practical element:

Students are to conduct scenario based exercises to determine the requirement of an IEE or EIA and scope for a hypothetical project in Pakistan *e.g.* a road or a factory.

# 8    Methods and techniques for assessment of impacts

In this chapter, methods and techniques used for assessing impacts in EIA are introduced. In this context, frequently used methods are distinguished from moderately used and rarely used methods and techniques. The main sources that this chapter draws on include Sadler (2005) and Fischer *et al.* (2008; chapter 16 by Belcakova: pp 157-165).

## 8.1 Methods and techniques used for assessing impacts in EIA

Over the years, numerous methods have been developed to ensure that various stages of the EIA process are carried out in a comprehensive and systematic way. Generally speaking, EIA methods should allow for the organisation of information and be beneficial for practitioners with limited experience. The most frequently used EA methods are listed in Box 8.1.

**Box 8.1: Methods used in EA**

| Types of methods | Use in EIA |
| --- | --- |
| Analogs | H |
| Checklists | H |
| Decision-focused checklists | M |
| Environmental cost benefit analysis | L |
| Expert opinion | H |
| Expert system | L |
| Indices or indicators | M |
| Laboratory testing | M |
| Landscape evaluation | M |
| Literature reviews | M |
| Mass balances | H |
| Matrices | H |
| Baseline monitoring | L |
| Field monitoring | L |
| Networks | M |
| Overlay mapping | M |
| Photographs/photomontages | M |
| Qualitative models | H |
| Quantitative models | M |
| Risk assessment | L |
| Scenario building | L |
| Trend extrapolation | L |
| *H= high use; M= moderate use; L= low use; O=limited use; NA=not applicable* | |

*Source: Belcakova (2008), based on Canter and Sadler (1997, p.95)*

Methods are subsequently described in more detail, first those that are frequently used in EIA, followed by those of moderate and low usage.

While the use of assessment methods and techniques would normally be left to the discretion of practitioners, however, they may also be prescribed in regulation or guidelines. In this context, EA methods and techniques will differ, according to the sector and tier of application. SEA of a regional land use plan, for example, will require the application of different methods and techniques as compared to EIA for a road construction project (see Fischer, 2007).

## 8.2    The most frequently used EIA methods and techniques

Subsequently, the most frequently used EIA methods and techniques are introduced. These include analogues, checklists, expert opinions, mass balances, matrices and interaction diagrams, as well as qualitative models.

### Analogues

Analogues are used in EIA to draw on experiences of similar actions in other policies or jurisdictions, countries or regions. In this context, observed impacts are taken as the basis for making judgments on the proposal that is being assessed. In this context, monitoring data should be used to provide for a sound analogy to the possible impacts of a proposed development.

### Checklists

Checklists have been described as a typical *ad-hoc* method (Sadar, 1996). Within EIA checklists, prescribed lists of environmental parameters are used that are to be checked for possible impacts of the proposed development. The potential benefits of simple checklists include (Sadar, 1996):

● to apply a simple method for identifying relevant environmental factors for consideration in EIA;
● to encourage discussion during the early stages of the assessment process; and
● to represent the collective knowledge and judgement of those who developed them.

Checklists may range from simple listings of environmental factors to listings that incorporate mathematical modelling. There are certain limitations when using checklists. For example, checklists are neither able to discover interdependencies, connectivities or synergisms between interacting environmental components, nor are they able to describe variations of environmental conditions. Finally, they do not provide information on specific data needs.

### Expert opinion

Opinions and perspectives from recognised experts in relevant fields are often used in an attempt to resolve complex situations in a relatively short period of time. In this context, consultations or workshops may be used. Consultations are frequently conducted with the aid of questionnaires. Workshops may include structured meetings, for example, with a problem solving focus on developing alternatives.

### Mass balances

Following Canter (1998), mass balance calculations refer to the analysis of existing situations and conditions with those that may result from proposed actions. They are mostly used in the context of air and water emissions as well as solid and hazardous wastes. Mass balance methods have a particularly high utilisation in project EIA processes.

### Matrices and interaction diagrams

Matrices usually take the form of a grid diagram or a two-dimensional table for cross-referencing a list of actions with environmental impact parameters. In this context, activities associated with various phases of a project or strategic action can be listed along one axis, with environmental components listed on the other. Inputs into a matrix can either be qualitative or quantitative. The simplest matrices indicate only the occurrence of an impact without any references to magnitude or significance. In more sophisticated matrices, quantitative estimates of impact magnitude and significance can be combined with a weighting scheme, leading to an

**Figure 8.1: Leopold matrix**

|   | A | B | C | d | E |
|---|---|---|---|---|---|
| a |  | 2 / 1 |  |  | 8 / 5 |
| b |  | 2 / 2 | 8 / 8 | 3 / 1 | 9 / 7 |

*Source: following Leopold et al., 1971*

'impact score'. The advantages of using matrices have been described by Sadar (1996) to include:

- a visual description of the relationship between two sets of the proposal being assessed;
- an identification of the impacts of different phases of a project; and
- an identification of separate site-specific impacts affecting a region as a whole (even though it may be better to describe different aspects of a proposal, using separate matrices).

Several types of matrices have been used in EA practice, for example, Leopold matrix, Peterson matrix, Component Interaction Matrix. The best known example is probably the Leopold Matrix (Leopold *et al.*, 1971, See: Figure 8.1), representing a pioneering approach to EIA. This matrix was designed for the assessment of impacts associated with most types of construction projects, listing 100 different project actions along one axis and 88 environmental characteristics and conditions along the other, including aspects of both, the biophysical and socio-economic environments. Also, it involves qualitative as well as quantitative information about cause and effect relationships. Several authors have stressed that the determination of relative importance or significance of an impact is a highly subjective process, and ideally should reflect consensus of opinion among experts from a variety of disciplines.

*Qualitative models*
Qualitative models refer to descriptive methods where relevant information is utilised to address the implications of actions that can result in changes to environmental components. It is a method usually based on expert opinion, *i.e.* professional judgement.

## 8.3 Moderately used methods and techniques
This section focuses on methods and techniques that are moderately used in EIA. These include decision-focused checklists, indices or indicators.

*Decision-focused checklists*
These are basically lists of environmental factors, including information on measurement, impact prediction and assessment. They are particularly helpful in the comparative evaluation of alternatives, and may be used, for example, for ranking environmental factors and associated impacts in order of their relative importance, thus providing a basis for selecting the preferred action.

*Indices or indicators*
Indices or indicators comprise selected features or parameters of environmental media or resources, representing broader measures of the quality/quantity of such media or resources. Indices may specifically refer to either, numerical or categorised information which can be used in describing the affected environment and impact prediction and assessment, typically based on selected indicators and their evaluation (Canter, 1998).

*Laboratory testing*
This method is useful for impact identification and impact prediction at the project (*i.e.* EIA) level. It

involves conducting specific tests or experiments to gain both, qualitative and quantitative information on predicted impacts of a certain type of project in a given location, for example, the impact of high rise buildings on wind.

*Landscape evaluation*

Methods and techniques of landscape evaluation are being used for visual and amenity assessment when focusing on the description of affected environments. Landscape evaluation is based on indicators, criteria and thresholds. Important information can be aggregated into overall scores. Landscape impacts include direct and indirect impacts of actions upon landscape elements and features, as well as impacts on the general landscape character and quality of surrounding areas.

Figure 8.2 shows visibility mapping for grading of views into a site.

Landscape evaluation can be linked with carrying capacity assessment. This is a tool used in land use planning assessment for setting development thresholds according to sensitivities of environmental and social systems. This method is particularly useful in the assessment of cumulative impacts and sustainability thresholds.

*Literature reviews*

Literature reviews can be used in both, EIA and SEA processes at different procedural stages (*e.g.* impact identification, impact prediction, impact assessment). Similarly to analogues, this method is about the collection of information on types of actions and their impacts. Literature

reviews may allow EA practitioners to identify the links between policy actions and environmental impacts, using documents like state of the environment reports and/or environment policy plans.

*Networks*

These are used to identify the structure, key elements and interactions in a given system, using *e.g.* decision flowcharts and loop analysis. A network diagram visually describes cause-effect links. In this context, different levels of information can be displayed. The relative dependence of one factor on the condition of

**Figure 8.2: Visibility mapping into a specific site**



*Source: Belcakova, 2008; IEA, 1995*

**Figure 8.3: Networks System Diagrams**
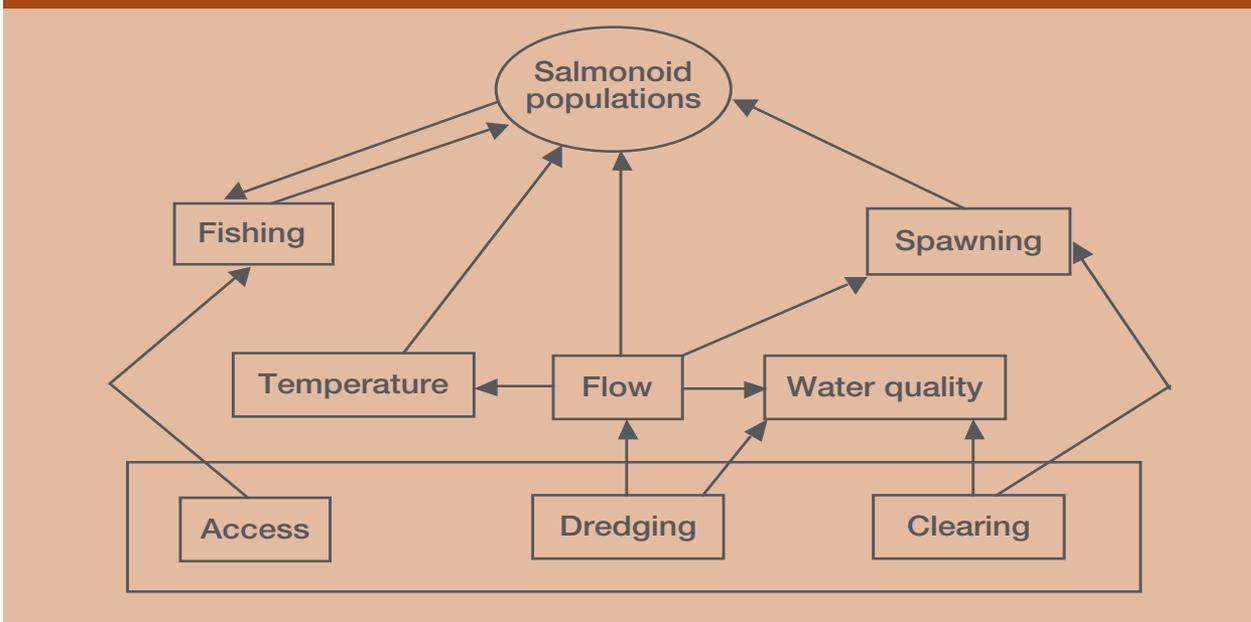


*Source: Belcakova, 2008; following Sadar, 1996*

another may be indicated by various arrow widths and heights (See: Figure 8.3). Negative and positive feedback loops can also be identified, if the nature of the interrelationship is indicated.

*Overlay mapping*
The overlay mapping technique is based on producing sets of maps of project effects, or environmental characteristics or themes (biophysical, social, aesthetic), for example, in order to provide for a composite characterisation of a regional environment. Impacts can then be identified by noting the affected environmental characteristics within the project area boundaries. Overlay mapping is normally used to identify areas which are compatible with the proposed action. There are some limitations when using this method, as follows (Sadar, 1996):
maps tend to oversimplify;
specific interrelationships between environmental factors are not readily obtainable using traditional map overlays; and
map overlays cannot effectively describe ecosystem dynamics through time.

*Photographs and photomontages*
Photographs and photomontages are

visualisation methods related to landscape evaluation (Canter, 1998) that can be applied in order to describe affected environments, as well as for impact prediction. They are helpful for analysing the visual quality of the project site or affected area and the potential visual impacts of proposed actions. Their advantage is that they can show the development within the real landscape and from known viewpoints. Various CAD systems can help with their application. Photomontages are the superimposition of an image onto a photograph for creating a realistic view of proposed potential visual changes. Figure 8.4 shows examples of computer generated and hand-painted photomontages.

*Quantitative models*
These are based on mathematical models that are used specifically for addressing expected changes in environmental media or resources. They range from simple to very complicated models (for example three dimensional computer-based models) that may require extensive data input. In most cases, models are used for the description or prediction of changes in properties of the system over a time period. Quantitative modelling is most effective when environmental

**Figure 8.4: An example of photograph/photomontages technique**
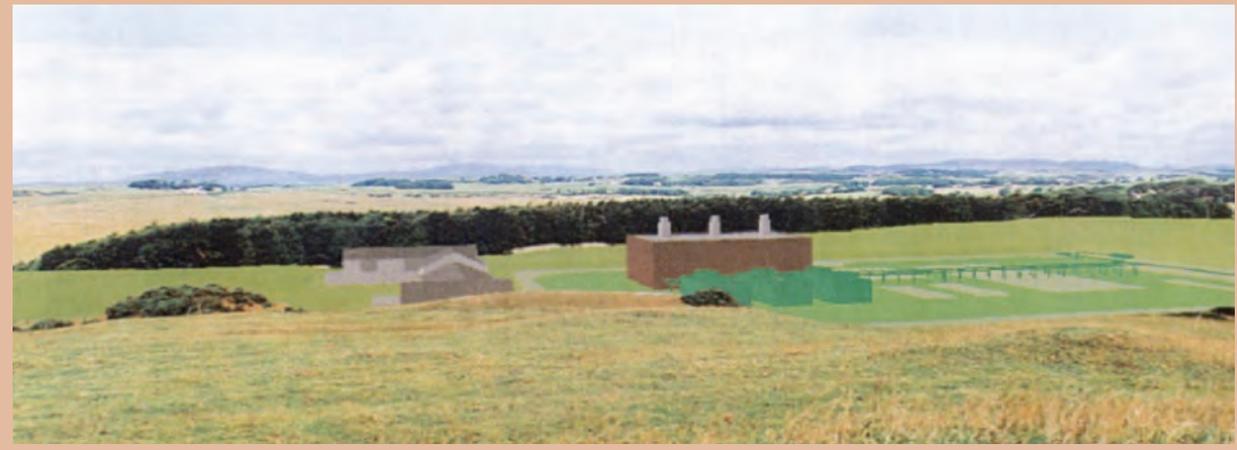


*Source: Belcakova, 2008; IEA, 1995*

factors are easily quantifiable, so that they can easily be assigned a mathematical value.

## 8.4    Low use of methods and techniques

In this section, low-use methods and techniques are introduced. These consist of environmental cost-benefit analysis.

*Environmental cost-benefit analysis*
This is used to select the best option for achieving set targets or goals at least cost (environmental or financial). It is based on identifying a benefit–cost ratio for choosing between different options.

*Expert systems*
Expert systems represent task-specific models which may or may not be computer based. They incorporate both, knowledge and experience of experts from different fields and from relevant disciplines. Knowledge is fed into a structured decision-making analytical tool. Expert systems are based on value judgements and best-guesses about likely outcomes.

*Baseline monitoring and field studies monitoring*
Baseline monitoring is a measurement method utilised to establish existing environmental conditions and to interpret the significance of anticipated changes of proposed activities. Field study monitoring represents a specialised

approach. Here, monitoring of actual impacts, resulting from specific types of projects can be conducted.

*Risk assessment*
This is a method focusing on the assessment of strategic risks of a proposed action. In this context, trends that may undermine objectives and quality standards generating potential relevant damages and costs need to be considered.

*Scenario building*
Scenarios are used for projections to outline and compare means and conditions of the implementation of a proposed action based on reasoned assumptions. It is commonly used in land use and transport planning.

*Trend extrapolation*
Following Canter (1998), this method refers to utilisation of historical trends, extending them into the future based upon assumptions. These are related to either continuing or changed conditions.

## 8.5    Practical element:

For different types of developments *e.g.* roads, airports, power plants, waste management facilities, small groups of students should jointly consider what methods may be suitably applied to assess impacts of different alternatives and then report back to the whole class.

# 9 Public participation and consultation in EIA

In this chapter, first the key role of public participation and consultation in the EIA process is explained. Then the notions of 'the public' and 'public interest' are explored. How to establish the interests of the public and of stakeholders is discussed. Subsequently, the history and rationale for EIA and public decision-making is described before international legislation pertaining to EIA and public decision-making is introduced. Participation and consultation techniques and their suitability for different situations are explained and an outline of trans-boundary considerations is provided. The final section elaborates on public participation in Pakistan. The main sources that this chapter draws on include Fischer *et al.* (2008; chapter 15 by Aschemann: pp 151-156), Nadeem (2010), UNECE (2006) and UNEP (2002b).

## 9.1 Explain the key role of public participation and consultation in the EIA process

Public participation and consultation are key stages in the EIA process. They are important sources of information in EIA for *e.g.* the identification of impacts, potential mitigation measures and the establishment of alternatives. Participation and consultation make the EIA process open, transparent and robust (UNEP, 2002b, p.161). Nearly all EIA systems world-wide have provisions for some type of public involvement. Public participation is an interactive and intensive process of engagement, whereas public consultation (or dialogue) is about listening to public concerns. EIA processes often only involve consultation rather than participation. There is some consensus, though, that at a minimum, public involvement should provide an opportunity for those affected by a proposal to express their opinions on the proposal and its impacts.

The purpose of public involvement is to (UNEP, 2002b, p.161):
● "*inform the stakeholders about the proposal and its likely effects;*
● *canvass their inputs, views and concerns; and*
● *take account of the information and views of the public in the EIA and decision-making*".

The key objectives of public involvement are to (UNEP, 2002b, pp161-162):
● "*obtain local and traditional knowledge that may be useful for decision-making;*

- *facilitate consideration of alternatives, mitigation measures and trade-offs;*
- *ensure that important impacts are not overlooked and benefits are maximised;*
- *reduce conflict through the early identification of contentious issues;*
- *provide an opportunity for the public to influence project design in a positive manner (thereby creating a sense of ownership of the proposal);*
- *improve transparency and accountability of decision-making; and*
- *increase public confidence in the EIA process*."

A range of stakeholders are involved in EIA. These include the individuals, groups and communities affected by a proposal, the proponent of the development along with those associated with it, *e.g.* government departments, interest groups (including *e.g.* NGOs), and others *e.g.* donors and academics.

The professional literature on public participation has used different expressions and terms, including *e.g.* "public participation", "public involvement", "stakeholder involvement", "consultation", "expressing opinions", "communication", "reporting", "access to information", "participatory approaches" and others. Fischer (2007) differentiates between four main categories; participation, consultation, communication and reporting. These terms are further explained in Box 9.1.

Each word implies a different level of commitment to and involvement of the public in decision-making. Different levels of citizen participation were first conceptualised by Arnstein (1969). She identified eight stages of participation, which are shown in Figure 9.1.

| Box 7.2: Specific methods used in screening (UN, 2006f) | | |
|---|---|---|
| 8 | Citizen Control | 8 |
| 7 | Delegated Power | 7 |
| 6 | Partnership | 6 |
| 5 | Placation | 5 |
| 4 | Consultation | 4 |
| 3 | Informing | 3 |
| 2 | Therapy | 2 |
| 1 | Manipulation | 1 |

*Source: following Arnstein, 1969*

**Box 9.1: Participation, consultation, communication and reporting**

**Participation:** Engagement process, in which external persons (for example, the public) are called to contribute to the decision-making process by exchanging information, predictions, opinions, interests and values.

**Consultation:** Engagement process, in which external persons (for example, the public) are called to comment on documentation.

**Communication:** One-way process, in which the objective is to inform and assist third parties and the public to understand problems, alternatives, opportunities and solutions.

**Reporting:** Documentation process in which results are made available in a written document, on the basis of which third parties/the public can make their comments, providing for feedback on the analyses made, alternatives and decisions.

*Source: Fischer, 2007*

| Table 9.1: Matching public participation aims with appropriate involvement levels | |
|---|---|
| **Aim** | **Applicable method level** |
| To satisfy statutory requirements to consult | Applicable method level<br>1: Education and information provision and/or<br>2: Information feedback |
| To resolve conflicting views | 4: Extended involvement |
| To increase transparency | 1: Education and information provision and/or<br>2: Information feedback and/or<br>3: Involvement and consultation and/or<br>4: Extended involvement |
| To increase defensibility | 2: Information feedback and/or<br>3: Involvement and consultation and/or<br>4: Extended involvement |
| To change people's views about an issue through education | 1: Education and information provision and/or<br>4: Extended involvement |
| To improve services | 2: Information feedback and/or<br>3: Involvement and consultation |
| To determine needs and desires | 2: Information feedback and/or<br>3: Involvement and consultation and/or<br>4: Extended involvement |
| To empower citizens | 1: Education and information provision and<br>4: Extended involvement |
| To enable social learning | 1: Education and information provision and/or<br>4: Extended involvement |

*Source: Petts and Leach (2000, p.20)*

Petts and Leach (2000) discuss what appropriate levels of involvement may be in different situations. They recommend 'fitting methods to purpose', depending on the specific aims of involvement along the lines described in Table 9.1. They point out that there may be different aims at different stages of the EIA process ranging, for example,

> *"from the elicitation of values relevant to site selection at a project design stage to the optimisation of trust and credibility at the monitoring stage." (*Petts and Leach, 2000, p.20)

The exact format of public involvement is going to depend on the specific EIA situation. However, as a ground rule, it should commence during the preparatory stages of a project proposal and should continue throughout the EIA process. This is subsequently described further.

### 9.1.1  Involvement during screening

In certain cases, either the project proponent or the responsible authority may want to involve the public as early as possible during screening in order to obtain an idea about likely impacts. This can help to decide whether an EIA or an IEE is required. Also, information obtained in this way can assist in setting up scoping and other later stages.

### 9.1.2 Involvement during scoping

While public involvement during EIA screening is still somewhat unusual, it is a common feature at the scoping stage. This can help the identification of all potentially significant issues. The terms of reference for the EIA can thus be designed in a transparent and responsible manner. In this context, requirements for public involvement during the forthcoming stages of EIA should be formulated. A good starting point to public participation at this stage is to conduct a stakeholder analysis. What this means is further explained below.

### 9.1.3 Stakeholder analysis

There are various ways to involve the public in public decision-making. Many academics and practitioners involved with EIA consider a stakeholder analysis to be a prerequisite first step for sound public participation (World Bank 2007; Schwartz and Deruyttere 1996). A stakeholder analysis can be done, using various straight-forward methods (DFID 1995, section 2) and is undertaken in order to

> *"identify and understand the subgroups within the population to be consulted, relations of power among these subgroups, and the extent to which community organisations represent all interest groups" (Schwartz and Deruyttere, 1996).*

The outcome of a stakeholder analysis thus informs the mix of methods to be used for consultation (**See**: DFID 1995, section 2, for example). International development agencies naturally place a high importance on stakeholder analysis, as it is needed for orientation to the situation on the ground and to understand the needs, interests, and relative strengths of the various stakeholders.

The involvement of the public at the actual assessment stage *i.e.* when the EIA report is being prepared, can help to (UNEP, 2002b, p.169):

- *"avoid biases and inaccuracies in analysis;*
- *identify local values and preferences;*
- *assist in the consideration of mitigation measures; and*
- *select a best practicable alternative*".

This is the stage where most EIA systems globally have provisions for public involvement. Obtaining feedback from the public on the EIA report is crucial, as this should combine all existing information on baseline data, the project and its alternatives, as well as mitigation. It is important to keep in mind that asking for written comments may be daunting for parts of the public, *e.g.* the part which is not well educated and literate. Public hearings or meetings may be held at this stage. In this context, it is important to consider that some people may not be comfortable speaking in public.

### 9.1.4 Involvement during implementation and follow up

Environmental impacts of projects should be monitored during construction and operation. Representatives of local communities should participate in this follow up process. This can help devising remedial action in case problems arise. Furthermore, it can help promote good relations with local people or communities affected by a development.

## 9.2 'The public' and 'public interest'

The 'public' is not a monolithic entity. Rather, it is a diverse set of people and groups that tend to have a wide range of interests. However, despite this diversity of interests, with regards to environmental issues, it is still possible to speak of a 'public interest' (Taylor, 1994). Thus, addressing environmental issues such as ozone depletion, global warming, and pollution and resource depletion that threaten health and welfare clearly is in the public interest. EIA is, therefore, an instrument designed to enhance public interest. The concept of 'public interest' is discussed further below.

### 9.2.1 What is public interest?

The notion that there is a 'public interest' has

been debated for at least 100 years. The first author contesting that there is something akin to a public interest was Bentley (1908), who has been labelled the 'father' of interest group theory in political science. According to him, "*society is nothing other than the complex of groups that compose it…*", concluding that "*we shall never find a group interest of … society as a whole* (in Taylor, 1994, p.88)." Today, authors with postmodern leanings are following in Bentley's footsteps, contesting and deconstructing the concept and ultimately denying the existence of a common welfare or 'public interest' (**See:** discussion and references in Campbell and Marshall, 2000).

However, many authors have challenged the claim that there is no public interest. Taylor (1994, p.89), for example, suggested that the fallacy of such arguments lies in

> "*the twin assumptions that society is composed only of groups with conflicting interests, and that where conflicts of interest exist between groups there cannot also be areas of consensus co-existing within the conflicts.*"

He explored several arguments around these two ideas and concluded that some interests are so fundamental that they must be recognised to some degree in any community. Taylor thus rejected the argument that there can be no conceptually coherent theory of the public interest. Different interests notwithstanding, he proposes that the interests shared in common by any group or person constitutes the public interest. However, he also suggested that there may be occasions when an action is in the public interest, but where, say, due to limited resources,

> "*we think it morally right (or of greater moral priority) to do something which promotes the interests of a particular group – say, a group which is especially disadvantaged…*"

This also means that public interest doesn't necessarily represent the interest of the 'majority' in a society.

### 9.2.2    Implications for EIA

The argumentation above provides a firm basis for defending environmentally sound decision-making and actions aimed at by EIA, as these are in the public interest. Overall, the concept of a public interest is useful and necessary if professional endeavours are to have any coherence at all and be anything other than partisan and arbitrary (Posas and Fischer, 2008).

## 9.3    The public, stakeholders and their representatives

The section above established that while there is a heterogeneous public, there are actions that can be said to be in the interest of the public. This does not mean, though, that minority opinions or actions should not be protected. Since in EIA it is not possible to consult everyone that might be considered to constitute 'the public,' current practice is to identify stakeholders who can collectively be seen to represent it (Abaza *et al.*, 2004). Stakeholders are individuals and groups who have a 'stake' or 'interest' that may be affected by a decision on a proposed project (Abaza *et al.*, 2004, p.69). Often, when stakeholders are being identified, broad categories will be defined and individuals assigned to one of them. Stakeholders are commonly divided into primary and secondary stakeholders, where the former are likely to experience direct effects and the latter may be indirectly affected or have the ability to influence the decisions taken (*i.e.* international conservation NGOs or media). Public participation as practiced in EIA can be defined as:

> "*any of several 'mechanisms' intentionally instituted to involve the lay public or their representatives in administrative decision-making*" (Beierle and Cayford 2002, p6).

Public participation thus refers to organised bureaucratic processes, excluding individual

actions. It is at times distinguished from stakeholder involvement, in that it is seen as:

> *"a popular democratic notion of lay citizens' involvement in local issues…'*

*Whereas the latter is:*

> *"… a more pluralist notion of interest group involvement in policy questions"* *(Beierle and Cayford 2002, p.6).*

## 9.4 History and rationale of public involvement in EIA

Various authors have written about the history and reasons for public involvement in decision-making, including environmental related decision-making in the 20th Century (Beierle and Cayford, 2002; Abaza *et al*., 2004; Petts and Leach, 2000; Webler and Renn, 1995). Based on their perspectives, subsequently an outline is provided on the history and rationale of public involvement in EIA (following Posas and Fischer, 2008).

### 9.4.1 Public participation, an evolving aspect of participatory democracy

Webler and Renn (1995) raised several points on the historical development of public participation in environmental decision-making. They suggested that:

- In countries of Anglo-Saxon tradition, public participation is synonymous with participatory democracy, and that people in such countries "*associate the very concept of democracy with the activity of participating in governmental decision-making*" (Webler and Renn, 1995, p17);
- Public participation has been a major topic of debate in the U.S. and all European countries since the beginning of the 19th Century; the early development of democracy in the aftermath of the French and American revolutions resulted in gradual integration of citizens in the political system, starting with voting;
- In addition to citizens fighting for equal rights in the political sphere, attention also turned to participation within the economic system (*i.e.* labour movements); and

- Although social movements and citizens' initiatives have been advocating for more direct influence in political decision-making since the 1920s, their efforts, with a few exceptions, were not effective until the ecological movements of the 1970s.

### 9.4.2 Expanding role for the public

Petts and Leach (2000) saw a convergence of different pressures for public participation, including the need to consider sustainable development, a falling trust in experts, public fears about risks to the environment and health, among others. They traced the roots of growing interest in public participation in various areas such as land use planning and regeneration, among others. In a development cooperation context, still other factors were identified as providing impetus for greater public participation. These include trends at the global political levels, policies in multi- and bi-lateral development organisations, and lessons learned from evaluations of projects and policies. Public involvement and consultation have been integral to EIA since 1970.

### 9.4.3 Three models of public decision-making

Beierle and Cayford (2002) wrote about the history of public participation from a U.S. perspective, which simultaneously mirrored global trends in many democratic societies. They charted a historical progression from managerialism (late 1800s to 1950s) to pluralism (1960s to 1990s) to popular democracy (1990s to present):

- Managerialism rested on the managerial model in which government administrators were entrusted with identifying and pursuing the common good, particularly in the form of social welfare maximisation *i.e.* the greatest good for the greatest number for the longest time;
- Pluralism began to replace managerialism when government administrators stopped being seen as objective decision makers in the public interest, but rather as arbiters among different interests within the public. Unlike welfare maximisation, pluralism does

not recognise an objective sense of the 'public good' but rather a "contingent public good to be debated and arrived at by negotiation among interests"; and

- The third stage resting on popular democratic theory stresses the importance of the act of participation, *"not only in influencing decisions but in strengthening civic capacity and social capital" (Beierle and Cayford, 2002, p.4).*

It is important that while the three perspectives reflect a time sequence, they continue to coexist and compete in contemporary debates regarding how environmental policy should be made and implemented. The strength of commitment to each of the three models varies by country and relates to cultural traits, agency organisational culture, and sector, *e.g.* transport planning tends to be driven by a more managerial approach while spatial or land use planning is influenced by pluralism and popular democracy.

Beierle and Cayford (2002) gave justifications for public involvement in each of the above mentioned three perspectives. They suggested that during the managerial era, the purpose of public participation was to ensure that government agencies were acting in the public interest. In pluralism and popular democracy, on the other hand, public participation is seen as necessary for establishing what the public interest actually is, *i.e.* the purpose of public participation is not merely to provide accountability but help develop the substance of policy. This characterisation of the changing role of public participation is reflected in many literatures, including that on EIA. It is in line with the recent emphasis in the EIA literature on social learning (Sinclair and Diduck 2001; Jha Thakur *et al.*, 2009; Fischer *et al.*, 2009). This means that in addition to increasing the quality of decisions (Beierle, 2002), it is clear that public participation rationales are now going even one step further with the expectations around social learning, *i.e.* mutual learning and transformation of values.

### 9.4.4 Importance of public participation in public decision-making

Heiland (2005) provided for a selective summary of rationales for public participation in the EIA process. Among them is 'enhancing the transparency of decision-making processes' and 'enhancing the completeness, validity and reliability of the relevant information'. The belief that the public and their participation is important and helps create better decisions is not just a theoretical idea. An analysis led by Beierle (2002) of over 239 U.S. published case studies of stakeholder involvement in environmental public decision-making indicated that the quality of decisions tends to improve with stakeholder involvement.

Important issues not raised in Heiland's table are mentioned by Wilkins (2003) in relation to the subjective elements of EIA. Specifically, he argued that EIA opens opportunities for social learning and development of less individualistic and more communitarian values. EIA, he says, provides

> *"a temporary community forum at which various perspectives and viewpoints can be considered in the decision-making process and in discourse, likely resulting in stronger community values and the possibility that longer-term environmental discourse can be fostered and generated in other fora" (Wilkins 2003, p.410).*

He sees EIA's strengths in its qualities of public participation, transparency, promotion of discourse, social learning, and transformation of values. These latter kinds of ideas are still young in EIA, but are becoming increasingly popular (Jha-Thakur *et al.*, 2009).

## 9.5 (International) legislation pertaining to EIA and public decision-making

Legislative changes parallel the historical development of public participation. Francis-Nishima (2003) traced the development of

international instruments that govern information access and participation in environmental decision-making, starting from the 1948 Universal Declaration of Human Rights, elaborated by the UN General Assembly. She cited over two dozen instruments, but particularly singled out the 1992 Earth Summit's Rio Declaration on Environment and Development as the most historically important. Its international acceptance - 178 nations adopted it at the Earth Summit - and particularly its Principle 10[1] on participation in environmental matters are of particular importance. They underpin numerous subsequent regional initiatives and national laws, as well as international institution procedures and approaches to public participation.

Agenda 21, a comprehensive action plan to be taken globally, nationally and locally, was also launched at the Rio Summit. It

> *"relied heavily on the role of civil society in developing, implementing, and enforcing environmental laws and policies … [and it also emphasised] access to information, public participation, and access to justice (Francis-Nishima, 2003, p.10)."*

The same author also reviewed regional agreements in addition to international ones. The UNECE Aarhus Convention is the only regional agreement of its kind. This is further elaborated on below.

The United Nations Economic Commission for Europe (UNECE) *Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental* Matters was adopted on June 25th, 1998, in Aarhus, Denmark at the Fourth Ministerial Conference in the 'Environment for Europe' process. The Aarhus Convention, as it is more

commonly referred to, entered into force on October 30th, 2001. As of April 22nd, 2013, there were 47 parties to the convention and it has been ratified by nearly all European countries (UNECE, 2007).

Although regionally focused, the Aarhus Convention has global significance. The former UN Secretary General, Kofi Annan, called it an "impressive" elaboration of Principle 10 of the Rio Declaration and "*the most ambitious venture in the area of environmental democracy so far undertaken under the auspices of the United Nations*" (UNECE website). The Aarhus Convention's significant features include:

● linking environmental rights and human rights and government accountability and environmental protection;

● establishing that sustainable development can be achieved only through the involvement of all stakeholders; and

● granting rights to the public and imposing obligations on parties and public authorities regarding information access, public participation and access to justice.

These features make the Aarhus Convention more than an environmental agreement, but also a Convention about government accountability, transparency and responsiveness. Both, EIA and SEA are covered in the Convention; EIA in *Article 6: Public participation in decisions on specific activities*; and SEA in *Article 7: Public participation concerning plans, programmes, and policies relating to the environment*. Several principles are common to both EIA and SEA sections, including reasonable time-frames for participation, early public participation, and that decisions need to take due account of the outcome of the public participation. It is noteworthy that the Convention specifies that "*the public which may participate shall be identified by the relevant public authority*"

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1 Principle 10 states: "Environmental issues are best handled with participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided (UNCED, 1992)."

| Table 9.2: Participation methods and their allocation to three categories | |
|---|---|
| Information methods and techniques | • Making a project or PPP related map or plan publicly accessible<br>• Information on a project or PPP via flyers, leaflets, newspapers, radio, television and/or internet<br>• Information on and presentation of a project or PPP through models, exhibitions and/or public displays |
| Consultation methods and techniques | • Possibility to comment on documents related to a project or PPP<br>• Hearings, meetings and/or workshops on a project or PPP with discussion<br>• Use of a qualified public (e.g. NGOs, experts) representing the general public |
| More active and mutual participation methods | • Mediation<br>• Mediated modelling<br>• Consensus conference<br>• Citizens' jury; and<br>• Roundtable. |

*Source: Adapted from Aschemann, 2004*

(UNECE 2007; see also Chapter 15 of this handbook), thus recognising the diversity of publics from which an appropriate 'public' will need to be chosen and involved.

## 9.6    Participation and consultation techniques and their suitability for different situations

There are many different methods and techniques for public participation. Aschemann (2004) allocated methods to the three categories "information", "consultation" and "more active measures/methods". These are shown in Table 9.2.

Westman (1985) provided for a comprehensive overview of public involvement methods. He also looked at the effectiveness of these methods with regards to the overall objective of a particular participation exercise. This is shown in Table 9.3.

Techniques that may be used when involving the public include *e.g.* the use of Geographic Information Systems (GIS) along with other information and communication technology (ICT) tools (**See** *e.g.* Fischer, Kidd and Thakur, 2008). Furthermore, the Delphi method may be used, which is a structured communication technique,

originally developed as a systematic, interactive forecasting method which relies on a panel of experts. In a particular EIA, methods and techniques should be chosen, depending on the spatial and administrative level of the project. For major projects in small municipalities, the whole population could be invited to attend workshops or hearings. In a large municipality, this may not be possible. The use of the internet should be seen as an additional measure for participation, however, a public participation exercise should not entirely depend on it as, for example, elderly people and other (disadvantaged) groups may not have access to it. Any confidentiality issues should be disclosed in advance.

There is no 'cookbook' approach for selecting the most suitable and appropriate participation methods and techniques. Rather, tailor-made solutions have to be found that should take into account the subject of EIA, considering its contents and level of detail as well as its stage in the decision-making process. Moreover, that different methods and techniques require different amounts of time and money needs to be taken into account, *e.g.* to set up an internet homepage is normally cheap, while a TV spot tends to be

very expensive. The maintenance and update of an internet homepage could be time consuming, while the public display of a map could be done quickly. Additionally, the environmental and demographic profile of a country, its environmental problems and its stage of economic, social and technological development should be kept in mind when choosing appropriate (public) participation methods and techniques.

The International Association of Impact Assessment (IAIA) offers a concise background statement on various dimensions of public participation in EIA (Andre, 2006), and the World Bank (2007) and Canadian International Development Agency (CIDA, 2007) each offer a collection of resources pertinent to public participation in EIA processes. IAP2 (2004) summarises key points and what can go right/wrong in a wide range of techniques; it sorts them by the nature of participation and number of participants. Rauschmayer and Risse (2005) undertook an analysis of certain techniques, and the OECD DAC (2006), CIDA (2007) and the World Bank (2007) discuss participation techniques in a development cooperation context. Useful sources of guidance for designing and undertaking a participation process in the context of EIA and public environmental decision-making have been developed by Petts and Leach (2000), Beierle and Cayford (2002), and the World Bank (1999).

Several authors have made suggestions on how to select the appropriate level of public

| Table 9.3: methods of public participation and their effectiveness | | | | |
|---|---|---|---|---|
| | **Provide information** | **Cater for special interests** | **Two way communication** | **Impact on decision-making** |
| Explanatory meeting, slide/film presentation | √ | ½ | ½ | - |
| Presentation to small groups | √ | √ | √ | ½ |
| Public displays, exhibit, models | √ | - | - | - |
| Press release / legal notice | ½ | - | - | - |
| Written comment | - | ½ | ½ | ½ |
| Poll | ½ | - | √ | √ |
| Field office | √ | √ | ½ | - |
| Site visit | √ | √ | - | - |
| Advisory committee, task force, | ½ | ½ | √ | √ |
| Working groups of key actors | √ | ½ | √ | √ |
| Citizen review board | ½ | ½ | √ | √ |
| Public enquiry | √ | ½ | ½ | √/- |
| Litigation | ½ | - | ½ | √/- |
| Demonstration, protest, riots | - | - | ½ | √/- |

√ = yes        ½ = partly        - = no

*Source: adapted from Westman (1985)*

engagement in decision-making (Beierle and Cayford, 2002; Petts and Leach, 2000). Beierle and Cayford (2002) suggested that before setting up anything at all with regards to public participation, decision makers need to consider the following two commitments that go hand in hand with seeking participation (2003, p. 64):

1. committing to some degree of flexibility and open-mindedness regarding the nature of the process and its outcomes, as participants may want to redefine a problem or bring the focus on to other issues; and

2. recognising the legitimacy of public values and understanding that those values may lead to priorities and conclusions that agencies find undesirable or inconsistent with their perception of the public interest.

A third commitment might be to keep in mind that creative options may be possible, such as the famous case of siblings fighting over the last lemon, and then finding out one wanted to make lemonade and one a lemon cake using the rind, so their needs could both be met. A fourth commitment is to take the public contribution into account in decision-making and mention in reports how public concerns and issues were addressed or reasons why certain issues could not be addressed.

## 9.7    Public participation in Pakistan

Public participation or consultation in the form of public hearing is mandatory in Pakistan under section 12(3) of the Pakistan Environmental Protection Act (PEPA) 1997 and section 10 of IEE/EIA Regulations, 2000 during the EIA review process in Pakistan. A separate body of guidelines for public consultation has been prepared by the Pakistani Environmental Protection Agency (Pak-EPA) in the light of the World Bank's Participation Sourcebook, 1995. The guidelines suggest that project proponents should hold comprehensive discussions with the affected public and adequately incorporate their 'genuine' concerns in the project design and mitigation measures to avoid adverse effects.

### 9.7.1    Guidelines for public consultation

Public consultation and participation during EIA review is a legal requirement in Pakistan. This section provides an overview, including some of the propositions, considered important within the local context, of the guidelines for public consultation formulated by the Pak-EPA as a part of the Pakistan Environmental Assessment Package (GoP, 1997d).

Levels of public involvement:

Despite the title of guidelines as "public consultation", the difference among various levels of participation is highlighted for the sake of clarification, as follows:

 "***Informing:*** *one way flow of information from the proponent to the public;*

***Consulting:*** *two way flow of information between the proponent and the public, providing opportunities for the public to express views on the proposal; and*

***Participating****: proponent and the public involved in shared analysis, agenda setting and decision-making, through reaching consensus on the main elements*" (GoP, 1997d p.2).

For effective participation, it is also emphasised that

"*proponents should explain their proposals clearly to affected communities, actively listen to the communities' responses, and make prudent changes to the proposal to avoid or mitigate adverse impacts. Where proponents are able to go beyond this to "participation", they will achieve even greater benefits for themselves and for the stakeholders.*" (GoP, 1997d, p.3)

The Public or Stakeholders as suggested in the guidelines:

Composition of the public or stakeholders may vary from project to project and from country to

country. There are some universal as well as some context specific types of stakeholders. The following categories of stakeholders have been identified in the Pakistani guidelines:

**Local people:** Individuals or groups in the local community having indigenous knowledge;

**Other affected communities:** communities and minorities that may not be living near the project site but that are likely to be affected indirectly;

**Proponents:** proponents of the same and other projects situated around the project site and those who are likely to be affected indirectly;

**Government agencies and local councils:** concerned officials of concerned government departments or agencies including infrastructure/utility service providers and local councils *e.g.* Tehsil Municipal Administrations;

**Non-government organisations (NGOs):** representatives of local and international NGOs may or may not be working for environmental protection especially those who may not have a conflict of interest with the proponent or affectees;

**Influential people:** large landholders, heads of tribes or clans, members of Parliament, mayors and members of local councils; and

**Others:** anyone who can make a significant contribution, *e.g.* independent experts of relevant professions, academia, consultants, *etc.*

In some situations, it is important to consult with representatives of particular interest groups. In such situations, the concerned group should be allowed to choose their representatives. It must also be ensured that "*fair and balanced representation of views is sought and that the views of the poor or minority groups are not overwhelmed by those of the more articulate, influential or wealthy*" (GoP, 1997d, p.5).

Principles of effective public involvement: Some basic principles have been suggested which may help in achieving a positive outcome and enhancing the efficacy of public involvement exercise (Box 9.2).

Levels and techniques of public involvement: The guidelines present a comparative view of various communication levels, techniques of public involvement and the objective of public consultation which every technique can possibly achieve. This follows closely best practice principles as described in the international professional literature (See: Table 9.3). It is obvious from the table that public hearing, as required and practiced during EIA review in Pakistan, is a comparatively weak technique of public consultation or participation. Other than fulfilling the legal requirement, it is suggested that the proponents and EPA officials should try

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**Box 9.2 Principles of effective public involvement**

- Provide sufficient and relevant information understandable to non-experts.

- Allow sufficient time for the stakeholders to comprehend the provided information and consider its possible implications.

- Allow sufficient time for stakeholders to raise their concerns.

- Respond to each and every issue raised by the stakeholders for the sake of building trust in the consultation process.

- Select the timing and venue of consultation which are most suitable to the majority of the stakeholders and provide them with an egalitarian environment to express their views.

*Source: Adapted from GoP, 1997d*

different techniques of communication and public involvement which suit specific objectives of the proposed project and the local or cultural context as well as the stakeholders' level of literacy.

It has been suggested to involve the stakeholders during the following stages of the EIA process:

- Scoping;
- Assessing impacts;
- Mitigation and impact management;
- Reviewing and decision-making; and
- Monitoring and auditing.

The guidelines also advocate participation of women and the poor by doing gender analysis, identifying and addressing cultural and educational constraints and using local language(s) as well as visual methods of communication/consultation. In these respects, local and international good practice examples have also been cited. All of the above mentioned aspects of public consultation, as suggested in the Pak-EPAs guidelines, are comparable with those suggested in other developing as well as developed countries. However, many deficiencies can be found in the actual practice of public consultation, which may possibly be overcome by taking certain measures (**See**: Nadeem and Fischer, 2011).

### 9.7.2    Practical experiences

While in more developed EIA systems, public participation is obligatory during scoping (Wood, 1999), in Pakistan the proponent does not legally need to involve the concerned public during EIA preparation. Some proponents, particularly of foreign-funded public sector projects, however, do consult affectees, even if it is mainly done for the purpose of collecting socio-economic baseline data and occasionally for obtaining their views on a project.

Stakeholders are given 30 days, following a notice published in two national daily newspapers, for submitting written comments before the public hearing. The venue for a public hearing is normally a high class hotel in the city or office of the concerned EPA or public sector

proponent which are often inaccessible by the directly affected indigenous people who are living in remote areas (Nadeem and Hameed, 2006c). In addition, stakeholders are not informed about how their concerns have been incorporated into the EIA report and final decision.

Similar inadequacies pertaining to public participation in EIA have also been reported for some other developing countries, for instance, India, Bangladesh, Sri Lanka, Thailand, Indonesia and Malaysia (Paliwal, 2006; Momtaz, 2002; Zubair, 2001; Boyle, 1998). In spite of all the odds, some instances of environmental activism do exist in Pakistan. These include the cases discussed by Nadeem (2010), including the Karachi Elevated Expressway Project, Lahore Canal Bank Road Remodelling Project, and the Lahore Ring Road Project. He states that awareness about the environmental impacts of mega projects is rising particularly among those living in the urban areas of Pakistan.

This awareness is leading to active participation in the public hearings and follow-up of the outcome of EIA related decisions. According to a news report, the alignment, as in the approved EIA report, of the Karachi Elevated Expressway Project was withdrawn by the proponent,.City District Government, Karachi, due to legal and financial constraints in the land acquisition. Instead, the route alignment suggested by the stakeholders during public hearing was being pursued (Daily Times, 2007). Similarly, some of the environmental NGOs and stakeholders of the Lahore Canal Bank Road Remodelling Project filed a petition in the Lahore High Court against the proposed project and issuance of environmental approval by the Punjab EPA. Later on, an appeal was filed in the Supreme Court of Pakistan. The Court after various hearings and upon the recommendations of a mediation committee, (set up by the Court), directed the Punjab government and the Environment Protection Agency (EPA) "*to ensure that minimum damage is caused to the greenbelt and every tree cut is replaced by four trees of the height of 6/7*

*feet, and this replacement when commenced and completed should be notified through press releases for information of general public and the copies of that should be sent to the Registrar of the apex court "* (Sigamony, 2011).

Likewise, as a result of protest by the affectees, a section of Lahore Ring Road Project, proposed to traverse through Gulshan-e-Ravi Housing Scheme, had been withdrawn. The proponent department, Communication and Works Department of the Government of Punjab, had asked its consultants to design the said section through new route alignment avoiding Gulshan-e-Ravi (The News, 2006). Keeping in view the above scenario, it can be stated that although the actual practice of EIA has yet to be evolved into substantial public participation, still there are

some examples showing that public involvement in EIA is leading to project changes.

## 9.8    Practical element:

Visit a public hearing or conduct a public participation mock exercise with the students,

and / or:

Review World Bank Safeguard policies (environmental assessment and disputed areas): http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTLAWJUSTICE/0,,contentMDK:22226433~menuPK:6256357~pagePK:148956~piPK:216618~theSitePK:445634,00.html

# 10 EIA baseline data collection, consideration of alternatives and mitigation

This chapter is divided into three sections. First, what baseline data need to be collected and reported on in EIA is explored. Secondly, the role of alternatives in EIA is elaborated upon and finally, the importance of avoidance, mitigation, as well as compensation measures is discussed. The main sources this chapter draws on include the Asian Development Bank (2003), European Commission (1999), Fischer *et al.* (2008; chapter 14 by Herberg: 143-150; and chapter 17 by Rajvanshi: 166-182), Department of Environmental Affairs and Tourism (2004a) and UN University (2006h).

## 10.1 What baseline data need to be collected and reported on in EIA

Baseline *data* need to allow for a description of a study area in terms of the existing environmental resources and the likely future state. This is the basis for assessing impacts of a planned development. In EIA, baseline *data* should not just be presented, but the method applied to gather information should be described, including what *data* sources are used and how. As much as possible, the baseline information should be presented in *e.g.* tables, figures and maps. According to the Asian Development Bank (2003), baseline environmental information in EIA should include the following:

(i) **Physical Resources** such as:.
- atmosphere (*e.g.* air quality and climate);
- topography and soils;
- surface water;
- groundwater; and
- geology / seismology

(ii) **Ecological Resources** such as:
- fisheries;
- aquatic biology;
- wildlife;
- forests;
- rare or endangered species;
- protected areas; and
- coastal resources;

(iii) **Economic Development** such as:
- industries;
- infrastructure facilities (*e.g.* water supply, sewerage, flood control);
- transportation (roads, harbours, airports, and navigation);
- land use (*e.g.* dedicated area uses);
- power sources and transmission; and
- agricultural development, mineral development, and tourism facilities.

(iv) **Social and Cultural Resources** such as:
- population and communities (*e.g.* numbers, locations, composition, employment);
- health facilities;
- education facilitie;s
- socio-economic conditions (*e.g.* community structure, family structure, social well-being);
- physical or cultural heritage;
- current use of lands and resources for traditional purposes by indigenous peoples; and
- structures / sites of historical, archaeological, paleontological, or architectural significance.

The scope and quantity of *data* collected will depend on the specific EIA situation. The better the understanding of the potential significant impacts, the more targeted the baseline *data* collection exercise can be. With regards to the type of *data* used, in EIA, existing *data* are normally used alongside *data* that are specifically generated for assessment. *Data* may be needed in all of the above mentioned categories (i) to (iv).

It is important that different skills and expertise are needed within an EIA team in order to be able to (a) collect the right *data* that are meaningful in a specific situation, and (b) make sense of the wide range of *data* and information collected in an EIA. Teams often include ecologists and biologists with different specialism, *e.g.* entomologists and botanists, geographers, landscape planners, as well as *e.g.* climatologists, toxicologists and engineers with specific knowledge, on *e.g.* noise, water or ground stability.

## 10.2   Role of alternatives in EIA

Alternatives serve a key purpose in EIA. They are needed in order to "*find the most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, and through reducing or avoiding potentially significant negative impacts*" (Department of Environmental Affairs and Tourism, 2004a, p.4). The consideration of alternatives in EIA needs to start as early as possible, *i.e.* during screening and scoping. However, despite their importance, frequently they are inadequately handled. This means that at times feasible alternatives are not being considered and unfeasible alternatives are being assessed in order to influence certain outcomes.

The consideration of realistic alternatives is important in order to ensure that the EIA is not reduced to simply defending a particular project proposal which a proponent may want. In this context, it is important for EIA to include an unbiased, proactive consideration of options for being able to determine the best possible course of action. The way in which alternatives are approached during the early phases of an EIA will often determine the subsequent unfolding of the whole EIA process.

An inadequate consideration of alternatives is, therefore, often an indication of a biased process and the dissatisfaction with EIA processes is frequently connected with this. As a consequence, the likelihood of controversy in EIA increases. On the other hand, the confidence of stakeholders will grow when alternatives are considered in an open and transparent manner and there is public acceptance of the assessed alternatives.

According to the Department of Environmental Affairs and Tourism (2004a, p.4) obstacles to the full consideration of alternatives include:
- "*Technological obstacles, where high costs of a particular technology may prevent it from being considered as a viable option, or the*

*lack of technological development may*
*preclude certain options from consideration;*

- *Resource availability obstacles, which may*
  *limit the range of alternatives in a particular*
  *context; and*

- *Political economy or intellectual obstacles, in*
  *which barriers may be imposed by groups or*
  *individuals, usually holding positions of*
  *economic or political power, who wish to*
  *advance a particular agenda*".

Alternatives provide a framework for subsequent decision-making (Glasson *et al*., 1999). Their importance therefore cannot be overestimated. Being clear about the impacts of relevant alternatives is the basis for sound decision-making. In this context, decision-makers and others involved in EIA need to be given tailor-made and adequate information so that the best possible alternative can be chosen. In this context, trade-offs between different factors should be made clear.

### 10.2.1 Types of alternatives that can be considered

Different types of alternatives usually exist in any project situation. However, not all of them are necessarily appropriate for consideration in a specific EIA. For example, certain policy options may not be available at the project level. Consideration therefore needs to be given to those that are appropriate and suitable. In this context, the Department of Environmental Affairs and Tourism (2004a) states that an important starting point is to consider the following aspects:

- Who is the proponent? (private or public sector);

- Who are the intended beneficiaries? (general public, select groups or individuals); and

- Where is the proposal to occur? (zoned land use, common property or private property).

There are discrete and incremental alternatives. The former are identified during screening and scoping, the early phases of an EIA. The latter can arise during EIA as a reaction to potential negative impacts that have been identified. They

**Box 10.1: Different types of alternatives that may be considered in EIA**

1. Activity alternatives;
2. Location alternatives;
3. Process alternatives;
4. Demand alternatives;
5. Scheduling alternatives;
6. Input alternatives;
7. Routing alternatives;
8. Site layout alternatives;
9. Scale alternatives; and
10. Design alternatives.

*Source: Following Department of Environmental Affairs and Tourism (2004a)*

are developed to reduce adverse impacts and to enhance associated benefits. Frequently, incremental alternatives are discussed when devising mitigation measures. They may also be included in the final project proposal.

According to the Department of Environmental Affairs and Tourism (2004a), ten types or categories of alternatives can be identified. These are summarised in Box 10.1 and are further described below.

An activity alternative would be an alternative to the proposed project, *i.e.* a different project. This could be the extension of a tram, rather than a new road, or an incinerator, rather than a new landfill site. In many instances, it may not be possible to use activity alternatives in EIA at the project level, due to *e.g.* specific legal requirements. They are often supposed to be considered at higher tiers of decision-making, *i.e.* at the level of policies or plans.

Location alternatives are frequently considered in project EIA. They may include an entirely different location for *e.g.* a new power plant or the location of a road bypass on the Eastern rather than the Western side of a town. There may be certain restrictions with regards to location alternatives, for example, if a certain patch of land is to be developed.

Process alternatives are those considered to achieve the same outcome or output. For example, a certain output of electricity may be achieved by different renewable or non-renewable means. The scope for considering specific process alternatives will depend on a particular situation. Similarly to activity alternatives, they may be considered at higher tiers, *e.g.* in an electricity policy.

In the same way, demand alternatives are often to be considered above the project level of decision-making. Taking the electricity example from above, a question arising would be if additional electricity is needed after all or if there are other ways for reducing the need for electricity. With regards to housing, this may include the consideration of low energy homes. Also, the need for waste treatment facilities can be reduced if less waste is being produced.

Scheduling alternatives are also known as sequencing or phasing alternatives. For example, activities that generate noise may be scheduled to only happen at certain times of the day. With regards to many airports, night time restrictions are often in place in order to protect local residents from noise.

Input alternatives are often particularly relevant for industrial development projects. For example, different combustion materials may be considered in the production of a product. Furthermore, different materials may be possible in a product, *e.g.* card board or plastic.

Routing alternatives can be said to overlap to some extent with locational alternatives. Routing alternatives are frequently considered for *e.g.* electricity transmission lines or new roads. They are often considered in connection with *e.g.* infrastructure corridors.

Site layout alternatives are design alternatives that can help to reduce negative impacts by changing the layout of *e.g.* a high rise building (local wind or shadow) or a factory so that *e.g.*

noisy activities do not happen next to a residential area, but on the opposite locational side of a proposed development.

Scale alternatives are about the size of a particular development. They may include the consideration of *e.g.* 50 rather than 100 housing or other units.

Finally, design alternatives can reduce negative visual or landscape impacts. Incinerators, for example, can be 'hidden' behind an interesting architectural design. A well-known example is an incinerator designed by the well-known architect Hundertwasser in the city of Vienne.

*The 'zero' or 'no action' alternative*
The 'zero-alternative' is also known as the 'no-action' alternative. This is an alternative which assumes that the activity does not go ahead; therefore implying a continuation of the status quo, *i.e.* no new development is happening. This is important in order to be able to judge how much better or how much worse the environmental situation would be in the absence of any development. There are cases in which the *zero alternatives* can be considered the only viable major alternative to a proposed development. However, this does not mean it is necessarily the best alternative from an environmental perspective. An example would be upgrades of existing industries where outdated and polluting technologies may be replaced, resulting in fewer harmful emissions into *e.g.* soils, water and air.

Many EIA experts believe the *zero alternative* should be considered in every EIA. The World Bank suggests that when evaluating the *zero alternative*, it is important to take into account the implications of foregoing the benefits of a proposed project (World Bank, 1996). Assessing the zero alternative means describing and evaluating the baseline and establishing the likely future state of the environment if no development is taking place.

### 10.2.2 Identification of suitable alternatives for use in EIA

There are different types of alternatives that may be considered in EIA. These have been described above. However, as already mentioned, not all alternatives are appropriate for assessment of a particular project. Possible alternatives should therefore be identified as early as possible in the preparation of a project (*e.g.* during the pre-feasibility stage). While some may already be identified during screening, the choice of the main alternatives should be achieved during scoping. In this context, the process of choosing alternatives should be well documented. It should be transparent how alternatives were identified and they should represent as wide a choice of options as possible. As discussed in chapter nine, stakeholders and potentially the general public should play an important role when identifying alternatives.

There are a number of key questions that should be asked when considering alternatives in EIA, including whether a certain alternative is "practicable", whether it is "feasible", "relevant", "reasonable" and "viable" (Department of Environmental Affairs and Tourism, 2004a). In order to be able to conduct a meaningful assessment, it may be necessary to focus on a few alternatives only, *i.e.* eliminating others. The whole process involved in developing and assessing alternatives should be well-documented and substantiated and explanations should be provided as to why certain alternatives are being considered and others not. Those alternatives included in EIA should be assessed thoroughly with regards to their significant environmental impacts. In this context, technical and financial aspects should also be taken into account.

A generic process for identifying and analysing alternatives in EIA was introduced by the Department of Environmental Affairs and Tourism (2004a). It starts with an establishment of project objectives. This is followed by an identification of alternative technologies. Having defined a range of possible technologies, resource requirements should be determined for each of them (World Bank, 1996). Alternatives should then be screened in the light of environmental objectives for a particular area. In this context, efforts and costs associated with potential data collection and assessment should be taken into account. Location suitability and social acceptability needs to be carefully considered at this point.

Having established a shortlist of alternative technologies, the next step is to find a range of possible alternative locations, which subsequently should also be screened, using the same criteria as above. Each chosen alternative then needs to be evaluated and assessed, taking a comparative perspective. Alternatives must be assessed and evaluated at a scale and level that allows for a comparison with the proposed project. The assessment should focus on the potential direct, indirect and cumulative impacts. When selecting a specific alternative, the criteria used to do so need to be explained. Rejected alternatives should also be described and the reasons for the rejection alternatives be given. Methods for comparing alternatives range from very simple descriptive and non-quantitative methods, through methods based on varying levels of quantification to a full quantitative comparison, in which all impacts are expressed in monetary terms (**See**: chapter 8).

## 10.3 The importance of avoidance, mitigation, as well as compensation measures

It is frequently difficult to reconcile new developments with environmental protection and nature conservation if conflicts have been detected, but the economic case is strong. Mitigation and compensation measures in EIA aim at preventing any significant negative impacts from happening. Overall, mitigation and compensation in EIA is supposed to (Rajvanshi, 2008):

- Support the development of measures to avoid, reduce, remedy or compensate significant adverse impacts of development proposals on environment and society;

- Enhance beneficial effects and lower costs for environmental protection and conservation of natural resources as an outcome of development where possible; and
- Foster better opportunities for business through positive outcomes for environmental conservation, sustainable livelihoods and human well-being.

Mitigation and compensation thus potentially enable better protection of environmental assets; encourage prudent use of natural resources and ecosystems, and so avoiding costly environmental damage. They are important and integral parts of EIA.

Rundcrantz and Skärbäck (2003) defined mitigation as something that 'limits or reduces the degree, extent, magnitude or duration of adverse impacts'. Furthermore, in the European Commission's guidance note on Article six of the Habitats Directive (European Commission, 2000), mitigation is defined as 'measures at minimising or even negating the negative impact of a plan or project, during or after its completion'.

Compensation is about implementing measures to replace lost or adversely impacted environmental values. Compensation measures should have functions similar to existing environmental values. In this context, Kuiper (1997) talked about compensation in terms of 'the creation of new values, which are equal to the lost values'. If the lost values are irreplaceable, compensation concerns the creation of values which are as similar as possible. Currently, the only country globally with area-wide formal requirements for environmental compensation in place that go beyond protected areas and zones is Germany, based on the Federal Environmental Impacts' Compensation Rule (*Eingriffsregelung*). Other countries with environmental compensation requirements for protected areas include the USA (no net loss of wetlands, see above), Canada, Austria and Switzerland (Peters *et al*., 2003). Compensation in EIA usually refers to biological functions. In case no adequate functional compensation can be found, many systems have compensation rules in place that allow for monetary compensation.

### 10.3.1 Mitigation and compensation hierarchy

Mitigation and compensation should be considered in a hierarchy, consisting of avoidance, minimisation, rectification, compensation and enhancement measures. This is shown in Figure 10.2.

Priority should be given to avoiding impacts at source, *e.g.* through the re-design of a project



**Figure 10.2: Hierarchy of mitigation measures**

| Priority | | |
|---|---|---|
| Highest | Avoid | Avoid the potential impact |
| | Minimize | Decrease the spatial/temporal scale of the impact during design, construction, etc. |
| | Rectify | Apply rehabilitation techniques after the impact has occurred |
| | Compensate | Offset the residual impact and compensate, as appropriate |
| Lowest | Enhance | Apply measures to create new benefits |
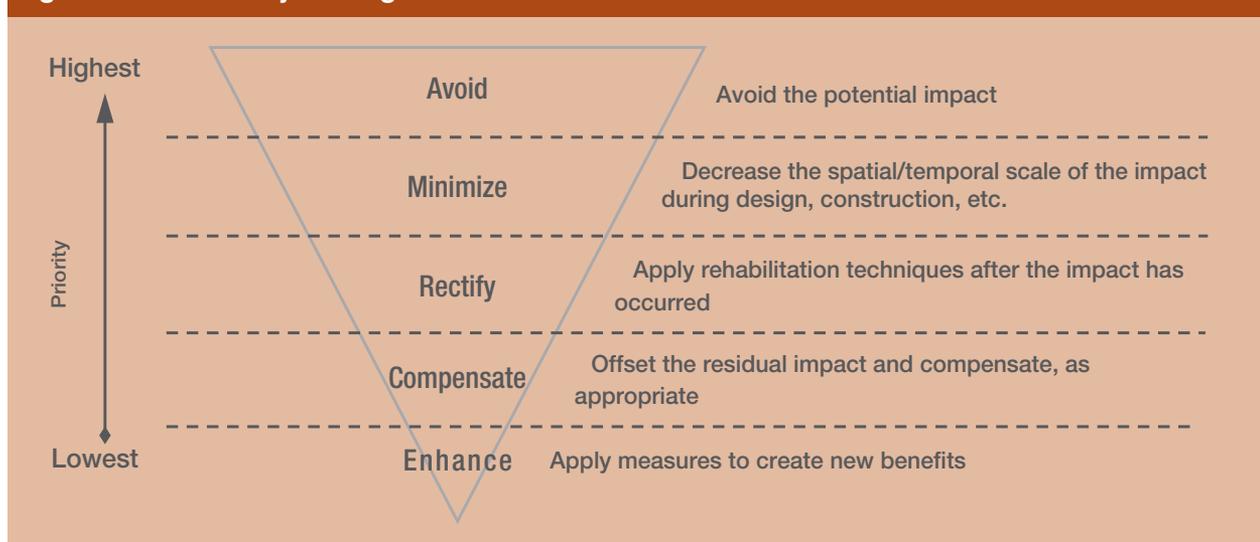
*Source: Rajvanshi (2008), modified from UNEP (2002)*

**Figure 10.3: Approaches for mitigation of impacts**



**Mitigation by avoidance**
Measures considering siting, design, process, technology, route alternatives and 'no go' options to avoid impacts.

Represents cheapest and most effective form of impact mitigation.

This approach offers the greatest benefit of avoiding impacts early in the planning cycle.

**Mitigation by reduction**
Measures attempting to reduce impact or to limit the exposure of receptors to impacts.

Applicable only in the progressive phase of the development project.

This approach aims at limiting the severity of impacts and not avoiding them altogether.

**Mitigation by remedy**
Measures undertaken to restore the environment to its previous condition or to a new equilibrium.

Applicable only towards the end phase of project implementation.

This 'end of pipe' restorative approach helps improve adverse conditions created by the proposed development.

**Residual impacts**

**Compensation**
Represents measures to achieve no net loss.

Represents on-site or off site measures considered early in the planning process and also alongside the development to offset residual impacts.

This approach opens a window of opportunity for negotiations between developers and decision-makers.

**Enhancement**
Represents measures to achieve net positive gain.

Applied in parallel with other compensation measures to encourage opportunities to limit the scope and scale of impacts and on improving environmental features.

This approach may result in a win-win situation and improve prospects for project acceptability.

*Source: Rajvanshi (2008, p.168)*

proposal or by changing the timing and location of activities. In this context, the precautionary principle should be applied, in particular in situations where the level of uncertainty of a project is high. If avoiding significant negative impacts is not possible, they should be reduced. If significant negative environmental impacts still remain, compensation may be necessary. However, this should only be applied if all other measures from Figure 10.2 have been considered. Figure 10.3 explains the different mitigation measures introduced in Figure 10.2 further, referring to 'approaches for mitigation of impacts' (following Rajvanshi, 2008). Subsequently, measures to avoid and minimize impacts are discussed further before remedial action is considered.

*10.3.2   Avoiding environmental impacts*
There are various possibilities to avoid environmental impacts. These include the consideration of alternatives, sensitive design, environmentally sustainable technology, development restrictions in sensitive areas, avoidance of certain key areas, adopting the 'precautionary approach', and finally, refraining from certain action altogether.

Identification of alternatives:
The identification of least impacting alternatives is at the heart of any EIA. A range of possible impacts were introduced above. A specific alternative can lead to avoiding impacts on sensitive environments, such as human settlements, biodiversity rich areas, habitats of endangered species, archaeological and cultural sites of proposed projects.

Sensitive design:
Adopting environmentally sensitive design of development projects can help to avoid many

impacts. 'Nature engineering' concepts have been discussed by a range of authors (Canters *et al.*, 1995; Spellerberg, 1998; Forman and Sperling, 2003) and are being implemented in practice in many countries. This can include *e.g.* road underpasses and bridges for animals or fish ladders on dams. Artificial nests also fall into this category.

Environmentally sustainable construction and technology:
Environmentally sustainable construction and technology for controlling impacts and making good environmental choices are also important. Environmentally sustainable technology can be applied during construction, post construction and in progressive phases of a project.

Development restrictions in sensitive areas:
In many countries, there are restrictions on locating projects in specific areas. In the UK, the 'Green Belt' has protected open space around major conurbations, keeping development and sprawl in around metropolitan areas to a minimum. The same applies to the Dutch 'Green Heart', an area with development restrictions between Amsterdam, the Hague, Rotterdam and

Utrecht. In Germany, the landscape planning system identifies, in an area wide manner, sites suitable for defined developments and sites with development restrictions (Hanusch and Fischer, 2008). Development controls are being increasingly enforced in other countries.

Avoiding development in certain areas altogether:
An effective way for avoiding negative environmental impacts is to avoid development in certain areas altogether. This may include, for example, estuaries, salt marshes, wetlands, shore lines and specific sensitive habitats such as breeding grounds, rearing areas, over wintering sites and migration routes. There is an emerging consensus on 'no development' zones (Box 10.2), based on guidelines of various international bodies (WWF, 2002; EBI, 2004; IFC, 2004). Some institutions have adopted a no development zones approach. These include *e.g.* the US Overseas Private Investment Corporation, a bilateral finance agency, which categorically prohibits projects in or impacting IUCN I-IV protected areas, World Heritage Sites, and projects that involve conversion or degradation of critical forest areas or related critical natural habitats. Also, the Bank of America will not

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**Box 10.2: Criteria for recognising high conservation value sites as 'No-Development' zones**

- Protected areas, core areas of biosphere reserves and Ramsar sites not included under IUCN category I-IV of Protected Areas.

- Proposed protected areas in priority conservation areas.

- Sites that maintain conditions vital for the viability of protected areas that support 'jewels'.

- Centres of plant diversity.

- Areas officially proposed for protection based on local and national priorities.

- Area of known high conservation value, these may include sites of degree of endemism, rarity, vulnerability, representativeness and ecological integrity.

- Areas where there is a lack of knowledge of biodiversity.

- Areas where operations will reduce populations of any recognised critically endangered or endangered species, or significantly reduce the ecological services provided by an ecosystem.

- Areas recognised as protected by traditional local communities.

- Critical fish breeding grounds.

- Areas where there is a serious risk of soil, watershed, pollution, and knock-on effects such as land invasion.

*Source: Rajvanshi (2008, p.171)*

finance projects that include resource extraction from high conservation value forests, primary tropical moist forests, and primary forests in temperate or boreal forest regions (IUCN, 2005).

Timing of activities:
Many countries have regulations in place with regards to scheduling certain activities as to take place in defined times only. This is done in order to avoid overlaps with *e.g.* flowering and seeding, nesting or breeding seasons.

Adopting the 'precautionary approach':
The precautionary approach means preventive decisions are to be made in the face of uncertainty in order to protect the environment. Probably the best known document putting forward the Precautionary Principle internationally is the Rio Declaration from the 1992 United Nations Conference on Environment and Development (Agenda 21). It promotes action to avert risks of serious or irreversible harm to the environment (Cooney and Dickson, 2006). The Precautionary Principle has been integrated into numerous international conventions and agreements. One of the first countries to have included the precautionary principle into environmental legislation is Germany, where the idea can be traced back to the first draft of the clean air legislation in 1970 (Wurzel, 2006).

Refraining from certain developments:
Refraining from certain developments altogether means avoiding particular impact-causing actions. An important question to ask is thus whether a particular development is needed at all, even though in practice this may often be difficult.

### 10.3.3 Minimising environmental impacts
Minimising impacts of development is the next stage on the EA mitigation hierarchy ladder. There are a number of measures aimed at limiting the degree, extent, magnitude, and duration of adverse impacts, including control measures for preventing pollution, minimisation of physical disturbances, 'good housekeeping', the

installation of physical barriers, creative land management, technological fixes, promotion of compatibility, and if possible, translocation of affected species.

Control measures for preventing pollution:
Numerous control measures can be used for preventing air, water and other environmental pollution. Innovative design and technological measures can also reduce the magnitude and severity of project related impacts. Examples include the installation of well-designed chimneys for regulating emissions and sound-proofing in order to reduce noise coming in. Furthermore, effluents can be filtered before discharge into water bodies.

Minimisation of physical disturbances:
Responsible construction practices can significantly reduce environmental impacts. This applies to other activities, as well, *e.g.* dredging and mineral extraction. Exploration activities should always use non-intrusive techniques, including remote sensing and global positioning systems. The use of existing infrastructures should normally be given preference and the use of *e.g.* helicopters to transport equipment into sensitive areas is also a way to minimize environmental impacts (White *et al.,* 1996).

Good housekeeping:
Good housekeeping, use of energy-saving appliances and cleaner production technologies are being universally promoted. These can reduce environmental pollution and emission of *e.g.* greenhouse gases.

Installation of physical barriers:
Installing physical barriers and developing landscape buffers to reduce visual impacts of infrastructures and buildings are now undertaken in many countries. They can be very effective in reducing visual and noise impacts.

Creative land management:
Creative land management, landscaping and development of land-use alternatives can reduce

physical impacts, both during construction and operation. It can also improve post project aesthetics.

Technological measures:
Technological measures can be very effective in minimizing impacts. Examples include bio-filtration, energy conservation through more efficient engines and electric vehicles. They also include renewable energy technologies, such as solar panels and wind turbines.

Promotion of compatibilities:
Promoting compatibilities between different uses can minimise impacts. Measures can range from keeping high density residential developments separate from major motorways to promoting eco-parks. These are industrial zones where businesses co-operate with each other. This may mean one company using the waste produced by another to produce energy for the entire park.

Translocation of certain species:
Translocation of plants and animals and possibly habitats from sites of proposed development can be an effective way to minimize impacts. Relocation of animals in certain development situations is a legal requirement in many countries. This may help reducing the decline of native species. Policies in the UK (JNCC, 2003a and b) propose translocation of habitats as a means to reducing the impacts of damaging developments. They suggest moving affected wildlife habitats to new "safe" locations. Translocation and relocation measures should, however, normally be applied only as the last resort for mitigating impacts of a development.

### 10.3.4 Remedial action – restoration and compensation

Remedial measures include the repair, reinstatement, restoration or rehabilitation of an affected environment. The goal is to either maintain or recreate pre-development environmental characteristics of a site. Furthermore, as a last resort for residual unavoidable harm, compensating for a lost

environmental quality may also be considered. Compensation should aim at restoring an environmental value either on-site or next to the site. If that's not possible, compensation action further away may also be a possibility. Off-site compensation may mean *e.g.* creating a new habitat elsewhere by *e.g.* strengthening conservation of species threatened by a proposed development. Finally, 'in-kind' compensation may be necessary when both, on-site and off-site compensation are not possible. In-kind compensation involves use of *e.g.* trading instruments to offset impacts and to support the environmental sustainability of development proposals. Carbon trading and wetland and conservation banking schemes (see the US Endangered Species Act and the Clean Water Act) are perhaps the best examples of trading instruments. The state of California pioneered the mitigation banking approach in 1990. Since then, similar trading schemes in the US have created 72,000 ha of wetland and endangered species habitat in over 250 approved 'banks'. Habitat 'credits' are sold in more than 45 states in the USA (Wilkinson and Kennedy, 2002; Fox and Nino-Murcia, 2005). The bio-banking scheme of Australia (NSW) and the area pools (*Flächenpools*) in Germany (in the context of the *Federal Environmental Impacts Intervention Rule)* are founded on similar principles. While there is also the possibility of out-of-kind monetary compensation, as a general rule, this should not normally be considered, as this does not directly benefit the environment.

In practice, restoration may mean, for example, reforestation, not just planting saplings, but also managing growth, restocking reservoirs with fish or reclaiming or stabilizing abandoned sites. The following are some of the best recognised and most frequently employed remedial measures. It is important that any remedial or compensation action also takes possible impacts into account, carefully considering trade-offs and long-term effectiveness. Compensation measures should aim at enhancing environmental quality and at achieving no net-loss of environmental services.

**Figure 10.4: Compensation measures for achieving no net less or positive enhancement**
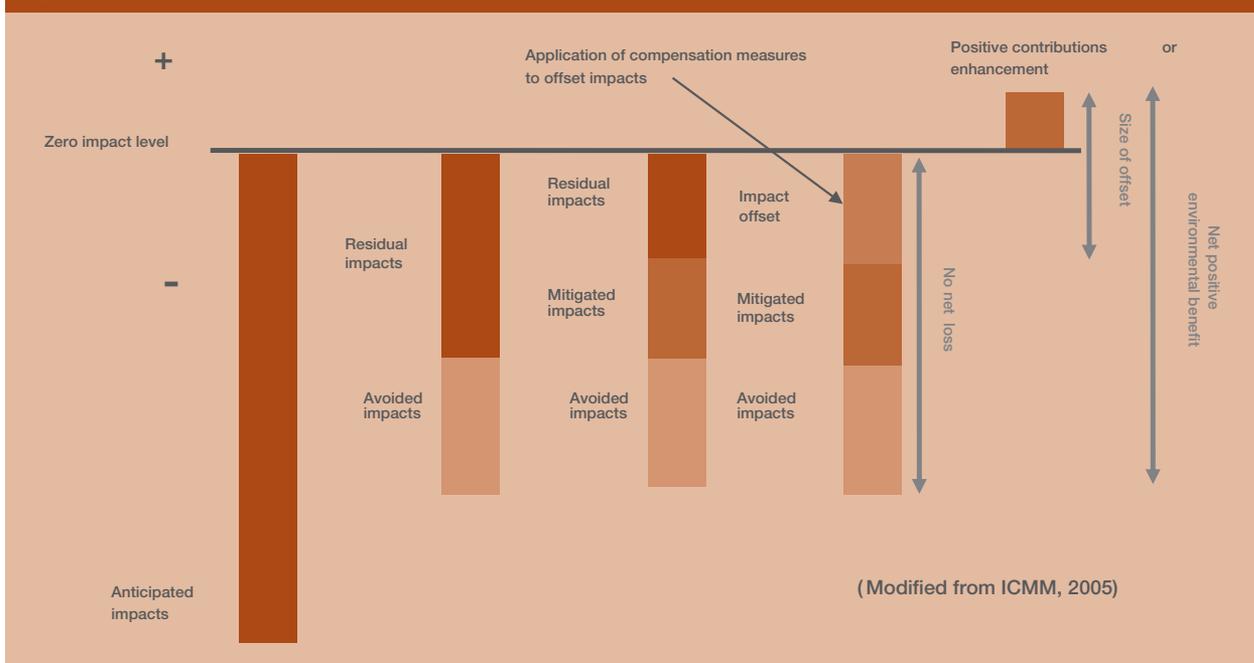


*Source: Rajvanshi, 2008, p176*

Figure 10.4 indicates what compensation should aim to achieve with regards to counterbalancing a significant negative impact.

### 10.3.5  Criteria for successful implementation of mitigation and ingredients for good practice approaches

Good mitigation practice has been described as contributing to the resolution of environmental and social problems and optimising the benefits from a particular development. While mitigation has been criticised as ultimately enabling development without securing safeguards, there is evidence that at least some good practice is emerging (EBI, 2007; Patricia and Ernst, 2007).

Several factors determine the reliability, practicality and successful implementation of mitigation measures. Tomlinson (1997) warned that mitigation 'promises' made in EIAs may not be delivered unless they are built into the consent procedures. Effective implementation of mitigation measures may involve the preparation of a written plan including a schedule of agreed actions. With regards to EIA, this plan is often referred to as an 'Environmental Management Plan (EMP)'. Preparation of EMPs is required by *e.g.* the World Bank (World Bank, 1999) and Western Australia (Wood, 2003), and in the EIA systems of many developing countries.

Good EMPs should focus on the mitigation measures put forward in EIA. .In this context, technical details, financial allocations, and time schedules should be clarified. Table 10.1 shows what an EMP for an EIA may entail.

**Table 10.1: Format for summarising mitigation outcome for developing EMP**

| Project activities | Type of impact | Potential impacts | Where the impact is likely to happen | When the impact is likely to occur | Magnitude of impacts | Mitigation measures | Anticipated costs | Institutional responsibility | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Implementation | Supervision |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

*Source: Rajvanshi, 2008, p179*

## 10.4 Practical element

Students should develop suitable alternatives for EIA in different sectors *e.g.* transport, energy, resource extraction and waste, and consider suitable methods or techniques for assessing them.

# 11 EIA reporting and EIA report quality review

This chapter is divided into five sections. First, what an EIA report is, is explained. Secondly, the content and focus of an EIA report is explored. This is followed by a section describing the importance of EIA report quality review. The role of EIA report quality review packages is then explained and an example package is introduced. Finally, EIA report quality review in Pakistan is explored. The main sources this chapter draws on include: European Commission (2001), Fischer et al (2008), Nadeem and Hameed (2008), and UN University (2006g).

## 11.1 The EIA Report

Report preparation is a key technical stage of the EA process. The EA report represents an important basis for discussing the acceptability of proposed projects. Furthermore, it helps to identify possible amendments and mitigation measures.

The EIA report is the main document produced in the EIA process. Different systems refer to it with different terms, for example, Environmental Impact Statement (EIS). It can be one document of a few pages only or it can consist of several volumes. Its objective is to provide some detailed information on the assessed activity for a range of individuals and institutions, including decision- makers, stakeholders and the general public. Its main purpose is to describe the current state of the environment as well as to present an evaluation of the likely or significant impacts. It should also include suggestions for mitigation and monitoring. The EIA report should comprise the identification of significant environmental impacts and how to avoid, mitigate or compensate for them. The EIA report is also the basis for a transparent public participation process. In this context, the report should be subjected to public review, possibly resulting in suggestions on how to amend the proposed project or the EIA itself.

The EIA report is normally highly demanding for those preparing and those reading it. Therefore, in many systems there are certain rules in place with regards to *e.g.* project proponents commissioning listed professionals or consultancies. Generally speaking, an EIA report greatly benefits from the involvement of local experts. In order to be a document that also lay people can understand, the report should be written in a clear and simple manner. In

this context, ideally, the EA report should contain easy-to-understand pictures and visualisations. Normally, it is also expected to include a non-technical summary. Furthermore, it frequently contains specific studies on important issues that are looked at by experts, *e.g.* ecologists or hydrologists. Those preparing an EIA report need to closely cooperate with responsible authorities and the affected public. Guiding principles of report preparation are illustrated in Box 11.1.

## 11.2   Focus of an EIA report

In an EIA, it is important to understand, and wherever possible, to quantify the environmental impacts of investment activities. Key questions to be addressed during impact prediction include:

- What impacts are likely to be caused by a development proposal?
- What objectives are the basis for evaluating the significance of environmental impacts?
- What indicators should be used in order to be able to describe and understand environmental impacts and how can these be quantified?
- What is the significance of environmental impacts of the proposed development and its alternatives and how can they be avoided, mitigated or compensated?

An EIA report consists of several distinct sections. These can be summarised in terms of five main tasks it is supposed to fulfil, including:

- Description of a project and its alternatives;
- Description of the baseline environment;
- Prediction of positive and negative environmental impacts;
- Assessment of cumulative effects;
- Evaluation of impact significance; and
- Identification of mitigation measures.

These sections are subsequently described in further detail.

### 11.2.1   Description of a project and its alternatives

The proposed project should be described with an explanation as to what it means in practice, while focusing on the information that is important for EIA. This description should clearly state the underlying objectives. Alternatives need to be meaningful and realistic. Furthermore, an environmentally friendly option and the 'do nothing option' should be included.

### 11.2.2   Description of the baseline environment

In an EIA report, the baseline environment needs to be described, including *e.g.* human health, *fauna*, *flora*, soil, water, air, climatic factors, material assets, cultural heritage, as well as landscape. Other aspects may need to be included, depending on specific legal requirements. Characteristics need to be evaluated, establishing their environmental sensitivity. Existing environmental data from previous surveys, monitoring, environmental audits, environmental databases, land registers, GIS and other environmental management and planning instruments are often useful in this context. Other sources of information include *e.g.* spatial and other development plans, habitat and soil maps, climate, noise and emission registers. These need to be sufficiently detailed and up-to-date. Normally, other data are specifically generated for EIA. The description of the baseline environment should put special emphasis on existing environmental problems and constraints, as well as on ecologically important and sensitive areas.

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### Box 11.1: Guiding principles for EIA report preparation

- the content of the report should reflect the outcomes of the scoping stage;
- the focus should be on information relevant for EIA;
- the quality and relevance of information is more important than its quantity; and
- the forecasts need to be reliable, based on scientific principles that others can understand.

*Source: Belcakova, 2008; von Seht, 1999; Sadler, 1996*

### 11.2.3  Prediction of positive and negative environmental impacts

Positive as well as negative environmental impacts need to be predicted. These should include direct, indirect, synergistic, cumulative, ancillary, long-term, delayed, regional and global impacts (Belcakova and Finka, 2000). Generally speaking, predictions should be linked to key issues of the baseline environment.

Impacts can be determined qualitatively – and wherever and whenever possible – quantitatively. Certain impacts may be calculated, others be modelled or otherwise be predicted. Many impacts will not be recordable as quantitative data, but will only be described qualitatively. Appropriate methods will need to be identified at the scoping stage and might have to be reassessed later on in the EIA process. Environmental impacts may affect various media due to the complexity of causal chains and monocausal relationships will rather be the exception than the rule. Feedback mechanisms and synergisms will make the assessment more complex. In this context, it is important that environmental impacts depend on the characteristics of the receiving environment as well as the type of action giving rise to impacts.

### 11.2.4  Assessment of cumulative effects

The assessment of cumulative effects is an aspect of EIA that requires particular attention. A range of methods is available for this, from the more analytical matrices to planning oriented multi-criteria analysis. Sadler and Verheem (1996) put forward the following framework for analysing cumulative effects in EIA:

- Sources: The pattern and timing of activities that can cause or will potentially initiate environmental change;
- Effects: The syndrome of impacts and long term changes that occur in response to stress; and
- Processes: The ecological pathways, mechanisms and triggers that structure accumulation of effects.

### 11.2.5  Evaluation of impact significance

Evaluation of impact significance needs to be based on objectives, including *e.g.* environmental and sustainability objectives. These can be based on regulations, guidelines or on *e.g.* expert or public opinion. In order to evaluate impact significance, an appropriate method needs to be chosen. In this context, applying a pre-defined method makes EIA more transparent, reproducible and comparable.

Knowledge of the significance of impacts is essential for being able to make decisions on alternatives and mitigation measures. Most experts agree that when using evaluation methods and techniques, it should be avoided:

- to pretend a non-existing accuracy of the results; and
- to aggregate the evaluation results of various media or impacts into one single variable; this means information for the decision-maker will be lost in the process without pre-agreed methods on weighing and scaling.

### 11.2.6  Identification of mitigation measures

Modifications of the original proposal and mitigation measures that will improve the environmental friendliness of the proposed project, policy, plan or programme should be considered. This is a key function regarding environmental protection.

## 11.3  Pakistani guidelines for preparing environmental reports of specific sectors

These include guidelines for preparing environmental assessment reports of the projects pertaining to the following eight sectors (http://www.environment.gov.pk/info.htm):

- Housing estates and new towns development;
- Oil and gas exploration and production;
- Major chemical and manufacturing plants;
- Major thermal power stations;
- Major sewerage schemes;
- Major roads;
- Industrial estates; and
- Wind power projects.

Each of these guidelines highlights the significance of the sector and specific issues including site selection parameters, potential environmental and socio-economic impacts, possible magnitude of impacts, emissions or discharge requirements, and checklists of environmental parameters, various mitigation measures, monitoring, management and training aspects. These guidelines have been prepared on the basis of reviewing local laws, environmental and planning standards and the EIA/EIS guidelines of the Pakistan Government, IUCN, World Bank and Asian Development bank. The UNEP Training Resource Manual and sector specific guidelines of developed countries (*e.g.* New South Wales EIS Guidelines, 1997) have also been consulted or referred to. The guidelines appear to be equally useful for prospective proponents, EIA consultants, EPA officials and the academics. These are "*quite comprehensive and as comprehensive in nature as compared with such guidelines and regulations in other countries like Sri Lanka, India, Bangladesh and Egypt*" (Nadeem and Hameed, 2008, p.564 ). A sample checklist of environmental parameters of industrial estates as appended in the relevant guidelines is presented in Table 11.2.

## Table 11.1: Checklist of environmental parameters for industrial estates

| Actions Affecting Environmental Resources and Values | Damages to Environment | Recommended Feasible Measures |
|---|---|---|
| A. Problems Related to Site Selection | A. Depends on Nature of Problem | A. Depends on Nature of Problem - Reject site if inappropriate |
| 1. Displacement of existing land use e.g. agricultural land | 1. Loss of economic resource | 1. Proper quantification of impacts. |
| 2. Destruction of sensitive areas | 2. Loss of natural habitat | 2. Proper valuation of impacts. |
| 3. Natural adverse site conditions | 3. Impact on human welfare | 3. Design accordingly. |
| 4. Adjoining land owners | 4. Impact on human health/welfare | 4. Design accordingly. |
| 5. Displacement of existing population | 5. Social inequities | 5. Adequate resettlement planning and budgeting |
| 6. Impairment of historical/cultural resources | 6. Loss or impairment of these values | 6. Careful planning/ design, plus offsetting measures |
| 7. Availability of existing infrastructure and services | 7. Overloading of existing infrastructure | 7. Expanding infrastructure where possible |
| B. Problems Related to Design Phase | B. Depends on Nature of Problem | B. Depends on Nature of Problem |
| 1. Hazardous materials | 1. Hazards to workers and adjoining population | 1. Careful planning and emergency procedure |
| 2. Liquid waste emissions | 2. Impairment of down-stream water quality and use | 2. Careful planning/ design and O and M, plus operating/monitoring |
| 3. Gaseous waste emissions | 3. Impairment of community and regional air quality | 3. Careful planning/ design and O and M, plus operating/monitoring |
| 4. Solid waste emissions | 4. Impacts on human health | 4. Careful planning, O and M and monitoring |
| 5. Noise | 5. Damage to workers and neighbours | 5. Careful planning and O and M |

| Actions Affecting Environmental Resources and Values | Damages to Environment | Recommended Feasible Measures |
|---|---|---|
| 6. Transport and traffic issues | 6. Air pollution and noise effect human health | 6. Careful traffic and circulation planning |
| 7. Aesthetics | 7. Visual intrusion | 7. Careful planning/design/landscaping |
| 8. Loss or impairment of flora and fauna | 8. Loss of environmental resource | 8. Careful layout and design |
| C. Problems During Construction Stage | C. Unnecessary Environmental Damages | C. Careful Construction Planning and Monitoring |
| 1. Silt runoff from construction operations | 1. Soil erosion with damage to property and aesthetic values | 1. Erosion control planning and careful monitoring |
| 2. Dangers to workers from accident, disease quarrying, and emissions | 2. Injuries to workers and nearby residents | 2. Careful construction planning and monitoring |
| 3. Local flooding from watering excavations, flushing of pipes | 3. Local flooding damages | 3. Careful construction planning and monitoring |
| 4. Loss/degradation of vegetation from mechanical damage | 4. Loss of vegetation, forest and habitat in general | 4. Careful construction planning and monitoring |
| 5. Traffic congestion and blocking of access | 5. Loss of time and fuel and accidents | 5. Careful construction planning/monitoring |
| D. Problem During Operation Stage | D. Depends on Nature of Problem | D. Careful O and M, plus Operation Stage Monitoring |
| 1. Pollution, health hazards and nuisance | 1. Damage to workers and adjoining residents | 1. Competent O and M |
| 2. Occupational health inadequacies | 2. Damage to worker safety and health | 2. Occupational health plan plus monitoring |
| 3. Inadequate O and M performance | 3. Damage to worker safety | 3. Occupational health plan plus monitoring |

*Source: GoP (1997f, pp.16-17)*

## 11.4   The importance of EIA quality review

The review of the quality of an EIA report is important in order to check its adequacy. Conducting a quality review allows a responsible authority and stakeholders to check whether all legal requirements have been met and to what extent the report meets good practice criteria. Quality review is normally done on the basis of review matrices or packages. These are normally based on review criteria that are evaluated with regards to whether the report can be considered to be of *e.g.* excellent, good, average, poor or very poor quality. The latter two evaluation results would normally indicate that the report does not meet acceptable standards.

There are a number of good practice principles with regards to the review of EIA reports. The United Nations University (2002g) explains that a framework for the EIA review needs to be established first, including the following steps:
- "*set the scale/depth of the review;*
- *select reviewer(s);*

- *use input from public involvement; and*
- *identify review criteria and aspects to be considered*".

Conducting the actual review means to evaluate the EIA report on the basis of the framework. In this context, potential problems and deficiencies need to be identified and suggestions be made on how these may be addressed. Findings then need to be reported and shared with project proponents, assessors, responsible authorities and possibly others.

Before starting a review, the person conducting it should have a clear idea about the time and resources available. Depending on the project, the review may be done either quickly or in-depth. It is probably not a good idea to run quickly through an EIA report review for a controversial project or a project with many environmentally significant effects.

Any review should be done by at least two or more reviewers. To start with, individuals should conduct their reviews independently. They should then get together and compare their results, attempting to reach consensus on the quality of the EIA report. The review team may consist of people with different expertise and experiences, depending on the specific proposal for which the review is conducted.

EIA review does not only consist of an expert applying a framework to evaluate the quality of the EIA report. In most EIA systems, the EIA report is an important basis for obtaining feedback from stakeholders and the general public. This is particularly useful in order to establish whether all potential impacts have been detected and whether there are any other omissions (*e.g.* with regards to baseline data). There is a range of different ways in which the stakeholders and the general public may get involved at this stage. This may involve public hearings or written comments. It is good practice that replies are provided to comments either by the assessor or a responsible authority and that

both, comments and replies are made accessible, *e.g.* on the internet. Public participation methods and techniques were introduced in chapter 9.

*Identifying the review criteria*
The United Nations University (2002g) introduces a number of questions to be used in order to identify review criteria. These include the following (UN University, 2002g):

- Are terms of reference or other guidelines available for the review?

If this is not the case, the first task of a review would be to identify the main issues and impacts that should be addressed in the EIA report. In this context, those methods used for scoping can be helpful (**See:** chapter 7).

- Are any reviews of EIA reports of similar proposals and settings available?

Both, EIA reports and their reviews of similar proposals and settings can be useful reference points. They may help proponents, assessors, authorities and other reviewers to develop a better understanding of the EIA report they are looking at. Depending on the specific EIA system and the particular situation of application other EIA reports may either be from the same system or from elsewhere.

- Which generic review criteria may be useful?

According to the United Nations University (2002g), generic criteria that support an effective EIA review include:
- "*legal EIA requirements (if any);*
- *relevant environmental standards, guidelines or criteria;*
- *principles of EIA good practice; and*
- *knowledge of the project and its typical impacts and their mitigation*".

- When is a comprehensive review appropriate?

| Table 11.2: Main categories and sub-categories of the Lee and Colley Review Package |
| --- |
| **Main Categories of Lee and Colley Review Package** |

| Review areas | Review categories |
| --- | --- |
| 1 | **Description of the development, local environment and baseline conditions**<br><br>1.1 Description of the development: The purposes of the development should be described as should the physical characteristics, scale and design (5 questions).<br><br>1.2 Site description: The on-site land requirements of the development should be described and the duration of each land use (5 questions).<br><br>1.3 Wastes: The types and quantities of wastes which might be produced should be estimated, and the proposed disposal routes to the environment described (3 questions).<br><br>1.4 Environmental Description: The area and location of the environment likely to be affected by the development proposals should be described (2 questions).<br><br>1.5 Baseline conditions: a description of the affected environment as it is currently and as it could be expected to develop if the project were not to proceed, should be presented (3 questions). |
| 2 | **Identification and evaluation of key impacts**<br><br>2.1 Definition of impacts: Potential impacts of the development on the environment should be investigated and described (5 questions).<br><br>2.2 Identification of impacts: Methods should be used which are capable of identifying all significant impacts (2 questions).<br><br>2.3 Scoping: Not all impacts should be studied in equal depth. Key impacts should be identified, taking into account the views of interested parties, and the main investigation centred on these (3 questions).<br><br>2.4 Prediction of impact magnitude: The likely impacts of the development on the environment should be described in exact terms wherever possible (3 questions).<br><br>2.5 Assessment of impact significance: The expected significance that the projected impacts will have for society should be estimated (2 questions). |
| 3 | **Alternatives and mitigation of impacts**<br><br>3.1 Alternatives: Feasible Alternatives to the proposed project should have been considered (3 questions).<br><br>3.2 Scope and effectiveness of mitigation measures: All significant adverse impacts should be considered for mitigation (3 questions).<br><br>3.3 Commitment to mitigation: Developers should be committed to, and capable of carrying out the mitigation measures and should present plans of how they propose to do so (2 questions). |
| 4 | **Communication of results**<br><br>4.1 Layout: The layout of the statement should enable the reader to find and assimilate data easily and quickly. External data sources should be acknowledged (4 questions).<br><br>4.2 Presentation: Care should be taken in the presentation of information to make sure that it is accessible to the non-specialist (3 questions).<br><br>4.3 Emphasis: Information should be presented without bias and receive the emphasis appropriate to its importance in the context of the ES (2 questions).<br><br>4.4 Non-technical summary: There should be a clearly written non-technical summary of the main findings of the study and how they were reached (2 questions). |

*Source: Lee and Colley (1992)*

As was explained above, it is possible to conduct either short or more comprehensive quality reviews. In case a more comprehensive review is deemed necessary, this may also cover other aspects of the EIA process than just the EIA report. "*Some or all of the elements and aspects that may require consideration include:*

- *performance of scoping;*
- *accuracy of impact prediction;*
- *criteria used to evaluate significance;*
- *comparison of alternatives;*
- *effectiveness of proposed mitigation measures;*
- *requirements for monitoring and impact management; and*
- *modes of public and stakeholder involvement*" (UN University, 2002g).

Some attention should be given to the executive summary, which is intended to explain the key findings concisely and in a non-technical manner. What is important is that on many occasions the non-technical summary will be the only document decision-makers and others are likely to read.

## 11.5    EIA report quality review packages

Numerous EIA report quality review packages have been developed in many institutions and authorities worldwide. There are packages that are supposed to be applicable in different situations and there are packages that are produced for use in one specific system or area. One of the first packages developed was that by Lee and Colley (1992). This had been prepared primarily to assist in assessing the quality of environmental statements submitted in response to UK planning regulations which require environmental assessments to be undertaken in accordance with European Directive 85/337/EEC. It is a package that is commonly used and accepted. Published studies based on the application of the review package include *e.g.* Marr (1997) and Barker and Wood (1999). More recently, this review package has been adapted for reviewing strategic environmental assessment (SEA) documentation (see Bonde and Cherp, 2000 and Fischer, 2010).

By utilising the package, reviewers are able to assess whether an EIA report fulfils a number of important quality criteria with regards to its content, the prediction of impacts and the presentation of information. The package helps to identify additional information that may be required for the ES from the developer, such as impacts which have not been satisfactorily addressed and where further information may be required. Quality review is performed using a set of hierarchically arranged review topics. Table 11.2 presents the main categories and sub-



**Figure 11.1: The assessment pyramid**

Level 4 — **Overall quality assessment of the Environmental Statement**

Level 3 — **Assessment of the Review Areas**

Level 2 — **Assessment of the Review Categories**

Level 1 — **Assessment of the Review Sub-categories**

*Source: Rajvanshi, 2008, p176*
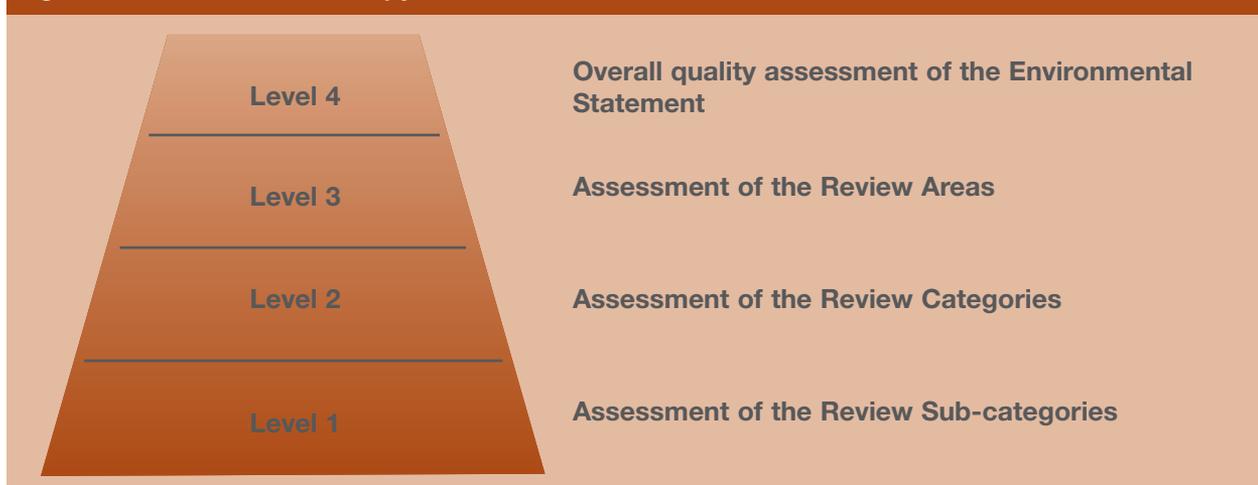
**Table 11.3: Lee and Colley Review Package Granding System**

| Grade | Explanation |
|---|---|
| A | Relevant tasks well performed, no important tasks left incomplete. |
| B | Generally satisfactory and complete, only minor omissions and inadequacies. |
| C | Can be considered just satisfactory despite omissions and/or inadequacies. |
| D | Parts are well attempted but must, as a whole, be considered just unsatisfactory because of omissions or inadequacies. |
| E | Not satisfactory, significant omissions or inadequacies. |
| F | Very unsatisfactory, important task(s) poorly done or not attempted. |
| N/A | Not applicable. |

*Source: Lee and Colley (1992)*

categories used and also indicates how many questions contribute to a sub-category. In total 52 questions are to be answered.

The review topics are arranged hierarchically. An overall EIA report quality mark is assigned on the basis of the review areas, categories and sub-categories. Figure 11.1 shows the pyramid principle of the Lee and Colley review package.

Quality grades are assigned, ranging from A (best possible grade) to F (worst possible grade). All grades are presented in Table 11.3.

In order to conduct the review, a reviewer should follow the following steps:

- Read the statement;
- Read the review category (*e.g.* 1.1) and the component sub-categories (*e.g.* 1.1.1-1.1.5);
- Assess the sub-categories;
- Carefully choose an assessment symbol and record it on collation sheet;
- Use assessments of sub-categories to obtain an overall review mark for the review; category (*e.g.* 1.1);
- Assess all other review categories;
- Assign a final mark;
- Compare your marks with that of your peer; and
- Write a report on strengths and weaknesses, provide comments and recommendations.

## 11.6 The EIA report in Pakistan

Various legal documents and guidelines that are of importance for the preparation of EIA (Environmental) reports in Pakistan are as follows:

- Pakistan Environmental Protection Act (PEPA), 1997;
- Pakistan Environmental Protection Agency's Guidelines for the Preparation and Review of Environmental Reports, Pak-EPA, 1997;
- Policy and Procedures for the Filing, Review and Approval of Environmental Assessments;
- Guidelines for the Preparation and Review of Environmental Reports;
- Guidelines for Public Consultation;
- Sectoral Guidelines for Preparation of Environmental Reports; and
- Pak-EPA (Review of IEE and EIA) Regulations, 2000.

What an environmental report should consist of is described in the guidelines for the preparation and review of environmental reports. Box 11.2 shows the contents of an environmental report, following the guidelines.

*Guidelines for preparation and review of environmental reports*
This set of guidelines encompasses basic steps in preparation of the review of IEE and EIA reports. It is useful for prospective proponents, EIA consultants as well as for the EPA officials involved in this process. Though a bit old, the guidelines can still be used as one of the sources

of literature on the subject. The following aspects have been discussed in detail:

- Relationship between environmental assessment and good design;
- Inter-agency coordination;
- Early consideration of strategic context;
- Environmental impact assessment process including impacts identification, assessment and prediction methods;
- Mitigation and impact management as well as report drafting style;
- Steps in reviewing environmental report;
- Decision-making, approval process for public and private projects;
- Environmental monitoring and auditing; and
- Project management, including role and attributes of a good environmental manager, programming and budgeting, and capacity building aspects.

While highlighting various issues involved in site selection, project design and the need for coordination among all stakeholders, these guidelines suggest a systematic approach for the preparation and review of the environmental assessment report, follow up, monitoring and project management (**See:** GoP, 1997c; http://www.environment.gov.pk/info.htm). These aspects are introduced and discussed in various sections of this curriculum.

'Quick' checklist

Official criteria for evaluating EIA reports are also provided in the same guidelines (Pak-EPA, 1997b), presented in the format of a 'quick' checklist. This is summarised in Box 11.3.

## 11.7   Practical element

- Students should conduct a quality review of an EIA statement from Pakistan, based on Box 11.3, and discuss review experiences with the teacher and other students.
- Lecturers should stress the importance of writing skills to students; if possible request the services of somebody from a social science department who is dealing with 'good writing'.

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**Box 11.2: Contents of en environmental report, following Pak-EPA guidelines**

- Executive or non-technical summary;
- Description of the objectives of the proposal;
- Description of the proposal and its alternatives including do-nothing alternative;
- Discussion of the proposal and current land use and policies;
- Description of the existing and expected conditions;
- Evaluation of impacts for each alternative;
- Comparative evaluation of alternatives and identification of the preferred options;
- Environmental management plan, monitoring plan and proposed training; and
- Appendices containing:
  - a glossary;
  - management of study process including list of individuals and agencies consulted;
  - sources of data and information;
  - list of EA study team members with qualifications; and
  - TOR of environmental reports and those given to individuals and specialists.

*Source: Nadeem and Hameed, 2008; derived from Pak-EPA, 1997b*

## Box 11.3: Criteria for evaluating EIA reports in Pakistan

- Whether the executive summary presents significant impacts, cumulative effects of impacts, mitigation measures, requirements for monitoring and supervision;

- Whether the project description is complete and at least includes aspects which can affect the environment;

- Whether project alternatives are described;

- Whether baseline conditions have been described adequately in an easily understandable manner with comments on quality of data;

- Whether significant impacts have been predicted and evaluated with indication of potential impacts that were expected at scoping stage but not found at this stage;

- Whether mitigation measures to control adverse impacts and enhance project benefits have been proposed;

- Whether institutional arrangements for implementing mitigation measures have been defined in the form of Environmental Management Plan (EMP);

- Whether costs of implementing all recommendations have been adequately budgeted in the cost estimates;

- Whether monitoring programme is described and commitment made with reasons for and detail of costs of carrying out monitoring activities;

- Whether local people have been involved in the study process and an overview of the issues raised and their treatment is given; and

- Whether the EIA report is written with clarity, free of jargon and explains technical issues in terms that are intelligible to a nontechnical reader.

*Source: Nadeem and Hameed, 2008; derived from Pak-EPA, 1997b*

# 12   EIA follow-up, monitoring and auditing; the role of environmental and social management plans

This chapter is divided into eight sections. First, what EIA follow-up is and why it is relevant is explained.  Secondly, the rationale for EIA follow up is introduced and who should be involved is discussed.  Then, regulations for follow-up and how to conduct it are established.  The potential role of a follow-up programme, environmental and social management plan and possible connections with environmental management systems are explained and barriers as well as enabling factors and challenges are portrayed.  Lastly, EIA follow-up, monitoring and auditing requirements in Pakistan are presented. The main sources this chapter draws on include Asian Development Bank (2003ii); Fischer et al. (2008; chapter 18 by Arts, J: pp.183-196); Nadeem and Hameed (2010); GoP (2000) and GoP (2010).

## 12.1 What is EIA follow-up and why is it relevant?

Follow-up is an important stage of EIA.  It is important in order for EIA to 'become a true instrument for safeguarding sustainable development' (Arts, 2008).  Follow-up can help in managing environmental risk and to learn from past experiences.  Without it, it is not possible to identify the environmental performance of a particular project.  EIA follow-up can be defined as "The monitoring and evaluation of the impacts of a project or plan (that has been subject to EIA) for management of and communication about the performance of that project or plan" (Morrison-Saunders and Arts, 2004).  EIA follow-up has been described as comprising four key components (Arts et al. 2001).  These are summarised in Box 12.1.

According to Arts and Morrison-Saunders (2004b) there are different forms of follow-up.  Furthermore, follow-up can be applied to different abstraction levels.  These range from micro- (a specific project EIA) to macro- (an EIA system) levels.  The concept of EIA can also be said to be followed-up at the meta-level.

## 12.2 What is the rationale for EIA follow-up?

The rationale for follow-up is closely connected with obtaining a better understanding of uncertainty inherent in EIA.  It is important that while EIA focuses on the planning stages, i.e. the stages before development begins, follow-up is about looking at what is happening after a consent decision.

## Box 12.1: The four key components of EIA follow-up

- "Monitoring – the collection of activity and environmental data and comparison with standards, predictions or expectations. Baseline monitoring refers to measuring the initial state of the environment before activity implementation and provides the basis for prediction and evaluation in the EIS. In the post-decision stages, monitoring may relate to both, compliance and impact of the decision. Closely related to the continual activity of monitoring is auditing, which is the periodical objective examination of observations by comparing them with pre-defined criteria (standards, predictions or expectations);
- Evaluation – the appraisal of the conformance with standards, predictions or expectations as well as the environmental performance of the activity. This may involve (policy-oriented) value-judgments. Ex-ante evaluation is forward looking and predictive in nature (an example is the preparation of an EIS). Ex-post evaluation has a backward looking nature, involving the appraisal of a policy, plan, program or project that has been or is currently being implemented;
- Management – making decisions and taking appropriate action in response to issues arising from monitoring and evaluation activities. Ongoing management responses may be made by both, proponents (in response to unexpected impacts) and EIA regulators (e.g. reviewing consent conditions and management requirements). An environmental management system (EMS) is a (often voluntary) system of compliance that operationalises the implementation of environmental protection and management measures; and
- Communication – informing the stakeholders about the results of EIA follow-up in order to provide feedback on project/plan implementation, as well as feedback on EIA processes. Both, proponents and EIA regulators may engage in communication on follow-up and communication may extend beyond simple informing about results and management responses but may also include direct stakeholder participation in the monitoring, evaluation and management".

*Source: Arts, 2008 p.183, based on Arts et al., 2001*

## Box 12.2: Objectives of EIA follow-up

- "Controlling, checking and adjusting the plan/project and their impacts for the purpose of controlling (environmental) risk, maintaining decision-making flexibility and allowing adaptive management responses;
- Learning by providing feedback on EIA processes, predictions and actual effects – i.e. learning for the plan/project, for EIA in general or for enhancing scientific and technical knowledge; and
- Communication about the environmental performance of the plan/project. This may include informing stakeholders about mitigation measures and management of potential impacts on the environment, which is relevant for improving e.g. public awareness and acceptance".

*Source: Arts, 2008, p.184*

Follow-up should be integrated into project management, in particular with regards to impact monitoring. It is essential in identifying real outcomes of projects and associated EIAs. Feedback from follow-up into the EIA system enables learning from experience. It is a necessary element in any EIA system. Box 12.2 summarises the objectives of doing EIA follow-up.

Follow-up links pre- and post-decision stages of EIA, thereby bridging the implementation gap (Dunsire, 1978). This gap can arise in case of a difference in project planning and project implementation (Arts et al., 2001). As EIA is predictive there may be differences between what it says and what is actually happening in reality.

However, it is not the predicted impacts, but the real effects that are relevant for protecting the environment (Arts, 2008). Follow-up does not only inform about the consequences of an activity, but also gives proponents an opportunity to implement measures to mitigate or prevent negative effects on the environment.

EIA follow-up has financial and staffing demands, and it is important to integrate it with other monitoring and auditing activities (Arts and Nooteboom, 1999). However, there is emerging evidence that the costs and effort put into EIA follow-up are outweighed by the benefits arising (See: e.g. Marshall, 2005 and Sanchez and Gallardo, 2005).

### 12.3 Who should be involved in EIA follow-up?

Three groups of stakeholders should be involved in EIA follow-up, including the proponent of the project, the (EIA) regulator and the affected community (Arts, 2008). A proponent is the private company or governmental organisation developing a project. They are often expected to perform most follow-up activities (1st party follow-up). The way in which follow-up is done may include self-regulatory or industry-led initiatives, including e.g. environmental management systems (EMS). The regulator, or competent authority, is normally a government or funding agency, e.g. ADB or World Bank, responsible for administering and implementing EIA processes (2nd party follow-up). The regulator's role is to ensure proponents comply with EIA approval conditions. The affected community includes the public, ranging from individuals directly affected by a proposal or other interested persons (e.g. NGOs). Affected community participation may "range from direct involvement in follow-up programmes to simply being kept informed of follow-up activities and outcomes" (Arts, 2008). Follow-up done by the community (3rd party follow-up) ranges "from formal committees or agencies established to oversee or sometimes conduct follow-up activities through to independent action by community members concerned about environmental effects in their neighbourhood" (Arts, 2008). EIA follow-up can take many forms, ranging from proponent driven self-regulation to requirements imposed by EIA regulators or initiatives motivated by public pressure and community involvement (Morrison-Saunders et al., 2001).

### 12.4 Regulations for EIA follow-up

Currently, post-decision follow-up is still a weak point of EIA practice in many jurisdictions. Legislative requirements for EIA follow-up exist in e.g. The Netherlands, the US, the UK, Hong Kong, Western Australia, California and Canada. The Espoo Convention on 'EIA in a trans-boundary context' (UNECE, 1991) includes a discretionary

**Figure 12.1: EIA follow-up as a link between planning / assessment and project implementation**
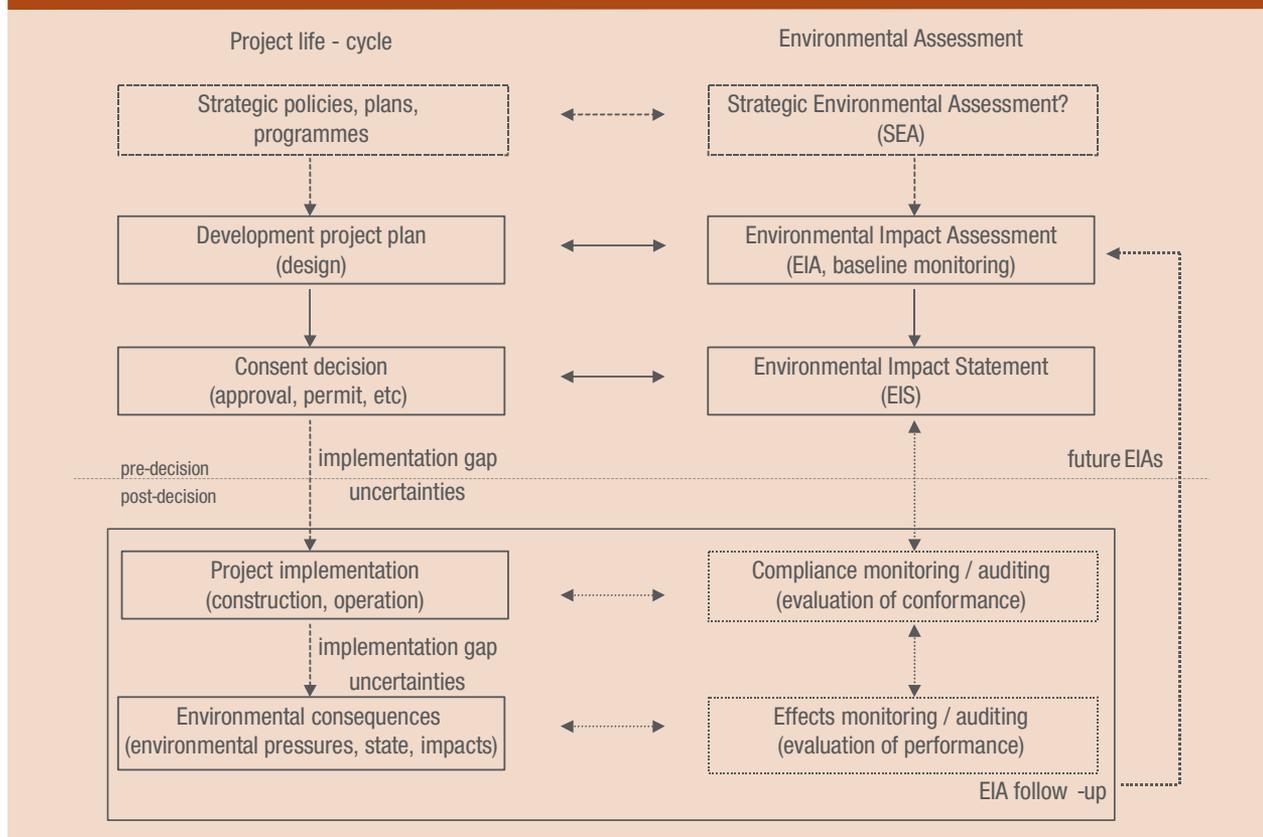


*Source: Arts, 2008, p185, based on Morrison-Saunders and Arts, 2004a*

## Box 12.3: the EIA follow-up process

- "Screening: This is about the determination of the need for follow-up. This will depend on e.g. regulatory requirements and the degree of development certainty, which will be connected with the complexity and magnitude of a proposed activity as well as the involvement of new or unproven technologies. Also, the sensitivity of the receiving environment is important and the degree of risk of incorrect implementation. Additionally, political and public concern needs to be taken into account.
- Scoping: This is about defining the content of EIA follow-up. Potential residual effects need to be considered along with the expected most adverse effects, including e.g. cumulative effects. Gaps in knowledge along with public sensitivities need to be taken into account.
- Designing a follow-up programme: This includes determining the roles and responsibilities of those involved in a project and EIA and its follow up. Results of scoping need to be documented. This includes a description of the methods and tools used. Costs of follow-up and the requirements of other resources, e.g. time, need to be determined. It is important that at least a draft EIA follow-up programme is prepared prior to project approval and that this is included into the terms and conditions of the consent decision.
- Implementation: This relates to specific activities, i.e. baseline, effects and compliance monitoring. Connections should be made with other monitoring activities, e.g. environmental auditing or Environmental Management Systems (EMS) activities.
- Evaluation: This relates to the need to evaluate results and outcomes. Follow-up data need to be gathered and the conformance with standards and predictions be checked. The overall environmental performance of the activity also needs to be critically looked at.
- Issue management: This is about taking action in response to follow-up outcomes and may range from doing nothing if e.g. follow-up results are positive to implementing additional mitigation measures or modifying construction and project operation. Issue management can be conducted by proponents, e.g. in response to unexpected impacts, and EIA regulators e.g. with regard to reviewing consent conditions and management requirements.
- Communication: This is about reporting follow-up results. Communication may extend beyond providing simple information and could include direct stakeholder participation in monitoring, evaluation and management".

*Source: Arts, 2008, p.187*

requirement on follow-up. This states that parties involved can decide that on request a country must undertake an ex post evaluation of a project. There are three basic regulatory settings to EIA follow-up (Arts and Morrison-Saunders, 2004):

- "command and control – requirements by government regulators laid down in formal EIA regulations and focussing on compliance with law, insight in environmental and EIA system performance. These might link up with environmental permits, standards, surveillance, enforcement and prosecution or offences for legal breaches;

- self-regulation – by proponents. This will often be related to instruments like environmental management systems (EMS), or environmental management plans. Examples of this are formal systems, such as ISO 14001 and EMAS. The output usually focuses on third party accreditation (e.g. contractors), compliance with industry standards, management of the activity and a green profile; and

- public pressure – created by community stakeholders. This might be achieved via public concern, interest of the media, studies or lobbying by interest groups. The focus might be transparency and accountability of management of the activity, information about the project, enhancement of local environmental knowledge, public participation. Public pressure might be a very strong driver for EIA follow-up" (Arts, 2008, p.186).

While prescriptive EIA follow-up arrangements establish the 'rules' for all stakeholders, there are other mechanisms in place, including e.g. proponents' permit compliance monitoring and area-wide monitoring by regulation authorities (Arts and Nooteboom 1999). This may mean preparing management plans. Various EIA regulations include requirements for a periodic systems evaluation of the EIA regulations and practice (macro-level follow-up). Associated requirements are found in the EU, the Netherlands, Canada, Australia and Hong Kong (See: e.g. Wood 2003).

### 12.5 How to do EIA follow-up?
Arts (2008) introduced a process for conducting EIA follow-up which looks similar to the EIA process itself. Box 12.3 shows what it entails.

## 12.6 The potential role of a follow-up programme / environmental and social management plan and possible connections with environmental management systems

The Asian Development Bank (ADB) asks for environmental management plans (EMPs) to be prepared within EIAs and IEEs for the projects they finance. This includes setting out conditions and targets to be met during project implementation. A borrower needs to include this in their terms of references. It is stated that 'where appropriate, the key contents of EMPs are incorporated into the loan agreement, for implementation and monitoring by the Borrower' (ADB, 2003).

In the planning stages of a project it is not always possible to provide all the details required for an effective EMP. In this case, the ADB would ask the Borrower to prepare a revised EMP later, i.e. at the beginning of the implementation stage.

In terms of institutional arrangements, the ADB asks for a project environmental management office (EMO) to be set up within the executing agency. In this context, they recommend that associated staff be drawn from permanent full-time staff of the executing agency. It is the responsibility of the EMO to ensure mitigation measures and monitoring programmes are completed as agreed (in line with ADB requirements).

The EMP is of crucial importance, as it is the basis for judging "whether the executing agency is carrying out the project in conformity with the EMP, (ii) identify problems, and (iii) to develop plans for corrective action" (ADB, 2003). The ADB (2003) defines the contents of an EMP which is included with an EIA or IEE as follows:

### 1. Summary of Impacts

There is a need to summarise mitigation activities for the predicted adverse environmental and social impacts.

### 2. Description of Proposed Mitigation Measures

Targets and quantitative indicators for monitoring need to be clearly set out. Measures need to be described, explaining the associated impact. Conditions with regards to 'designs, development activities, equipment descriptions, and operating procedures and implementation responsibilities' (ADB, 2003) need to be laid out.

### 3. Description of Monitoring Programmes and Parameters

Requirements for the specific monitoring to be conducted along with associated protocols, parameters, and frequencies of production need to be established. Environmental performance indicators that can show the linkages between impacts and mitigation measures should be devised and the parameters to be measured and methods used be clearly explained. In this context, locations and frequency of measurements need to be identified and thresholds be set that indicate the need for corrective actions. Monitoring and supervision arrangements need to be agreed. There is a need to show compliance with agreed action.

### 4. Public Consultation Activities

Public consultation activities should be part of an EMP. This may happen during both, the finalisation and implementation of an EMP. The extent of consultation will depend on the specific project and local situation. According to the ADB (2003) it "will normally include
(i)   notification of local communities when project activities are going to take place;
(ii)   disclosure of the results of monitoring programs to local communities and other stakeholders; and
(iii)  provision for independent third party monitoring, where necessary".

Public and stakeholder consultation may also be required during the design of mitigation measures, in particular when significant extensive effects are to be expected.

## 5. Description of Responsibilities for Mitigation and Monitoring Requirements

Institutional arrangements for implementation should be specified, taking local conditions into account. Responsibilities need to be defined and arrangements put into place for the flow of information and for the coordination of activities between different bodies responsible for mitigation. The EMP needs to specify who will be responsible for conducting the mitigating and monitoring measures. In case of limited capacity of the responsible authority, a third party may need to be involved. In this context, the EMP may pay out measures to strengthen institutional capacity.

## 6. Preliminary Cost Estimates

It is important that mitigation and monitoring are adequately funded and that the EMP provide for preliminary cost estimates. It is also important that once construction and operation has started, the EMP may need to be revised. In this context, additional information may be needed on responsibilities, work and procurement plans, costs estimates and mechanisms for taking corrective action (ADB, 2003).

## 7. Description of the Responsibilities for Reporting and Review

Responsibilities for reporting and review need to be clearly defined. This includes the responsibilities of e.g. developers, contractors, authorities, and e.g. development banks (ADB). Roles to be defined include preparation, submission, reception, review, and approval of reports. A detailed implementation schedule should be prepared. "Structure, content and timing of reporting should be specified to facilitate supervision, review and approval, if necessary, by ADB" (ADB, 2003).

## 8. Work Plan

The work plan should include information on EMO staffing and on other work to be done. EMP requirements should be included in all bidding and contract documents and responsibilities of contractors with regards to environmental

management should be made clear. Follow-up work needs to be supervised and if requirements are not met, there should be possibilities of enforcement and potential disbursement (ADB, 2003).

## 9. Procurement Plan

The procurement plan should list those items and equipment required to implement mitigation and monitoring programmes and procedures to ensure consistency of all project procurement should be described.

## 10. Cost Estimates

Detailed costs of implementation need to be specified for all expenses, both initial and recurring. These need to be integrated into the total project costs. Operation, maintenance and administrative costs need to be considered. A budgeting plan should clearly state the costs and how these are to be met (ADB, 2003).

## 11. Project Feedback and Adjustment

This is about the procedures and mechanisms that will be used to modify and reshape the project in the light of monitoring results. A feedback mechanism, with proposed timing and procedures should be included in the EMP to provide for modifications to the Project, and the involved bodies and agencies.

The ADB (2003ii) provides for specific matrices to be included in an EMP that can be used for taking track of developing mitigation measures, the monitoring programme, institutional arrangements and scheduling.

## 12.7 What are barriers and enabling factors for EIA follow-up and challenges

While follow-up is an essential element of EIA, in practice the extent to which it is applied is still limited. This is connected with the existence of certain key barriers to its implementation. Arts (2008, p.89) summarised those in terms of the following five aspects:

- "Limitations of EISs or environmental impact statements – EISs are often descriptive rather than predictive, containing vague and qualitative prediction statements that are difficult to test. Other limitations include gaps in information and outdated assumptions about future developments.

- Limitations of techniques for follow-up – the methods and techniques for follow-up are less developed than other components of EIA. Most methods can be considered only minor variations on the standard research design. In addition, knowledge about dose-effect is limited and cause-effect relationships between activities and environmental change are difficult to establish. Also, baseline information is inadequate (Arts and Morrison-Saunders, 2004a).

- Limitations in organisation and resources – monitoring environmental changes and linking them to a source, a project or plan, may require considerable time, money, staff, expertise and the involvement of several parties. The division of tasks, responsibilities and costs may be unclear. During the long time period the EIA follow-up may cover, the project may be handed over to others, or there may be changes in personnel. The task of organising an EIA evaluation may be complex while little guidance and training exist.

- Limited support for conducting EIA follow-up – in general, authorities and proponents alike seem to give EIA follow-up a low priority. In many jurisdictions, EIA follow-up is part of the EIA framework. Reasons for this lack of support relate to e.g. expected benefits of EIA follow-up and its added value in relation to the costs; EIA follow-up may overlap with other evaluative instruments and activities; the extent to which EIA follow-up can perform all of the potential functions may be less than expected; it may be considered threatening and a burden on both, the proponent of the activity and the authority that had originally given consent; and external pressure may also be lacking.

- Uncertainties about benefits and cost-effectiveness – there seems to be an imbalance between the various 'stick and carrot' factors, enforcement versus incentives. As a consequence, in practice there seems to be an attitude of 'wait and see'. The 'stick' is usually perceptible to practitioners, unlike the 'carrot', which may be less obvious" (Arts, 2008, p.189).

The same author introduces important contextual factors supporting effective follow-up. He portrays effective follow-up as a function of the interplay of the following four factors:

- "Regulations and institutional arrangements that have been put in place. In order for EIA follow-up to be successful, the following issues are important; having a formal requirement for follow-up in the EIA system is an important prerequisite; strong commitment by EIA regulators for follow-up; industry self-regulation tools may fill in gaps; public pressure is an effective driver; quality control in EIA follow-up may be improved through external, independent, bodies.

- Approaches and techniques – This relates to such issues as: careful screening and scoping to ensure that follow-up is effective and efficient; making use of existing data and monitoring activities where available; rigorous approaches may be needed, but simple straightforward techniques may be sufficient; flexibility and a mix in approaches to monitoring; approaches need to be in accordance with the local 'culture' for EIA practice.

- Resources and capacity – EIA follow-up can easily comprise long periods of time, become complex and require much effort in money, time and staff resources. However, follow-up does not need to be complex and expensive. Important factors for success include: EIA regulators must reserve capacity and budgets; proponents need to be committed to carrying out follow-up; here, contractor agreements may be a relevant instrument;

public involvement can be a resource in its own right; local, communal knowledge and feedback on project implementation; local community and stakeholders will welcome becoming involved, provided that they are genuinely consulted; sufficient resources to communicate EIA follow-up findings is essential; education, training and capacity to support follow-up procedures; staff continuity in both, proponent and regulator organisations improves effectiveness.

● Project type – the characteristics of the project/plan that has been subject to EIA are important for determining on how to conduct EIA follow-up in a relevant manner. The design of the follow-up needs to consider the project type, relating to issues such as: large or small capital investment; long-term or

short-term; private or governmental development; spatial extent; and strategic or operational nature. In addition to controlling functions, informing and learning may be useful for more complex projects. SEA follow-up will be different from project-related EIA follow-up e.g. focus on subsequent tiers of decision-making and less directly on tracking detailed environmental changes" (Arts, 2008, p.190).

In order to support good follow-up practice, the International Association for Impact Assessment (IAIA) has issued 'International best practice principles for EIA follow-up' (Morrison-Saunders et al., 2007). These relate to the success factors discussed above. They are summarised in Box 12.4.

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### Box 12.4: Best practice principles for EIA follow-up

**Guiding Principles, relating to core values (why?):**
- Follow-up is essential to determine EIA (or SEA) outcomes;
- Transparency and openness in EIA follow-up is important; and
- EIA should include a commitment to follow-up.

**Guiding principles, relating to the nature of EIA follow-up (what?):**
- Follow-up should be appropriate for the EIA culture and societal context;
- EIA follow-up should consider cumulative effects and sustainability; and
- EIA follow-up should be timely, adaptive and action oriented.

**Operating principles, relating to roles and responsibilities (who?):**
- The proponent of change must accept accountability for implementing EIA follow-up;
- Regulators should ensure that EIA is followed up;
- The community should be involved in EIA follow-up; and
- All parties should seek to co-operate openly and without prejudice in EIA follow-up.

**Operating principles, relating to roles and responsibilities (how?):**
- EIA follow-up should promote continuous learning from experience to improve future practice;
- EIA follow-up should have a clear division of roles, tasks and responsibilities;
- EIA follow-up should be objective-led and goal oriented;
- EIA follow-up should be 'fit-for-purpose';
- EIA follow-up should include the setting of clear performance criteria;
- EIA follow-up should be sustained over the entire life of the activity; and
- Adequate resources should be provided for EIA follow-up.

*Source: Arts, 2008, p.191; based on Morrison-Saunders et al., 2007*

## 12.8 EIA follow-up, monitoring and auditing requirements in Pakistan

EIA follow-up, monitoring and auditing are mandatory requirements in Pakistan under various sections of the Pak-EPA (Review of IEE and EIA) Regulations 2000 (see also Chapter 5). After obtaining EIA approval, every proponent is bound to submit an Environmental Management Plan (EMP) along with a confirmation of compliance of the conditions of approval. A proponent is also bound to submit an annual monitoring report. But in practice, EMP is made part of an EIA report which stands approved along with the EIA (Nadeem and Hameed, 2008). The EIA follow-up, monitoring and auditing process in Pakistan based on the legal requirements and relevant guidelines, is presented in Figure 12.2.

Legally, concerned EPAs are obliged to inspect the project at any stage for confirmation of compliance and monitor or audit the gaseous emissions, noise pollution levels and contents or disposal of liquid effluents (GoP, 2000). According to Pak-EPA's guidelines for the preparation and review of environmental reports 1997, different stakeholders should be involved in various aspects of the monitoring and follow up activities. These include:

- "Responsible Authorities [that] make decisions on, and inspect or check implementation of, the conditions of approval;

- Proponents or their agents [that] are responsible for implementing the projects, including monitoring the actual effects,



**Figure 12.2: EIA follow up, monitoring and auditing process in Pakistan**
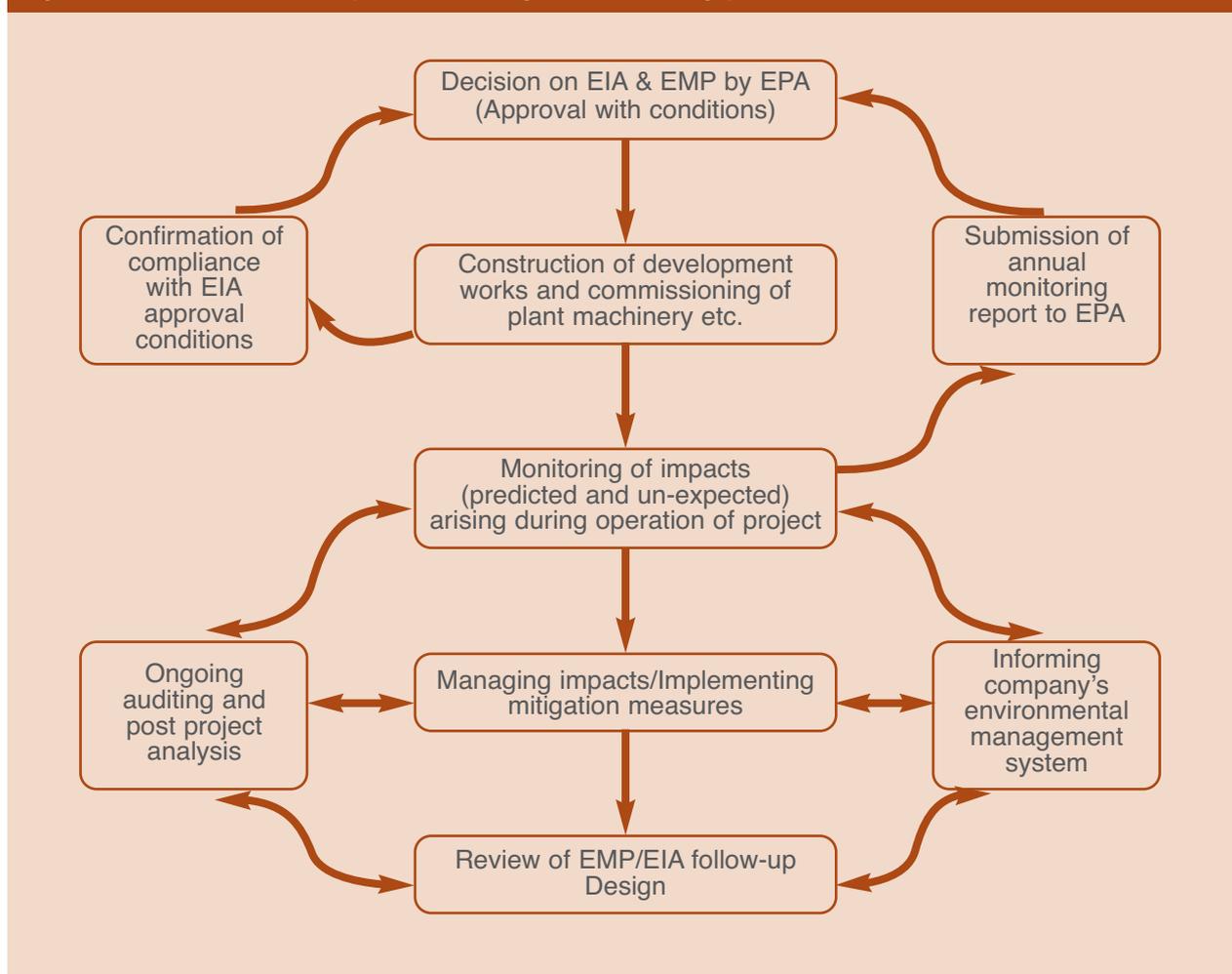
*Source: Nadeem and Hameed, 2010, p.118*

implementing remedial measures, and verifying the accuracy of predictions;

● Environmental Protection Agencies and Departments as regulatory authorities [that] check compliance with NEQS, and verify the effectiveness of mitigation measures; and

● The public [that] can be formally or informally involved in monitoring activities and may highlight inadequacies in monitoring programmes.  They may also have practical suggestions to help solve problems as they arise" (GoP, 1997c, p.37).

An EMP generally includes procedures of implementing mitigation measures and assign responsibility and frequency of monitoring the effectiveness of mitigation measures for the life cycle of the proposed project (Nadeem and Hameed, 2010; GoP, 1997c).  Part of an EMP of an industrial estate development project is presented in the Table 12.1 as a sample. However, EMPs also include environmental management measures for flora, fauna, soil conditions, health and safety of workers and resettlement action plan, if needed, indicating targets and mitigation measures.

## Table 12.1: Part of an EMP of an Industrial Estate in Pakistan

| *Concern/Impact Component* | *Considerations/ parameters* | *Applied Standards* | *Location* | *Monitoring Frequency* | *Duration* | *Responsibility* |
|---|---|---|---|---|---|---|
| Groundwater | pH, turbidity, colour, TDS, hardness, sulphate, fluoride, iron, faecal coliforms etc. | NEQS | Construction site, effluent treatment plant and landfill site. | Quarterly | - | Environment Manager/ Resident Engineer |
| Wastewater | Effluent flow, pH, BOD, COD, TSS, Chromium, Copper and Zinc, etc. | NEQS | Offices, Effluent treatment plant and landfill site. | Monthly | - | Manger Treatment Plant |
| Air Emissions | CO, NOx, SOx, PM10 | NEQS | 3 points near the main entrance, treatment plant site and landfill site in downwind direction. | Quarterly | 8 hours | Environment Manager/ Resident Engineer |
| Noise Levels | Noise levels on dB(A) scale | NEQS | 7.5 metre from the vehicles at 6 points near construction site, generator room, treatment plant site. | Quarterly | 15 minutes at each point | Environment Manager/ Resident Engineer |
| Solid Waste | Source, type, generation, used oil, discarded mechanical parts etc. | - | Construction site, administrative buildings, industrial sites. | Daily | - | Chief Sanitary Supervisor/ Incharge Landfill Site |

*Source: Nadeem and Hameed (2010, p.121).*

Furthermore, Table 12.2 presents national standards for drinking water quality

## Table 12.2: National Standards for Drinking Water Quality

| Properties/parameters | Standard Values for Pakistan | WHO Standards | Remarks |
|---|---|---|---|
| **Bacterial** | | | |
| All water intended for drinking (e.Coli or Thermotolerant Coliform bacteria) | Must not be detectable in any 100 ml sample | Must not be detectable in any 100 ml sample | Most Asian countries also follow WHO standards |
| Treated water entering the distribution system (E.Coli or Thermo tolerant Coliform and total Coliform bacteria) | Must not be detectable in any 100 ml sample | Must not be detectable in any 100 ml sample | Most Asian countries also follow WHO standards |
| Treated water entering the distribution system (E.Coli or Thermo tolerant Coliform and total Coliform bacteria) | Must not be detectable in any 100ml sample<br><br>In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12 month period. | Must not be detectable in any 100 ml sample<br><br>In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12 month period. | Most Asian countries also follow WHO standards |
| **Physical** | | | |
| Colour | ≤ 15 TCU | ≤ 15 TCU | |
| Taste | Non objectionable/Acceptable | Non objectionable/Acceptable | |
| Odour | Non objectionable/Acceptable | Non objectionable/Acceptable | |
| Turbidity | < 5 NTU | < 5 NTU | |
| Total hardness as CaCO3 | <500 mg/l | -- | |
| TDS | < 1000 | < 1000 | |
| pH | 6.5 – 8.5 | 6.5 – 8.5 | |
| **Chemical** | | | |
| *Essential Inorganic* | *mg/Litre* | *mg/Litre* | |
| Aluminium (Al) mg/l | ≤ 0.2 | 0.2 | |
| Antimony (Sb) | ≤ 0.005 (P) | 0.02 | |
| Arsenic (As) | ≤ 0.05 (P) | 0.01 | Standard for Pakistan similar to most Asian developing countries |
| Barium (Ba) | 0.7 | 0.7 | |
| Boron (B) | 0.3 | 0.3 | |
| Cadmium (Cd) | 0.01 | 0.003 | |
| Chloride (Cl) | <250 | 250 | |
| Chromium (Cr) | ≤ 0.05 | 0.05 | Pakistan similar to Asia[1] |
| Copper (Cu) | 2 | 2 | |

| Properties/parameters | Standard Values for Pakistan | WHO Standards | Remarks |
|---|---|---|---|
| *Toxic Inorganic* | *mg/Litre* | *mg/Litre* | |
| Cyanide (CN) | ≤ 0.05 | 0.07 | Pakistan similar to Asia[1] |
| Flouride (F)* | ≤ 1.5 | 1.5 | |
| Lead (Pb) | ≤ 0.05 | 0.01 | Pakistan similar to Asia[1] |
| Manganese (Mn) | ≤ 0.5 | 0.5 | |
| Mercury (Hg) | ≤ 0.001 | 0.001 | |
| Nickel (Ni) | ≤ 0.02 | 0.02 | |
| Nitrate (NO3)* | ≤ 50 | 50 | |
| Nitrite (NO2)* | ≤ 3 (P) | 3 | |
| Selenium (Se) | 0.01 (P) | 0.01 | |
| Residual chlorine | 0.2-0.5 at consumer end 0.5-1.5 at source | -- | |
| Zinc (Zn) | 5.0 | 3 | Pakistan similar to Asia[1] |
| **Organic** | | | |
| Pesticides  mg/L | | PSQCA No. 4639-2004. Page No.4 Table No.3 Serial No. 20-58 may be consulted. *** | |
| Phenolic compounds (as Phenols) mg/L | | ≤ 0.002 | |
| Polynuclear aromatic Hydrocarbons (as PAH) g/L | | 0.01 (By GC/MS method) | |
| **Radioactive** | | | |
| Alpha emitters bq/L or pCi | 0.1 | 0.1 | |
| Beta emitters | 1 | 1 | |

1.  Standard for Pakistan similar to most Asian developing countries
*    Indicates priority health related inorganic constitutes which need regular monitoring.
*** PSQCA: Pakistan Standards and Quality Control Authority.
Source: GoP, 2010b (S. R. O. 1063(I)/2010)

Proviso:
The existing water treatment infrastructure is not adequate to comply with WHO guidelines. The Arsenic concentrations in South Punjab and in some parts of Sindh have been found higher than revised WHO guidelines.  It will take some time to control arsenic through treatment process. Lead concentration in the proposed standards is higher than WHO guidelines. As the piping system for supply of drinking water in urban centres is generally old and will take significant resources and time to get them replaced. In the recent past, Lead was completely phased out from petroleum products to cut down Lead entering into the environment. These steps will enable to achieve WHO guidelines for Arsenic, Lead, Cadmium and Zinc. However, for bottled water, WHO limits for Arsenic, Lead, Cadmium and Zinc will be applicable and PSQCA standards for all the remaining parameters (GoP, 2010 (S. R. O. 1063(I)/2010).

### 12.8.1 Monitoring the environmental performance of industrial units

Monitoring the environmental quality or performance of industrial units in the country against a large number of parameters or types of pollutants require huge financial, technical and human resources.  Secondly, the proponents do not like the frequent entry of EPAs' inspectors and generally consider it a hindrance.  To overcome the deficiency of resources and win the confidence of industrialists in the country, the Pakistan Environmental Protection Council introduced a 'Self-Monitoring and Reporting System for Industry'.  This aims at "making the country's industry owners and operators responsible for systematic monitoring and reporting of their environmental performance". The underlying objectives are to "transfer the responsibility for examining and evaluating industry's environmental performance to individual industrial facilities" and "saving EPAs considerable expense, time and effort. This measure will enable industry to make long-term provisions for eco-friendly production. The reported data will also enable government agencies to assist industrial units in controlling their pollution levels" (Pak-EPA, n.d.).

For implementing the self-monitoring and reporting system, industries have been classified into three categories A, B and C, for reporting compliances with gaseous emissions and liquid effluents separately, corresponding to a specified reporting frequency. For liquid effluents, Category A industries include 23 different types of industries like fertilisers, steel, pulp and paper, etc. Category B industries include fourteen different types of industries like sugar, glass manufacturing and dairy industry, etc. Category C industries include 4 different types of industries like cement, pharmaceutical and marble, etc. (See: Table 12.3). Similarly, industries have been divided into two categories for reporting gaseous emissions (See: Table 12.4). A Category 'A' industry is required to submit the report of its emission levels after every month, Category 'B' industry quarterly and Category 'C' industry

biannually. Industrial units are required to get their effluent tested from a certified laboratory and enter the results in software named as SMART – Self-Monitoring and Reporting Tool. The data could be sent to respective Environmental Protection Agency via email or through compact disc.

Another important step in this regard is the formulation of National Environmental Quality Standards (Self-Monitoring and Reporting by Industry) Rules (GoP, 2001). These rules specify priority parameters for monitoring of liquid effluents and gaseous emissions separately for all the three categories of industries. The said rules are available at the Pak-EPA's website http://www.environment.gov.pk/info.htm. The Ministry of Climate Change, Federal and Provincial Environment Departments and all the EPAs of Pakistan are making diligent efforts to implement the NEQS and SMART Rules despite their limited resources and capacity. If the responsible agencies succeed in effectively implementing these standards, it is expected that the EIA follow-up, as well as overall monitoring and auditing of the environmental quality in Pakistan would result in a safe and healthy environment.

## Table 12.3: Categories of industrial units for monitoring of liquid effluents under the Self-Monitoring and Reporting System

| Category-A | Category-B | Category-C |
|---|---|---|
| (1) Chlor-Alkali (Mercury Cell). | (1) Dairy industry. | (1) Pharmaceutical (Formulation) Industry. |
| (2) Chlor-Alkali (Diaphram Cell). | (2) Fruit and vegetable processing. | (2) Marble Crushing. |
| (3) Metal finishing and electroplating. | (3) Glass manufacturing. | (3) Cement. |
| (4) Nitrogenous fertiliser. | (4) Sugar. | (4) Any other industry to be specified by Federal or Provincial Agency |
| (5) Phosphate fertiliser. | (5) Detergent. | |
| (6) Pulp and paper. | (6) Photographic. | |
| (7) Pesticides formulation. | (7) Glue manufacture. | |
| (8) Petroleum refining. | (8) Oil and Gas exploration. | |
| (9) Steel industry. | (9) Thermal Power Plants (Gas Fired) | |
| (10) Synthetic fibre. | (10) Vegetable oil and ghee mills. | |
| (11) Tanning and leather finishing. | (11) Woollen mills. | |
| (12) Textile processing. | (12) Plastic materials and products. | |
| (13) Pigments and dyes. | (13) Wood and cork products. | |
| (14) Thermal Power Plants (Oil and Coal Fired). | (14) Any other industry to be specified by federal or Provincial Agency. | |
| (15) Rubber products. | | |
| (16) Paints, Varnishes and Lacquers. | | |
| (17) Pesticides. | | |
| (18) Printing. | | |
| (19) Industrial chemicals. | | |
| (20) Oil and Gas production. | | |
| (21 Petrochemicals. | | |
| (22) Combined effluent treatment. | | |
| (23) Any other industry to be specified by Federal or Provincial Agency | | |

*Source: Pak-EPA, n.d.*

## Table 12.4: Categories of industrial units for monitoring of gaseous emissions under the Self-Monitoring and Reporting System

| Category-A | Category-B |
|---|---|
| (1) Cement. | (1) Sugar. |
| (2) Glass manufacturing. | (2) Textile. |
| (3) Iron and steel. | (3) Choloralkali plants. |
| (4) Nitrogenous fertiliser. | (4) Dairy industry. |
| (5) Phosphate fertiliser. | (5) Fruits and vegetables. |
| (6) Oil and Gas production. | (6) Metal finishing and electroplating. |
| (7) Petroleum refining. | (7) Boilers, ovens, furnaces and kilns (gas-fired) |
| (8) Pulp and paper. | (8) Any other industry to be specified by Federal or Provincial Agency. |
| (9) Thermal Power Plants (coal and oil based) | |
| (10) Boilers, ovens, furnaces and kilns (coal and oil fired) | |
| (11) Brick-Kilns (firewood and bagasse based) | |
| (12) Any other industry to be specified by Federal or Provincial Agency. | |

*Source: Pak-EPA, n.d.*

## Table 12.5: National Environmental Quality Standards for Ambient Air

| Pollutants | Time-weighted average | Concentration in Ambient Air | | Method of measurement |
|---|---|---|---|---|
| | | *Effective from 1st July 2010* | *Effective from 1st January 2013* | |
| Sulphur Dioxide ($SO_2$) | Annual Average* 24 hours** | 80 µg/m$^3$ 120 µg/m$^3$ | 80 µg/m$^3$ 120 µg/m$^3$ | Ultraviolet Fluorescence method |
| Oxides of Nitrogen as (NO) | Annual Average* 24 hours** | 40 µg/m$^3$ 40 µg/m$^3$ | 40 µg/m$^3$ 40 µg/m$^3$ | Gas Phase Chemiluminescence |
| Oxides of Nitrogen as ($NO_2$) | Annual Average* 24 hours** | 40 µg/m$^3$ 80 µg/m$^3$ | 40 µg/m$^3$ 40 µg/m$^3$ | Gas Phase Chemiluminescence |
| $O_3$ | 1 hour | 180 µg/m$^3$ | 130 µg/m$^3$ | Non dispersive UV Absorption method |
| Suspended Particulate Matter (SPM) | Annual Average* 24 hours** Annual Average* | 400 µg/m$^3$ 550 µg/m$^3$ | 360 µg/m$^3$ 500 µg/m$^3$ | High Volume Sampling (Average flow rate not less than 1.1 m$^3$/min). |
| Respirable Particulate Matter (PM10) | 24 hours** | 200 µg/m$^3$ 250 µg/m$^3$ | 120 µg/m$^3$ 150 µg/m$^3$ | β Ray absorption method |
| Respirable Particulate Matter (PM2.5) | Annual Average* 24 hours** 1hour | 25 µg/m$^3$ 40 µg/m$^3$ 25 µg/m$^3$ | 15 µg/m$^3$ 35 µg/m$^3$ 15 µg/m$^3$ | β Ray absorption method |
| Lead (Pb) | Annual Average* 24 hours** | 1.5 µg/m$^3$ 2 µg/m$^3$ | 1 µg/m$^3$ 1.5 µg/m$^3$ | ASS method after sampling using EPM 2000 or equivalent filter paper |
| Carbon Monoxide(CO) | 8 hours** 1 hour | 5 mg/m$^3$ 10mg/m$^3$ | 5 mg/m$^3$ 10mg/m$^3$ | Non Dispersive Infra-Red (NDIR) method |

*Source: GoP, 2010*

*Annual arithmetic mean of min. 104 measurements a year taken twice a week for 24 hours at uniform interval.

**24 hourly/8hourly values should be met 98% of the time in a year; 2% of the time it may exceed but not on two consecutive days.

## Table 12.6: National Environmental Quality Standards for Municipal and Liquid Industrial Effluents (mg/l, unless otherwise defined)

| Sr. No. | Parameter | Existing Standards | Revised Standards | | |
|---|---|---|---|---|---|
| | | | Into Inland Waters | Into Sewage Treatment [5] | Into Sea |
| **1** | **2** | **3** | **4** | **5** | **6** |
| 1 | Temperature or Temperature Increase* | 40oC | ≤3oC | ≤3oC | ≤3oC |
| 2 | pH value (H+) | 6-10 | 6-9 | 6-9 | 6-9 |
| 3 | Biochemical Oxygen Demand (BOD) at 20oC[1] | 80 | 80 | 250 | 80** |
| 4 | Chemical Oxygen Demand (COD) [1] | 150 | 150 | 400 | 400 |
| 5 | Total Suspended Solids (TSS) | 150 | 200 | 400 | 200 |
| 6 | Total Dissolved Solids (TDS) | 3500 | 3500 | 3500 | 3500 |
| 7 | Oil and Grease | 10 | 10 | 10 | 10 |
| 8 | Phenolic compounds (as phenol) | 0.1 | 0.1 | 0.3 | 0.3 |
| 9 | Chloride (as Cl- ) | 1000 | 1000 | 1000 | SC*** |
| 10 | Fluoride (as F- ) | 20 | 10 | 10 | 10 |
| 11 | Cyanide (as CN- ) total | 2 | 1.0 | 1.0 | 1.0 |
| 12 | Anti-ionic detergents (as MBAS) [2] | 20 | 20 | 20 | 20 |
| 13 | Sulphate (SO4 2-) | 600 | 600 | 1000 | SC*** |
| 14 | Sulphide (S2-) | 1.0 | 1.0 | 1.0 | 1.0 |
| 15 | Ammonia (NH3) | 40 | 40 | 40 | 40 |
| 16 | Pesticides [3] | 0.15 | 0.15 | 0.15 | 0.15 |
| 17 | Cadmium [4] | 0.1 | 0.1 | 0.1 | 0.1 |
| 18 | Chromium (Trivalent and hexavalent) [4] | 1.0 | 1.0 | 1.0 | 1.0 |
| 19 | Cooper [4] | 1.0 | 1.0 | 1.0 | 1.0 |
| 20 | Lead [4] | 0.5 | 0.5 | 0.5 | 0.5 |
| 21 | Mercury [4] | 0.01 | 0.01 | 0.01 | 0.01 |
| 22 | Selenium [4] | 0.5 | 0.5 | 0.5 | 0.5 |
| 23 | Nickel [4] | 1.0 | 1.0 | 1.0 | 1.0 |
| 24 | Silver [4] | 1.0 | 1.0 | 1.0 | 1.0 |
| 25 | Total Toxic metals | 2.0 | 2.0 | 2.0 | 2.0 |
| 26 | Zinc | 5.0 | 5.0 | 5.0 | 5.0 |
| 27 | Arsenic [4] | 1.0 | 1.0 | 1.0 | 1.0 |
| 28 | Barium [4] | 1.5 | 1.5 | 1.5 | 1.5 |
| 29 | Iron | 2.0 | 8.0 | 8.0 | 8.0 |
| 30 | Manganese | 1.5 | 1.5 | 1.5 | 1.5 |
| 31 | Boron [4] | 6.0 | 6.0 | 6.0 | 6.0 |
| 32 | Chlorine | 1.0 | 1.0 | 1.0 | 1.0 |

*Source: GoP, 2000*
Explanations:
1. Assuming minimum dilution 1:10 on discharge, lower ratio would attract progressively stringent standards to be determined by the Fed. Env. Prot. Agency. 1:10 dilution means that for each 1 m3 of treated effluent, the recipient water body should have 10 m3 of water for dilution of this effluent.
2. Methylene Blue Active Substances; assuming surfactant as biodegradable.
3. Pesticides include herbicides, fungicides, and insecticides.
4. Subject to total toxic metal discharge should not exceed level given at S.No. 25.
5. Applicable only when and where sewage treatment is operational and BOD5 = 80mg/l is achieved by the sewage treatment system.
6. Provided discharge is not on the shoreline and not within ten miles of mangrove and other important estuaries.
* The effluent should not result in temperature increase of more than 3oC at the edge of the zone where initial mixing and dilution take place in the receiving body. In case zone is not defined, use 100 metres from the point of discharge.
** The value for the industry is 200mg/l.
***Discharge concentration at or below sea concentration (SC).
Note: Dilution of liquid effluents to bring them to the NEQS limiting values is not permissible through fresh water mixing with the effluent before discharging into the environment. The concentration of pollutants in water being used will be subtracted from the effluent for calculating the NEQS limits.

## Table 12.7: National Environmental Quality Standards for Industrial Gaseous Emission (mg/Nm³, unless otherwise defined)

| Sr. No. | Parameter | Source of Emission | Existing Standards | Revised Standards |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| 1 | Smoke | Smoke capacity not to exceed | 40% or 2 Ringleman Scale | 40% or 2 Ringleman Scale or equivalent smoke number |
| 2 | Particulate Matter | (a) Boilers and Furnaces | | |
| | (1) | (i) Oil Fired | 300 | 300 |
| | | (ii) Coal Fired | 500 | 500 |
| | | (iii) Cement Kilns | 200 | 300 |
| | | (b) Grinding, crushing, Clinker coolers and related processes, Metallurgical processes, converter, blast furnaces and cupolas. | 500 | 500 |
| 3 | Hydrogen Chloride | Any | 400 | 400 |
| 4 | Chlorine | Any | 150 | 150 |
| 5 | Hydrogen Fluoride | Any | 150 | 150 |
| 6 | Hydrogen Sulphide | Any | 10 | 10 |
| 7 | Sulpher Oxides (2) (3) | Sulfuric acid/Sulphonic acid plants | | |
| | | Other plants except power plants operating on oil and coal | 400 | 1700 |
| 8 | Carbon Monoxide | Any | 800 | 800 |
| 9 | Lead | Any | 50 | 50 |
| 10 | Mercury | Any | 10 | 10 |
| 11 | Cadmium | Any | 20 | 20 |
| 12 | Arsenic | Any | 20 | 20 |
| 13 | Copper | Any | 50 | 50 |
| 14 | Antimony | Any | 20 | 20 |
| 15 | Zinc | Any | 200 | 200 |
| 16 | Oxides of Nitrogen | Nitric acid manufacturing unit | 400 | 3000 |
| | (3) | Other plants except power plants operating on oil or coal | | |
| | | Gas fired | 400 | 400 |
| | | Oil fired | - | 600 |
| | | Coal fired | - | 1200 |

*Source: GoP, 2000*

Explanations:
1.    Based on assumption that the size of the particulate is 10 micron or more.
2.    Based on 1 percent Sulphur content in fuel oil. Higher content of Sulphur will cause standards to be pro-rated.

In respect of emissions of Sulphur Dioxide and Nitrogen oxide, the power plants operating on oil and coal as fuel shall on addition to National Environmental Quality Standards (NEQS) specified above, comply with the following standards:

**A. Sulphur Dioxide**

| Sulphur Dioxide Background levels micro-gram per cubic metre (µg/m3) Standards | | | | |
|---|---|---|---|---|
| *Background Air Quality (SO$^2$ Basis)* | *Annual Average* | *Max. 24-hours interval* | *Criterion I Max. SO$^2$ Emission (Tons per day per plant)* | *Criterion II Max. Allowable ground level increment to ambient air (µg/m$^3$) One year Average* |
| Unpolluted | <50 | <200 | 500 | 50 |
| *Moderately Polluted\** | | | | |
| Low | 50 | 200 | 500 | 50 |
| High | 100 | 400 | 100 | 10 |
| Very Polluted\*\* | >100 | >400 | 100 | 10 |

\* For intermediate values between 50 and 100 µg/m3 linear interpretations should be used.
\*\* No project with Sulphur Dioxide emissions will be recommended.

**B. Nitrogen Oxide**

Ambient air concentrations of Nitrogen oxides, expressed as NOx should not exceed the following:

Annual Arithmetic Mean          100 µg/m3
                                (0.05 ppm)

**Emission level for stationery source discharge before mixing with the atmosphere should be maintained as follows:**

**For fuel fired steam generators as Nanogram (10o-gram) per joule of heat input:**

Liquid fossil fuel          ..      ..      ..      130
Solid fossil fuel     ..      ..      ..      300
Lignite fossil fuel     ..      ..      ..      260

Note:    Dilution of gaseous emissions to bring them to the NEQS limiting value is not permissible through excess air mixing blowing before emitting into the environment.

*Source: GoP, 2000*

### Table 12.8: National Environmental Quality Standards for Noise

| Sr. No. | Category of Area/Zone | Effective from 1st July 2010 | | Effective from 1st July 2012 | |
|---------|----------------------|---------------|----------|----------|----------|
| | | Limit in dB(A) Leq | | | |
| | | Day Time | Night Time | Day Time | Night Time |
| 1 | Residential Area (A) | 65 | 50 | 55 | 45 |
| 2 | Commercial Area (B) | 70 | 60 | 65 | 55 |
| 3 | Industrial Area (C) | 80 | 75 | 75 | 65 |
| 4 | Silence Zone (D) | 55 | 45 | 50 | 45 |

*Source: GoP, 2010*

Note: 1. Day time hours: 6.00 a.m. to 10.00 p.m.
2. Night time hours: 10.00 p.m. to 6.00 a.m.
3. Silence Zone: Zones which are declared as such by the competent authority. An area comprising not less than 100 metres around hospitals, educational institutions and courts.
4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.
*dB(A) Leq: Time weighted average of the level of sound in decibels in scale A which is relatable to human hearing.

### 12.9 Practical element

A student field visit should be organised of a project, possibly one which has previously been covered in e.g. within the EIA report quality review theme, and an evaluation of the situation after construction should be attempted. In this context, whether monitoring is actually in place should be explored. Furthermore, students should critically evaluate whether predicted impacts or unpredicted impacts have occurred.

# 13   EIA effectiveness – what do we need to consider in order to enhance positive and avoid negative effects

This chapter is divided into six sub-sections. First, terminology and the conceptual framework for EIA effectiveness are clarified.  Then effectiveness frameworks are introduced.  This is followed by a section introducing effectiveness criteria.  Subsequently, the empirical evidence for EIA effectiveness is introduced and discussed.  Recommendations are provided on how to support effective EIA.  The main sources this chapter draws on include Fischer (2009) and Fischer et al. (2008; chapter 12 by Retief: pp.122-135).

### 13.1 Exploring effectiveness – terminology and conceptual framework

Ever since it was first used, EIA has been under pressure to prove its added value.  On the one hand, this pressure has come from developers, politicians and decision makers.  On the other hand, traditional disciplinary boundaries have meant that this inherently inter-disciplinary decision support instrument has also, at times, been under fierce criticism from the research and academic communities.  In this context, empirical evidence and proof of how effective EIA is in achieving its objectives is of particular importance.  EIA effectiveness debates have revolved around questions such as (Retief, 2008, p.122):

- "is EIA a good idea and why?

- how do we know it adds value?

- can we prove that EIA is not a waste of time?

- is EIA as a decision support tool succeeding?"

To evaluate performance or effectiveness of EIA is a key component of any EIA system (Sadler, 1996; Wood, 2003).  A particular challenge in this context is that effectiveness evaluation is a cross cutting issue, which is integrated with other EIA debates.  Reflecting on the EIA literature, Retief (2008) suggested that EIA key debates revolve around three interrelated themes: EIA identity, application and performance evaluation.  This is illustrated in Figure 13.1.

The first key debate revolves around the identity of EIA, asking 'What is EIA?' Other associated debates deal with the need for EIA, what it aims to achieve and how it can be defined. The different aspects of this debate help to develop a basic understanding of what EIA effectiveness comprises and what it is about. What is of particular importance in this context is that the evolution of EIA thinking has not been driven by theory, but rather by practice. EIA theory has developed later, mainly over the past twenty years. Important EIA theory works include e.g. Bartlet and Kurian (1999), Lawrence (2000), Leknes (2001), Nilsson and Dalkmann (2001), Fischer (2003), Weston (2004), Richardson (2005), Fischer, (2007), and Elling (2008).

The second debate focuses on how EIA can be applied, dealing with EIA systems as well as procedural and methodological issues. The second debate has clearly received most attention in the professional literature to date.

Finally, the third debate is dealing with the evaluation of EIA performance or effectiveness, exploring how well EIA is being conducted and what it is achieving. Achieving a better understanding in theme 3 also means themes 1 and 2 are enhanced.

## 13.2 Effectiveness framework

Different people often have different things in mind when talking about effectiveness. Some think of impact, others of success, and still others of performance when using the term. Based on a review of the professional literature, Retief (2008) summarises the use of different terminology and explains differences as follows:

● effectiveness as compared with success: While most authors use the term 'effectiveness', some have also talked about 'success', including e.g. Sadler (2004) and Runhaar and Driessen (2007). In practice the two terms are interchangeable.

● effectiveness as compared with impact: The term 'impact' is normally used when making reference to the contribution of EIA on decision-making. Retief (2008) therefore suggests that 'influence' would be a better

### Figure 13.1: Key EIA debates



*Source: Retief, 2007; 2005*
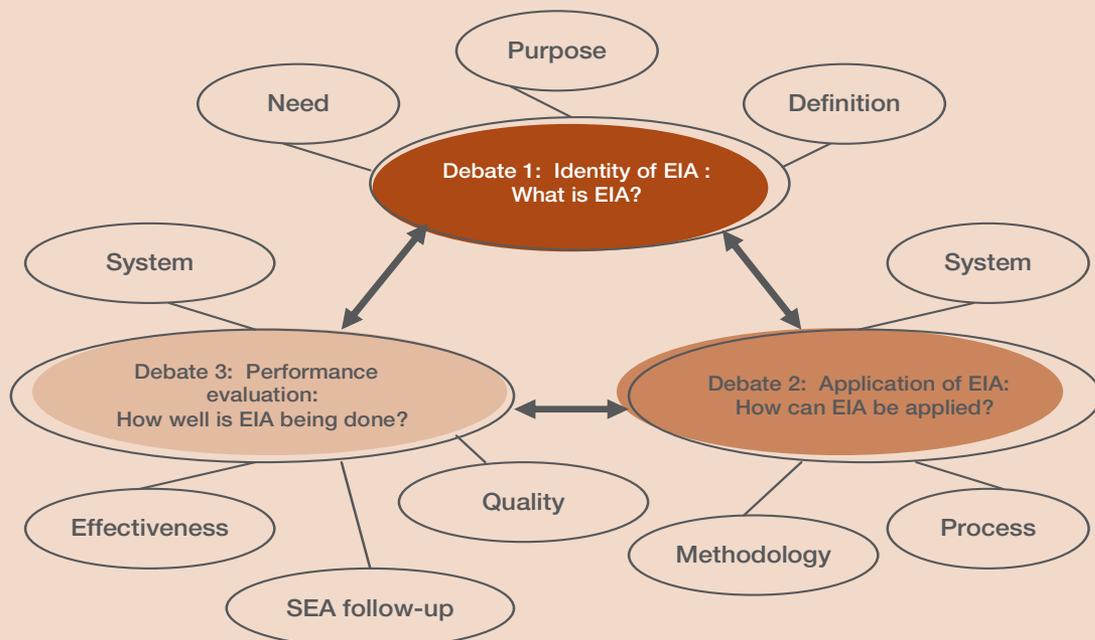
word to use in order to avoid confusion with the word 'impact' in EIA.

- effectiveness as compared with efficiency: While these two terms are also often used interchangeably, there is a distinct difference between the two. Retief (2008) suggests that "generally speaking, effectiveness asks the question 'are we doing the right things?', while efficiency asks, 'are we doing things right?'".

- effectiveness as compared with quality: Retief explains that 'quality' is a measure for 'inputs' to an EIA, including e.g. dealing with application of regulations, application of methods, and information products. 'Effectiveness', on the other hand, is about

'outputs' (see also Lawrence, 1998). The two are connected, as many believe that good quality inputs can lead to effective outputs;

- effectiveness review as compared with performance evaluation: Retief (2008) suggests that effectiveness review is a form of performance evaluation. While effectiveness has been said to mean whether the EIA process works satisfactorily to meet the intended purpose (Sadler, 2004), performance is more about the successful accomplishment of the task at hand.

- effectiveness review as compared with EIA follow-up: While EIA effectiveness review is interested in the effects during and after project planning (i.e. during implementation),

## Figure 13.2: EIA quality/effectiveness analysis framework



*Source: Retief (2008, p.126), based on Lawrence, 1997*
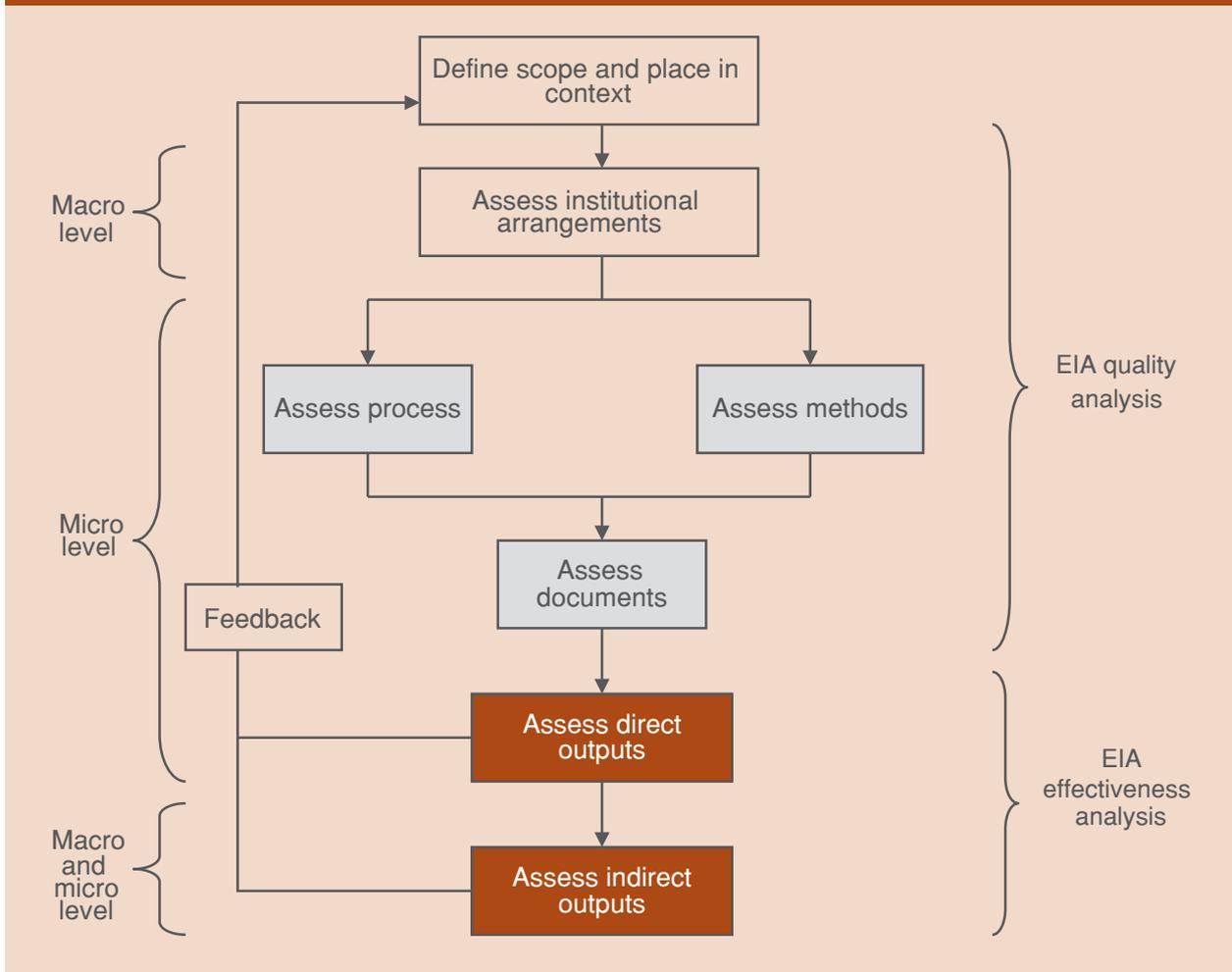
follow-up is about the latter.  However, it is important that follow-up also features during EIA processes in that it needs to be considered early on.

Lawrence (1997) depicted a holistic framework which he named an 'ideal EIA quality/effectiveness analysis'.  This is shown in Figure 13.2.  His framework requires the macro context to be defined.  Afterwards, a micro level review is conducted, which includes looking at the quality of process, methods and documentation.  Furthermore, direct and indirect outcomes are to be reviewed.  A feature of the framework is that it is structured and clearly differentiates between macro and micro levels.

### 13.3 EIA effectiveness criteria

There are two main aspects involved in measuring EIA effectiveness (Retief, 2007).  The first involves identifying and formulating specific effectiveness criteria.  Secondly, methods are required for measuring conformance with these criteria.  Some have argued that as the main purpose of EIA is about influencing decision-making, only qualitative or subjective measurement may be possible (Wood, 2003, p.10).  Also, criteria may differ, depending on the specific context of application (Annandale, 2001; Fischer and Gazzola, 2006).

Marsden (1998) argues that criteria should be chosen that allow for the determination of the extent to which objectives may be achieved.  He puts forward an approach to effectiveness evaluation, consisting of three aspects: objectives, principles and criteria.  These are going to differ, depending on the specific EIA system.

Retief (2008, p127) argues that a distinction should be made "between criteria designed to measure enabling conditions that would support effectiveness and criteria designed to actually measure if EA was effective".  This is important because there are different approaches to devising aspects that enable effective EIA.  These include criteria that consider the whole EIA

system (Elling, 1997; Wood, 2003; Fischer, 2007), those that consider the quality of EIA reports (Lee and Colley, 1998; Curran, et al., 1998; Bonde and Cherp, 2000) and those that consider the quality of EIA processes (Fischer, 2002; IAIA, 2002; Noble, 2003).  With reference to the previous section, these criteria would broadly speaking be classified as 'input quality' criteria rather than 'output effectiveness' criteria.  While some authors have argued that to date input quality has a weak link with output effectiveness (Retief, 2005c), more recently Phylip-Jones and Fischer (2013) found a statistically significant correlation between the two for wind farm EIAs in Germany and the UK.  This was also confirmed to some extent by Arts  et al. (2012).  However, there can be no doubt that the level of effectiveness is influenced by other factors, too.  This includes in particular a willingness of decision makers and proponents to use the instrument effectively.

Overall, there is consensus among the professional community that the 'litmus test' for EIA effectiveness is whether more informed decisions were made on the basis of EIA.  Furthermore, there is also a substantive aim, namely to maintain, or possibly 'restore', environmental quality.  With regards to the latter, it is not possible to make direct comparisons of environmental quality with and without EIA.  A possibility is to compare the same projects in similar environments with and without the instrument.  This was done by Wende (2001) who found a statistically significant difference with regard to the environmental quality resulting from projects with and without EIA in Germany.

Sadler (2004) proposed an effectiveness package consisting of a framework and a checklist.  The framework consists of:

(1) a preliminary audit of the adequacy of institutional arrangements;
(2) a step by step review of EIA implementation and operational performance;
(3) a review of the technical, consultative and administrative components of the EIA process; and

(4) a review of the influence of EIA on decision-making.

Following on from this, an overall review of EIA effectiveness and performance is attempted. While this package provides a good starting point for reviewing the effectiveness of EIA, criteria will differ depending on the specific context of application, i.e. between different countries.

Based on a multi-track approach put forward by Partidario and Arts (2005), Retief (2008) outlined five possible pathways for designing EIA effectiveness criteria, as follows:

- Track 1: Monitoring and auditing;

- Track 2: Evaluating achievement of stated objectives;

- Track 3: Evaluation of the performance of the strategic initiative;

- Track 4: Checking conformance of subsequent decision-making with the strategic initiative and SEA; and

- Track 5: Monitoring and evaluation of the actual impacts of a strategic initiative on the environment and sustainability.

## 13.4 Empirical evidence for EIA effectiveness

Initially, during the early years of EIA application, many EIA advocates were convinced that EIA was indeed able to protect the environment and lead to better decisions. Wandesforde-Smith and Kerbavaz (1988, p.162), for example, stated that:

"At the US federal level, impact assessment works. We know it works to influence project selection and design and to mitigate environmental impacts"

Subsequently, EIA became subjected to much criticism, in particular in the second half of the 1990s and the first few years of the 2000s. This was connected with the so-called 'post-modern' turn in decision-making and planning. Those propagating it did not believe that an instrument based on a rational framework was able to influence decisions. This, they argued could only be achieved through discourse. However, studies evaluating EIA at the time found that while there clearly were problems, overall EIA clearly did have an impact on decision-making and was making decisions more environmentally sustainable. One example is shown in Table 13.1, looking at various aspects that are said to contribute to EIA as a successful policy instrument, following work by Sadler (2004).

## Table 13.1: Current performance of aspects that contribute to making EIA a successful policy instrument

| Aspect Evaluated | Score / rating |
|---|---|
| Test 1: Wide adoption and use | B+ |
| Test 2: Record of process innovation or improvement | B |
| Test 3: Inclusion of new areas and aspects | A- |
| Test 4: Added value to decision-making and condition setting | C+ |
| Test 5: Effective means of achieving environmental protection | C- |

Evaluation scale:
A = The feature is represented fully and completely
B = The feature is represented well but there are minor qualifications
C = The feature is represented but there are a number of reservations
D = The feature is not represented well
E = The feature is represented only minimally or incipiently
Source: Sadler, 2004

Another study by Wood (2003) compared the influence of EIA reports on decisions for seven countries (See: Table 13.2). He found that in all countries there were regulatory requirements for the EIA report to be considered in decision-making and that in practice six of the seven countries could demonstrate partial influence. Wood concluded that although all countries had differing mechanisms for trying to make sure EIA gets considered, decision makers often try to circumvent them, based on other political or social agendas. Quite a few other studies confirmed his results, establishing an overall moderate impact of EIA only (Wood and Jones, 1997; Cashmore et al., 2004; Christensen et al., 2005; Jay et al., 2007).

In 1990, the Dutch Evaluation Committee (in Sadler 1996) found that early (i.e. pre-1990) EC Directive based EIAs had only a negligible or at best small influence on project development, if compared with the time and money spent on them. However, it also found that just over half (52%) of the EIAs had led to concrete modifications of the project and that 68% had influenced the parties involved in the project making process.

Papoulias and Nelson (1996) conducted a survey of EU member states' competent authorities' opinions on the effectiveness of EIA. They found that overall, EIA was perceived as being effective. Furthermore, they established that overall, EIA was perceived as having an overall positive cost-benefit ratio, i.e. EIA was value for money in terms of leading to changes in underlying projects.

Ten Heuvelhof and Nauta (1997) found that EIAs in the Netherlands had a great impact, suggesting that 79% of Dutch EIAs showed high direct

## Table 13.2: Consideration of EIA in project level decision-making

*Criterion question: Must the findings of the EIA report and the review be a central determinant of the decision on the action?*

| Jurisdiction | Criterion met? | Comment |
|---|---|---|
| United States | Partially | Consideration in and explanation of, decision and disclosure of environmental effects mandatory. In practice, EIS often influences decisions |
| United Kingdom | Partially | Environmental information is a material consideration but not necessarily a central determinant. Practice varies. |
| The Netherlands | Partially | Explanation of way environmental impacts considered in decision-making mandatory. In practice, EIA generally influences decisions. |
| Canada | Partially | Findings of self-directed assessment influence minister's decision: reason must be given by relevant authority when cabinet disagrees with recommendations of public review report |
| Australia | Partially | Environment Australia's assessment report based on EIA report must be taken into account in determining Environmental Minister's decision on approval. |
| New Zealand | Partially | Act makes EIA central to decision but, in practice, EIA is sometimes not given appropriate weight. Practice improving. |
| South Africa | No | Environmental authorisation must be based on scoping report or environmental impact report but decision sometimes narrowly based on nature conservation matters, not on full range of EIR issues. Refusals rare. |

*Source: Retief, 2008, based on Wood, 2003*

benefits.  Furthermore, they specified that even when taking into account the time and financial efforts required to produce an EIA, 69% of them would still have a beneficial impact.  They identified three reasons for their findings: (1) the process-bound nature of EIA; (2) the possibility of considering EIA as part of the negotiation arena; and (3) the presence of the EIA Committee and its role in the process.

Marr (1997) examined EIA practice for wastewater treatment plants conducted between the late 1980s and 1993 in the UK and Germany.  Her findings of practice in the early days of formal EIA requirements in both countries indicate a rather varied picture regarding the influence of EIA on decision-making.  While half of 27 interviewed competent authorities from the UK who expressed an opinion said that EIA had led to modifications in a wastewater treatment project (more than 80% said the EIA-report was an important consideration), only one third of the 34 interviewed German competent authorities shared this opinion (with less than 50% saying that the EIA-report was an important consideration).  Marr's study is particularly useful in terms of raising questions on possible differences between different countries and sectors, but also regarding the importance of considering the overall context within which EIA is applied.  Thus, the comparatively low impact in the German case was found to be connected with the existence of a formal landscape / environmental planning system which had been in existence in Germany since the late 1970s, following requirements formulated in the Federal Nature Conservation Act 1976.  This was already fulfilling many of the tasks that EIA is supposed to deliver.

Based on a quality review of 112 EIA reports from eight EU member states i.e. Denmark, Germany, Portugal, Spain, the UK, Belgium, Ireland and Greece, Barker and Wood (1999) concluded that

'there is no doubt that the EIA process is bringing about modifications to the projects assessed,

although many of the mitigation measures proposed are of minor significance'.

Nitz and Holland (2000) looked at environmental management commitments made within 285 Australian EIA reports. They found that a majority of these contained environmental monitoring and mitigation commitments.  More than half of the EIA reports also contained suggestions for corrective actions.

Wende (2001) examined the performance of 125 EIAs in Germany that had been prepared between 1990 and 1997.  In this context, he looked at the impacts of these EIAs on 'spatial modifications in planning decisions', and compared outcomes with eleven projects which did not include EIA (these ranged from roads and waterways, over shopping and recreational to waste disposal and sewage treatment projects).  Importantly, he found that there was a significant difference in the predicted direction i.e. spatial modifications of projects involving EIA.

Christensen et al. (2005) evaluated 36 Danish EIAs.  They found that in 90% of these, projects were modified based on EIA.  However, they also established that most of these were only minor.

Finally, a comment on post-EIA auditing.  Auditing allows to establish whether EIA 'greening' efforts are based on correct predictions.  If predictions turn out to be largely incorrect, then 'greening' may be judged as not having been successfully achieved.  In this context, it appears that we are witnessing a slow improvement of the situation. Thus, while in 1988, Bisset and Tomlinson identified 95% of all EIS predictions as either incorrect, unsure, unverifiable or non-quantifiable, Dipper  et al.(1998) found that 'only' 55% fell into this category. Of those predictions that were auditable, nearly three -quarters were accurate. More research in this context is urgently needed.

More recently, Phylip-Jones and Fischer (2013) evaluated the application and impact of EIA for

twenty wind farms (ten onshore and ten offshore) in the UK and Germany. They established a major to moderate impact on the decisions made (Figure 13.3).

They also provided for an overview of the type and extent of measures adopted in wind farm developments based on EIA. This is summarised in Figure 13.4. In all twenty cases conditions were included on the overall operating lifetime of the wind farm and the site re-instatement after operation. Furthermore, fifteen cases included a reduction in the number of turbines and ten restrictions on construction activity. Further measures considered included changes to wind farm layouts, stipulations of specific wind turbine types or sizes and conditions relating to electrical cable routing.



**Figure 13.3: Decision makers' perceptions on the overall influence of EIA**
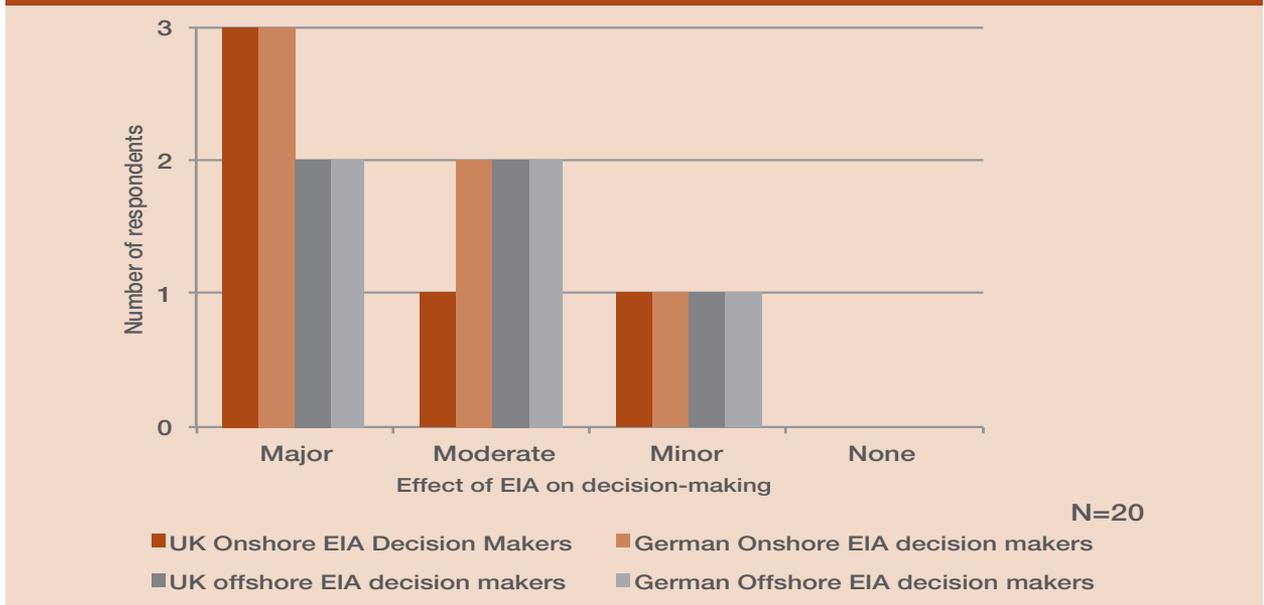
*Source: Phylip-Jones and Fischer, 2013*



**Figure 13.4: Type and extent of mitigation measures in wind farm EIAs**
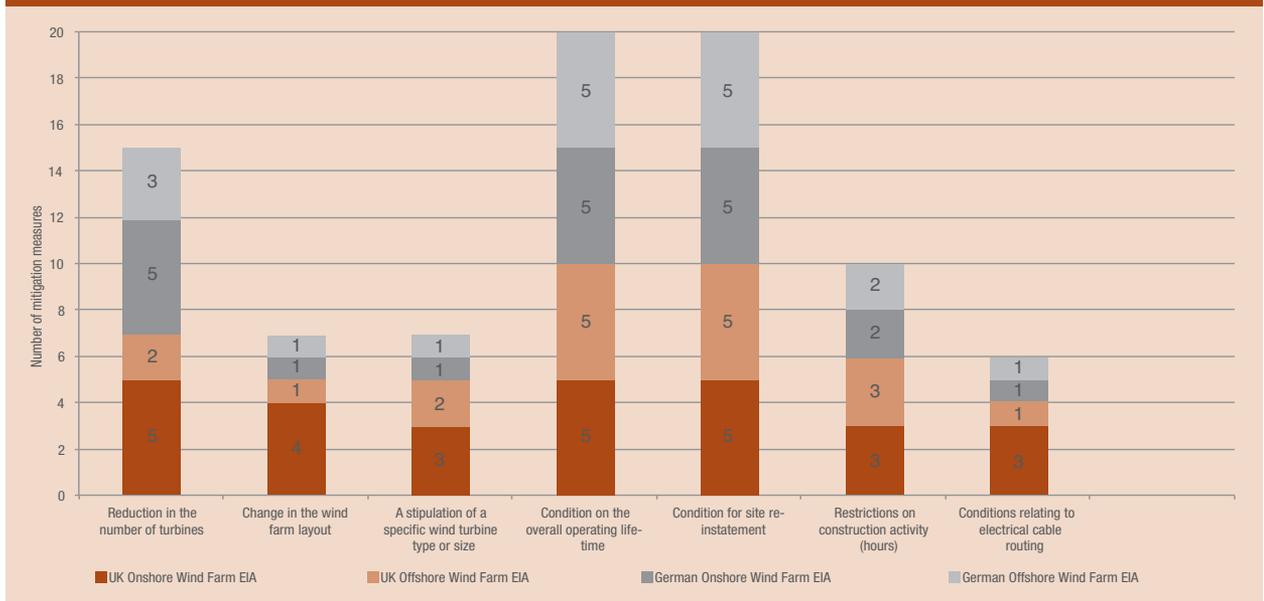
*Source: Phylip-Jones and Fischer, 2013*

## 13.5 How to support effective EIA

Much has been written on how to improve EIA. This includes e.g. the existence of best practice guides and principles, local guidance and others. Also, there is now a wide range of training courses and capacity building programmes available. Sadler (2004) summarised support measures in terms of two aspects. First, there are requirements for appropriate institutional arrangements e.g. sound administration, management and EIA process review. Secondly, he introduced three competencies for conducting EIA, referred to as the 'three Rs' of good practice, namely: rigorous analysis, responsive consultation and responsible administration.

Various authors have looked at factors that make EIA effective. More recently, in this context, the focus has been on strategic environmental assessment (SEA). Most authors have focused on the overall context within which the instrument is applied, and it is therefore suggested here that they are also applicable to a large extent to EIA. Two publications from the last decade have provided literature reviews on the subject. Runhaar and Driessen (2007), for example, looked at how fifteen publications were looking at effectiveness. The following important effectiveness criteria were identified:

- SEA needs to be flexible in order to fit into the decision-making context;

- Stakeholders need to be given an opportunity to participate;

- The SEA process needs to be transparent;

- SEA needs to have a binding character;

- Assessment needs to be of good quality;

- Values in SEA should reflect the values of the policy context;

- Decision makers should be open to environmental / sustainability issues;

- SEA needs to be tiered with other assessments;

- Adequate resources need to be made available; and

- Communication needs to be effective.

Fischer and Gazzola (2006) evaluated 45 professional publications, identifying two broad categories of criteria that support effectiveness. These include context and methodological criteria, as follows:
- Context criteria for effective SEA application:
  - the existence of an established institutional framework for the effective consideration of the environment including, in particular, biophysical aspects in PPP making, including an awareness for environmental problems as well as the existence of a sustainable development framework that provides for SEA objectives;

  - the existence of effective co-operation and public participation in PPP making; and

  - the existence of an effective project EIA system with which SEA can be tiered.

- Methodological criteria for effective SEA application:
  - a high degree of accountability and quality control in SEA;

  - a stakeholder driven, focused, iterative, flexible and adaptable SEA process that is open to the input of the general public; and

  - cost and time efficient generation of sufficient, reliable and usable information on environmental baseline, impact and alternative assessments in SEA making.

Retief (2007) looked at SEA practice and its effectiveness in South Africa. His findings are of importance for many other developing countries, too. He suggests that even in a system with no

formal SEA requirements extensive practice can develop. In this context, he says that a range of factors are important, including an enabling legal framework combined with a strong consultancy sector. What is of particular importance of Retief's findings is that in contrast to what many other authors are saying, he suggests that extensive practice may even be able to develop in the presence of a lack of clarity on what exactly SEA comprises, a lack of explicit SEA legislation and possibly even without a strong commitment from decision-makers and weaknesses of capacity within the public sector. However, what is also important is that extensive practice does not necessarily mean the instrument is applied effectively. An important implication of Retief's findings is that countries can have voluntary SEA systems in place, but they may not be able to implement recommendations of SEA in practice.

## 13.6 Practical element

The practical element for the theme EIA effectiveness can involve students in exercises such as role plays and games. Students can thus test how they may be able to influence others during assumed decision-making processes. Subsequently, short essays may be prepared on how EIA is thought to be effective in greening decision-making. In this context, Pakistani examples should be sought and described.

# 14 Introduction to SEA

This chapter is divided into six sections.  First, what SEA is and how it differs from EIA is explained.  Next, the SEA process is introduced.  SEA is defined and its potential benefits are explored.  The substantive focus of SEA and differences from project EIA are elaborated on, before principles of SEA and different SEA approaches are introduced.  Some international plan and programme SEA case studies are presented.  While the complimentary NIAP document to the curriculum, the 'EIA Handbook' lists a range of EIA case studies, there is currently a lack of suitable SEA cases.  This is the main reason for including those here.  The main sources this chapter draws on include Fischer (2007), Furman and Hilden (2001), and Department of Environmental Affairs and Tourism (2004b).

### 14.1 Introduction to SEA - what is it and how does it differ from EIA

The primary purpose of EIA is to determine and evaluate the environmental impacts of development and to inform decision-making at the project level.  However, there are a number of more strategic decisions that are typically made at plan, programme and policy levels of decision-making.  These can have a major impact on the nature of later development.  At these more 'strategic' levels of decision-making, strategic environmental assessment (SEA) has evolved.  This is supposed to determine the environmental implications of policies, plans and programmes and is complementary to EIA.

Initially, SEA was mainly thought of in terms of the application of project EIA principles to PPPs (Fischer and Seaton, 2002).  However, subsequently different interpretations emerged that were connected in particular with:
●   the different geographical and time scales of SEA and EIA (Lee and Walsh, 1992);

●   the different levels of detail at strategic and project tiers (Partidário and Fischer, 2004); and

●   the different ways in which strategic decision processes are organised, when compared with project planning (Kørnøv and Thissen, 2000; Nitz and Brown, 2001).

To date, SEA has been applied in a wide range of different situations, including

trade agreements, funding programmes, economic development plans, spatial/land use and sectoral, such as transport, energy, waste, and water policies, plans and programmes (PPPs). Numerous examples for SEA applications in a range of sectors can be found in the professional literature, including spatial/land use planning (Therivel, 2008; Fischer, 2010), transport planning (Fischer, 2002; 2006), waste management (Arbter, 2005; Verheem, 1996; Fischer et al. , 2011), trade (Kirkpatrick and George, 2004), oil and gas extraction (DTI, 2001),

economic development plans (Fischer, 2003b), wind farms (Kleinschmidt and Wagner, 1996; Schomerus et al. 2006; Phylip-Jones and Fischer 2013), water/flood management (DEFRA, 2004), tourism (Lemos et al., 2011) and funding programmes (Ward et al., 2005). Finally, policy SEA has been the main focus of two publications, including Sadler (2005) and the World Bank (2005).

Currently, probably the best-known SEA 'framework law that establishes a minimum

## Figure 14.1: EU Directive based SEA process



Plan and programme making process ←→ SEA process

A. Identify aims and objectives of strategic action ←→ Screening: is a SEA likely to be necessary?

B. Identify alternative ways to achieve objectives ←→ Scoping: Issues to be considered; baseline, objectives and targets

C. Assess alternatives and choose preferred alternative ←→ Assessment: avoid, minimise, mitigate, compensate

Consultation and participation[2]

D. Prepare draft pland and have it reviewed ←→ SEA Report: (and Review[1])

E. Decision Making - approve plan ←→ Decision Making: – approve SEA

F. Implement and monitor strategic action ←→ SEA Monitoring and follow-up

Notes: 1 not explicitly required by the Directive.
2 according to the Directive, at least at scoping and report stages of the SEA process.

*Source: Fischer, 2007; see also European Commission, 2006*

common procedure for certain official plans and programmes' (Dalal-Clayton and Sadler, 2005, p.37) is the European Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment ('SEA Directive'; European Commission, 2001b). This Directive advocates the application of a systematic, pro-active EIA-based and participative process that is prepared with a view to avoiding unnecessary duplication in tiered assessment practice. In this context, however, policies and cabinet decision-making are not mentioned. In its short lifetime to date, the SEA Directive has not only had an impact on EU member states, but also within a wider international context. It has been a reference point for practice, for example, in Asia, Africa and South America. Furthermore, the Kiev protocol to the Espoo Convention (UNECE, 2003) on trans-boundary SEA formulates almost identical requirements to the Directive, though it also explicitly mentions the possibility of applying SEA at the policy level. This protocol and the associated Resource Manual (UNECE, 2006) are likely to enhance SEA application in United Nations Economic Council for Europe (UNECE) states outside the EU.

## 14.2 The SEA process

Figure 14.1 shows a SEA Directive-based

assessment process. This is EIA based and is linked to plan and programme making stages in a continuous and integrated decision flow. This process is objective-led namely, trying to influence PPP making so that certain objectives can be reached) and baseline-led namely, relying on baseline data to be able to make reliable projections in assessment), and reflects ideas of instrumental rationality (Faludi, 1973). If applied in the way shown in Figure 14.1, the SEA process is thought to be able to influence the underlying plan and programme making process, with a view to improving it from an environmental perspective. Furthermore, a SEA that is applied in this manner may reshape the plan and programme decision flow, supporting not only the consideration of environmental issues at each stage of the process, but also leading to improved transparency and governance (Kidd and Fischer, 2007).

Describing non-EIA-based SEA, applied in policy and cabinet decision-making situations, at times also referred to as 'policy assessment'-based SEA, is not as straightforward, as this is normally portrayed as being flexible, adaptable and at times communicative i.e. reflecting ideas of communicative rationality (See: Healey, 1996). However, even non-EIA-based SEA is normally

### Box 14.1: Definition of SEA

SEA aims to ensure that due consideration is given to environmental and possibly other sustainability aspects in policy, plan and programme making above the project level. It is:
- A systematic, objectives-led, evidence-based, proactive and participative decision-making support process for the formulation of sustainable policies, plans and programmes, leading to improved governance; it can function as:
  - a structured, rigorous and open project EIA-based administrative procedure in public and, at times, private plan and programme making situations;
  - a possibly more flexible assessment process:
  - in public and at times private policy-making situations; and
  - in legislative proposals and other policies, plans and programmes, submitted to cabinet for decision-making.

- A policy, plan and programme making support instrument that is supposed to add scientific rigour to decision-making, applying a range of suitable methods and techniques; and

- A systematic decision-making framework, establishing a substantive focus, particularly in terms of alternatives and aspects to be considered, depending on the systematic tier (policy, plan or programme), administrative level (national, regional, local) and sector of application.

Source: Fischer, 2007

perceived as being a systematic process, which may take different forms (See: Kørnøv and Thissen, 2000). To date, attempts to define non-EIA-based SEA in a generic way have either led to a somewhat blurred picture of SEA or, ironically, have made it look similar to EIA-based SEA. This was described by Fischer (2003a), based on observations made by Tonn et al. (2000) and Nielsson and Dalkmann (2001). Generally speaking, non-EIA-based assessment approaches are considered to be less methodologically rigorous than EIA based processes, and descriptions of non-EIA-based SEA frequently mention the following core elements:

- Specifying the issue (problem identification);

- Goal setting (what are aims, objectives and targets);

- Information collection;

- Information processing and consideration of alternatives;

- Decision-making; and

- Implementation.

While there are a range of non-EIA-based systems, there is currently hardly any empirical evidence available for what makes non-EIA process-based SEA effective.

## 14.3 Definition and potential benefits of SEA

SEA's main aim is to ensure due consideration is given to environmental and possibly other sustainability aspects in PPP making above the project level. Furthermore, it is supposed to support the development of more transparent strategic decisions. It attempts to provide relevant and reliable information for those involved in PPP making in an effective and timely manner. As mentioned above, the exact form of SEA will depend on the specific situation and context it is applied in. Procedurally, differences are particularly evident between administration-led SEA and cabinet SEA. Regarding the substantive focus, that is, the issues and alternatives to be considered, differences may exist between different administrative levels (for example, national, regional, local), strategic tiers (for example, policy, plan and programme) and sectors (for example, land-use, transport, energy, waste, water). While certain key elements are likely to be reflected in every SEA system, others will differ depending on established planning and assessment practices, as well as on the specific traditions of the organisations preparing PPPs and SEAs. Based on what has been described in the previous section, Box 14.1 presents an up-to-date definition of SEA.

Generally speaking, a range of benefits are supposed to result from the application of SEA. In this context, SEA aims at supporting PPP processes, leading to environmentally sound and sustainable development. Furthermore, it attempts to strengthen strategic processes, improving good governance and building public trust and confidence into strategic decision-making. Ultimately, it is hoped that SEA can lead to savings in time and money by avoiding costly mistakes, leading to a better quality of life. Box 14.2 shows those SEA characteristics, based on which benefits are thought to result.

## Box 14.2: SEA characteristics, based on which benefits are thought to result

1. SEA allows for a more systematic and effective consideration of wider environmental impacts and alternatives at higher tiers of decision-making, leading to more effective and less time-consuming decision-making and implementation.
2. SEA acts as a proactive tool that supports the formulation of strategic action for sustainable development.
3. SEA increases the efficiency of tiered decision-making, strengthens project EIA and identifies appropriate and timely alternatives and options; in this context, it helps to focus on the right issues at the right time and aims to uncover potentially costly inconsistencies.
4. SEA enables more effective involvement in strategic decision-making, creating knowledge at low costs.

Source: Fischer, 2007; adapted from Fischer (1999a) and Dusik et al. (2003).

## 14.4 Focus of SEA and differences from project EIA

SEA is applied in strategic decision-making contexts that precede project decisions. Being associated with decisions on aims and objectives for future development, SEA may deal with issues such as need and demand management, evaluating, for example, different fiscal, regulatory or organisational and spatial development options. Project EIA, by contrast, deals with detailed decisions that are normally concerned with the location and design of a project. In practice, project EIA has frequently shown to revolve around measures for mitigating negative environmental impacts. Alternatively, SEA would normally aim at preventing negative impacts and at proactively enhancing positive developments. Furthermore, whereas in project EIA, alternatives to be assessed are often limited to minor variants, SEA may address a broad range of alternatives covering different sectors.

SEA can be applied in a range of situations that may differ in terms of their 'strategicness', and the range of different SEA applications is much wider than the range of project EIA applications. Box 14.3 summarises the changing focus of SEA, depending on how far away from the project level it is applied, that is, how 'strategic' it is. This shows a transition in the shape that SEA is likely to take from lower tiers of decision-making to higher tiers. Whereas at lower tiers, SEA is likely to be based on a more rigorous EIA-based approach, at higher tiers it is likely to be more flexible, and possibly non-EIA based. Methods and techniques applied vary, depending on the specific situation of application. At lower tiers, methods and techniques typically used in EIA for example, field surveys, overlay mapping and multi-criteria analysis (MCA) for comparing different spatial alternatives may be useful and appropriately applied.

At higher tiers, methods and techniques typically applied within policy-making may be more appropriate, such as forecasting, backcasting and visioning. Furthermore, there are methods and techniques that may be applied at both, higher and lower tiers, including, for example, checklists, matrices and impact trees. Generally speaking, quantification within assessment is more difficult to achieve at higher tiers that come with a greater degree of uncertainty. However, this does not mean that it is impossible to apply more quantitative techniques, as the frequent use of scenario analysis and mathematical modelling have shown (See Fischer, 2002).

### Box 14.3: The changing focus of SEA from lower tiers to higher tiers

| | SEA | | | EIA |
|---|---|---|---|---|
| | **'Higher tiers' / 'Lower tiers'** | | | |
| Decision making level | Policy ⟶ | Plan ⟶ | Programme ⟶ | Project |
| Nature of action | Strategic, visionary, conceptual | | | Immediate, operational |
| Output | General | | | Detailed |
| Scale of impacts | Macroscopic, cumulative, unclear | | | Microscopic, localised |
| Timescale | Long to medium term | | | Medium to short term |
| Key data sources | Sustainable development strategies, state of the environment reports, vision | | | Field work sample analysis |
| Type of data | More qualitative | | | More quantitative |
| Alternatives | Area wide, political, regulative, technological, fiscal, economic | | | Specific locations, design, construction, operation |
| Rigour of analysis | More uncertainty | | | More rigour |
| Assessment benchmarks | Sustainability benchmarks (criteria and objectives) | | | Legal restrictions and best practice |
| Role of practitioner | Mediator for negotiations | | | Advocator of values and norms Technician, using stakeholder values |
| Public perception | More vague, distant | | | More reactive (NIMBY) |

Source: Fischer (2007)

## 14.5 Principles of SEA and different SEA approaches

The rationale for applying SEA is connected with current shortcomings of PPP making. In this context, the necessity for SEA results from the need for:

- a stronger representation of strategic environmental thinking in PPP making;

- more effective reasoning in decision-making;

- more efficient decision-making; and

- better support of good governance and sustainable development in decision-making.

These four needs are subsequently described in further detail.

### 14.5.1 The need for a better representation of strategic environmental thinking in PPP making

The main reason for introducing SEA has been the perceived weak representation of environmental aspects in PPP making (Dusik et al., 2003; Morrison-Saunders and Fischer, 2006). In this context, and despite the widespread claim by policy makers and planners in many countries that a balanced evaluation is achieved, non-material, cultural, social and ethical values have tended to be underrepresented due to utilitarian and economistic views prevailing in planning (Ortolano, 1984). Having identified this as a problem, many countries now have introduced formal environmental assessment requirements, aiming to improve the consideration of the environmental dimension in decision-making. However, in spite of the efforts made, environmental issues – and particularly those that are of a strategic nature – are still frequently treated as simple 'add-ons' that are taken into account not during, but after PPP processes have been conducted. This means that environmental issues are dealt with in a reactive way.

A reactive approach, however, means that the main focus of assessment is on mitigation of negative environmental impacts, rather than on proactively finding ways for avoiding negative impacts and enhancing positive impacts. Furthermore, applying SEA in a reactive manner means that environmental standards – if available – are unlikely to be effectively used to guide PPP making. In current PPP making practice, concrete quantitative environmental thresholds are only rarely available. Also, if they do exist, they are frequently not respected (Fischer, 2002). In addition, there are indications that long-term visions of sustainable development and associated aims and objectives, with time horizons of between 20 to 30 years are not consistently followed through (Fischer, 2004). Rather, short-term political interests frequently appear to prevail. This problem is closely connected with the duration of election cycles.

Finally, a consistent consideration of thresholds within the whole planning system, that is, throughout all sectors and administrations, is normally difficult because in most countries and systems, different planning tiers, levels and sectors are isolated rather than effectively integrated and may have different aims and objectives (Stead et al., 2004). In this context, SEA may be used as a reconciliatory tool of different administrative levels, systematic tiers and sectors. How this might happen was discussed by Barker and Fischer (2003) for the pre-2004 English spatial or land use planning system.

### 14.5.2 The need for more effective reasoning in decision-making

SEA is more than the application of prediction techniques and methods within an assessment process. Rather, it provides for a systematic decision-making framework, identifying tasks to be addressed at different tiers and administrative levels (Fischer, 2006). In this context, SEA can help decision-makers to ask questions relevant to a specific tier, leading to more effective reasoning in decision-making. A generic SEA framework can thus guide decision-makers in systematically addressing, for example:

- initial 'why' and 'what' questions; typically at the policy tier of decision-making:
  - identifying and/or defining underlying – sustainability – objectives and targets;
  - supporting identification of possible development scenarios and policy options;
  - enabling the assessment of impacts of policy options on objectives and targets;

- subsequent 'what', 'where' and 'how' questions; at the plan tier of decision-making:
  - proactively developing possible – spatial – development options;
  - enabling the assessment of impacts of these options on objectives and targets;

- 'where' and 'when' questions at the programme tier of decision-making:
  - supporting ranking of possible projects and/or alternatives in terms of, for example, benefits and costs.

The value of a tiered approach to SEA lies in its potential to enable greater transparency and integration, supporting more effective streamlining of strategic planning. Furthermore, connections with other PPPs may be made explicit, thus helping to avoid duplication. Tiering within PPP making and SEA is not just a conceptual idea; this is evident when looking at current practice, for example, in transport planning in northern and western European countries (Fischer, 2006). Here, practice has been observed to fall into one of four main categories, which may be dubbed policy SEA, network-plan SEA, corridor-plan SEA and programme SEA. In this context, whereas transport policy SEAs have been found to address initial 'why' and 'what' questions, network-plan SEAs were found to revolve around subsequent 'what' and 'where' questions. Corridor plan SEAs were found to address 'where' and 'how roughly' questions, and programme SEAs, finally, were found to focus on 'when' questions. At times, categories are combined, for example, policy and network plans, as was the case with the regional Dutch transport strategies in the 1990s; (See:

Fischer, 2002) or corridor plans and programmes ; in other words, in practice boundaries are often flexible. Tasks may not only be allocated to different systematic tiers such as policies, plans or programmes, but also to different administrative levels.

### 14.5.3 The need for more efficient decision-making

SEA can support more efficient decision-making, particularly by, first, helping to achieve more structured decision-making frameworks, thus creating the context for more focused PPP making and subsequent project planning and EIA, and second, by supporting more systematic PPP processes. A systematic decision-making framework may support addressing 'the right issues at the right time' at different tiers, as explained above. Ultimately, a framework, within which different tiers and levels address different issues, tasks and alternatives, may help avoid delays in subsequent project preparation. In this context, SEA should help to address problems early enough in order to be able to proactively solve them, thus maximising positive impacts and preventing damage rather than only aiming at mitigating negative impacts.

Acting as a proactive decision framework and supporting more systematic PPP processes, SEA may help to detect not only direct, but also indirect, cumulative and synergistic effects. Providing for a participative process, SEA may enable the effective gathering of information and inputs from a wide range of stakeholders. Furthermore, providing for a tiered decision framework, SEA may support decision-makers to ask the right questions at the right time. In this context, SEA can also advise decision-makers and assessors on how to act, based on the technical knowledge and the expected potential conflicts in a certain situation, therefore helping them to act more efficiently.

'Acting strategies' may revolve around: first, mediation, for example, in more vague policy situations, where 'why' and 'what' questions are

addressed; second, advocacy in planning situations in which 'where' and 'how' questions are addressed and in which policies are supposed to be implemented; and third, technical approaches, where 'when' questions are addressed, based on, for example, MCA and cost–benefit analysis (CBA). While advocacy and technical approaches may work well in structured EIA-based processes, they may be less helpful in processes, in which the assessor needs to act as a mediator, requiring a higher degree of flexibility. Required skills in the context of mediation are less technical and include communication and negotiation capabilities (Heikinheimo, 2003).

### 14.5.4 The need for supporting good governance and sustainable development in decision-making

More recently, the use of SEA has been discussed in the context of its potential for improving governance (Kidd and Fischer, 2007). This is mainly based on its capability to increase transparency, participation and inclusiveness by advocating a participatory and structured assessment process. In SEA, communication, participation and reporting have an important role to play by introducing perspectives and inputs of different stakeholders to the PPP making process. Expected achievements can be subdivided into two main streams:

1   Long-term public empowerment:
    –   leading to, for example, conflict resolution, gain of public support for future actions, increased public confidence in decision-making and in politicians, development of social ownership and belonging.
2   An improved and more effective PPP process:
    –   leading to, for example, the identification of public concerns and the introduction of new ideas for possible solutions;
    –   ensuring that alternatives are considered and that decision makers and proponents are accountable; and
    –   providing opportunity to share expertise and to benefit from local knowledge and fresh perspectives on the SEA process.

The practice of public participation in SEA should anticipate and, if possible, help to avoid NIMBY (not in my back yard) and LULU (locally unwanted land use) situations, that often occur at project levels of decision-making. Ultimately, this should lead to reduced costs and avoidance of decision delays. The results to be achieved through communication, participation and reporting in SEA are likely to differ from those achievable in EIA. In this context, it is important to acknowledge that the general public is unlikely to be equally interested in all strategic issues, which at times may appear too unclear and unspecific. By providing for a systematic decision-making framework, SEA may lead to increased effectiveness and efficiency of decision-making. Ultimately, if applied in a systematic, participative and structured manner, SEA should lead to increased accountability, better integration, increased responsiveness and resilience of decision-making, thus supporting good governance. As explained above, SEA works as an effective decision-making support instrument for sustainable development. In this context, various authors have shown that it is potentially able to support PPP formulation for sustainable development by providing for an objectives-led, alternatives-focused and participatory instrument (Sheate, 1992; Fischer, 1999b).

Generally speaking, what makes defining sustainable development difficult is not just different attitudes and value systems, but also different dimensions and speeds of the various sustainability aspects to be considered. While, for example, fens or moorlands can take up to 1,000 to 10,000 years to develop fully, in business planning, a time horizon of ten to twenty years would in many cases already be considered strategic. Modern shopping centres, for example, are built for a lifespan of about fifteen years. Planning for sustainable development can therefore only be considered effective if clear objectives are in place for what a society wants to achieve in the short-, medium- and long-terms (see also below and Chapter 3). Furthermore, it is important to appreciate that planning for sustainable development is frequently controversial, coming with great uncertainties.

## 14.6 Case studies

This section introduces six SEA case studies (A to F), four reflecting practice in spatial or land-use planning and two in transport planning. The main purpose of presenting the case studies here is to show that there are different methodological approaches to SEA, i.e. case studies are not necessarily cases of good practice. This is important in a country like Pakistan, where SEA is only just emerging. All case studies follow the same structure. First the context is explained. Then the planning situation and context are elaborated on. The SEA action is explained before finally an evaluation of the SEA is attempted.

### 14.6.1 SEA for a local land use plan of the municipality of Ketzin, Germany (case A)

This was a formal SEA conducted by the municipality of Ketzin for a land-use plan in the mid 1990s

**The Context:**

Location, population and development prospects: Ketzin is a municipality located in the state of Brandenburg, Germany, about 40 km west of the city centre of Berlin. It has a population of 6,400, covering 93 km2. A stagnant population and economy is expected for the foreseeable future.

Political system: Germany is a federal and democratic country with written constitutions at Federal and state levels. There are democratically elected bodies at four levels, including Federal (national), state, county/municipal and local levels.

Spatial or Land-use planning system and SEA: There are four main planning levels, with state and municipal planning levels matching those of the democratically elected bodies. Furthermore, in parallel to statutory spatial or land use plans, landscape plans and programmes are prepared, some of which include SEA. Table A1.1 summarises spatial/land-use and landscape/SEA instruments. There are legal requirements for preparing state-wide landscape programmes, region-wide landscape framework plans and local landscape plans. Generally speaking, there is no strict planning hierarchy. Instead, the counter-current principle is applied, meaning that each level needs to take the plans of other levels into account. Decision-making aims at being 'administration consensus-based'.

## Table A1.1: Land use and landscape planning/SEA instruments

| Planning level | Spatial/Land-use Planning | Landscape Planning/SEA | Scale of maps |
|---|---|---|---|
| State (Land) | State Spatial Development Plan (Landesentwicklungsplan/-programm) | Landscape Programme (Landschaftsprogramm) | 1:500,000 to 1:200,000 |
| Region | Regional Plan (regionales Raumordnungskonzept) | Landscape Framework Plan (Landschaftsrahmenplan) | 1:100,000 to 1:25,000 |
| County (Kreis) (informal) | County Development Plan (Kreisentwicklungsplan) | | |
| Community, City | Land-use Plan (Flächennutzungsplan, §1 Federal Construction Law Book - BauGB) | Landscape Plan1 (Landschaftsplan) | 1:50,000 to 1:5,000 |
| City District (informal) | e.g. city district plan (Bereichsentwicklungsplan) | | Around 1:3,000 |
| Part of the Community | Master Plan (B-Plan, §1 Federal Construction Law Book - BauGB) | Open Space Master Plan (Grünordnungsplan) | 1:2,500 to 1:1,000 |

*Source: Fischer, 2005b*
1 There are about 430 landscape plans in Brandenburg

**The Planning and SEA Action:**

The land use plan to be assessed: Statutory local land use plans were prepared for the five administrative areas of the municipality of Ketzin. Their overall goal was to create the basis for a positive future economic, social and environmental development.

The SEA: A SEA was prepared between 1995 and 1996 in parallel to the local land use plans, formulating environmental development objectives and assessing the potential environmental impacts of land use changes, as brought forward by the land use plans.

The actors involved: The planning authority Ketzin was responsible for both, the preparation of the local land use plan and the SEA. Documentation was prepared by private consultants. Whereas land use plans are approved by the State Building and Construction Authority, the SEAs are confirmed by the State Environment Agency. There is some extensive consultation in land use plan making and SEA with both, statutory and non-statutory bodies, including investors and other stakeholders. Furthermore, there was public participation within the formal land use plan making processes, during which the SEA was open to the general public for comment.

The SEA process: All main 'conventional' SEA stages were covered, either directly, or as in the case of monitoring and public participation through the land use plan making process. General environmental monitoring is done by the Lower Environmental Protection Agency. The

SEA was conducted in a pro-active manner, i.e. it played a vital role in setting the development agenda for the land use plan. Table A1.2 summarises those stages covered by the land use plans and SEA Ketzin.

The assessment of environmental impacts approach: In the SEA process, various suggestions for future land use were assessed. In this context, alternative sites were compared and evaluated. Evaluation was based on existing data and some own data collection. Generally speaking, site alternatives with the least environmental impacts were identified based on overlay mapping. These were later included in the land use plans. An environmental development concept was designed, mainly aiming to promote measures in the areas of environmental protection, agriculture, water management and settlements. This concept was developed based on area sensitivities, identified through overlay mapping. Measures will partly be implemented through compensation for project impacts, as determined in project EIA, following formal requirements of the Federal Impact Intervention Rule.

The SEA report: The SEA report consists of six sections. These include an introduction, a baseline description and evaluation (climate and air, geology and soils, water, flora and fauna, landscape and recreation), land use conflicts, a development concept, further action and a summary. Figure A1.1 shows the area wide environmental development concept for the municipality.

| | *Screening* | *Scoping* | *Prediction* | *Report /evaluation* | *Review preparation* | *Monitoring* | *Consultation* | *Public participation* |
|---|---|---|---|---|---|---|---|---|
| Land use Plan | • | • | ✖ | • | • | • | • | • |
| Landscape Plan | • | • | • | • | • | ⇔ | • | ⇔ |

Table A1.2: Main procedural stages covered land use plan making and SEA

• = yes      ⇔ = indirectly, through land use plan      ✖ = no

## Figure A1.1 Development Concept of SEA Ketzin
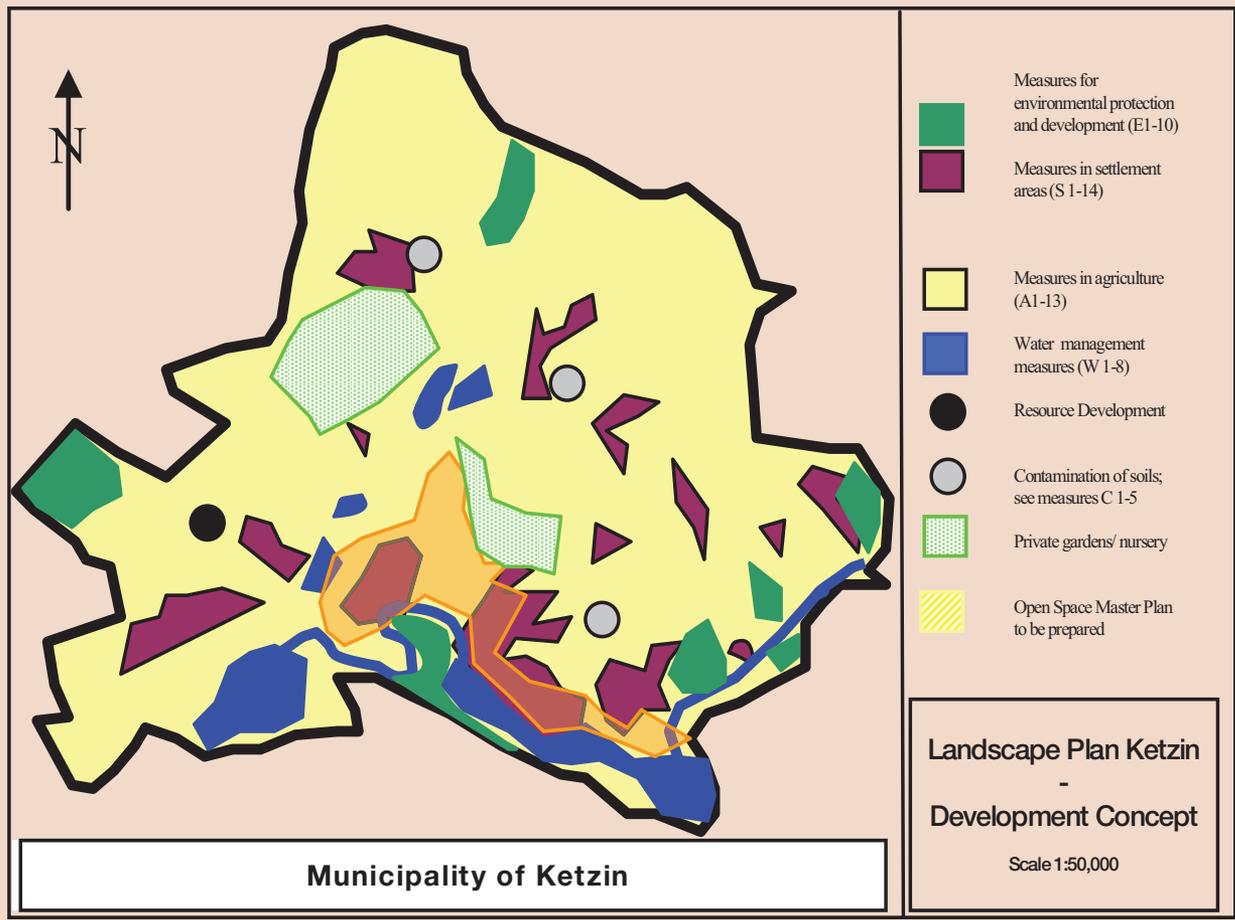


Source: own design, following landscape plan Ketzin

### Evaluation of the SEA

Overall evaluation of the SEA: The SEA for the land use plan Ketzin can be considered a successful case. Generally speaking, it was well received by all participating authorities or agencies and by those involved in the process. The land-use plans cannot be approved without completion and confirmation of the SEA. The SEA had a considerable positive impact on the land use plan. It was able to set the context for avoiding harmful environmental impacts and it identified environmental objectives and a development concept that will be the basis for future action.

Crucial factors for success: Factors that were crucial for overall success include in particular a good facilitator (i.e. consultant), the widespread consultations done with various stakeholders, the existence of formal plan making and SEA procedures and the checks and support by the state agencies.

Problems and shortcomings: The SEA itself is a good practice case. However, there are aspects of the overall context in which SEA is happening that could be improved. First of all, one SEA was prepared for five land use plans combined, making co-ordination of activities a lot more complicated. Furthermore, the planning system is rather complex and simplification could lead to greater clarity. Finally, no proper assessment of economic and social effects was done and, as a consequence potential trade-offs are somewhat difficult to establish.

**14.6.2 Sustainability appraisal of the Oldham** Unitary Development Plan – Appraisal of the Replacement Unitary Development Plan First Deposit Draft, England (case B)

This was a SEA conducted by the municipality of Oldham for a land-use plan review at the beginning of the new millenium

**The Context:**

Location: Oldham is one of the 10 metropolitan boroughs that form Greater Manchester.  It is situated in the North West of England (UK).  According to the 2001 census, Oldham had a total population of 217,273.

Political system: The UK is a unitary state and a democratic constitutional monarchy, with an un-codified and unwritten constitution.  The UK has four constituent parts, which are also considered as territories or nations, including England, Scotland and Wales and Northern Ireland.  In England, at the time the SEA was prepared, there was a two-tier government structure, consisting of county and local councils besides a one-tier government structure of unitary authorities (normally metropolitan areas, including Oldham).  In England, local governments are regularly undergoing reforms.

Spatial or Land-use planning system and SEA: England's planning system is known for its discretion, allowing for a high degree of flexibility.  This administrative discretion is mainly concentrated in central and local government bodies.  The main purpose of this discretion is to achieve a balance between public and private interests, within the framework of planning policies.  Another feature of the UK planning system is the strong role of the local governments.  England has a SEA system that takes the form of sustainability appraisal (SA), which tests the consistency and performance of plans and their objectives against sustainability objectives.

**The Planning and SEA Action:**

The land use plan to be assessed: The UDP (local land use plan) sets out the policies that the council needs to follow when considering

applications from prospective developers in Oldham Metropolitan Borough over the next ten years.  It sets out a process of development control, aiming at balancing different types of development and aims at ensuring that the planning decisions that are made in a rational and consistent manner.

The SEA/SA: The SEA/SA was done for a Replacement UDP.  In this context, the consistency and performance of the plan and its objectives against sustainability objectives were tested. SA ran in parallel with the formulation of policies, i.e. it was an integrated exercise and not an add-on process.

The actors involved: The objectives of the UDP were defined by Oldham Partnership . The SEA/SA team was composed by: the Oldham Borough Environment Forum, the Planning committee, a "critical friend" (a consultant accompanying the process), GONW , Oldham Chamber, Oldham Groundwork, Environment Agency, and Oldham Metropolitan Borough Council (MBC).  The SEA/SA team was split into two groups: the sustainability appraisal group whose purpose was to carry out a detailed appraisal at each stage of plan preparation; and the sustainability appraisal sounding board, constituted primarily of elected members, with the aim of providing a greater degree of thoroughness and an ongoing political input.  According to government regulations, the UDP review process must be subjected to public participation at regular intervals throughout the process.  However, the way the public can influence its contents varies from stage to stage.  Unresolved objections are considered in a public inquiry.

The SEA/SA process: The UDP was the key strategy for providing a suitable framework for sustainable development at the local level.  All policies and proposals had to be tested against key sustainability objectives, based on the NW's strategy for sustainable development "Action for Sustainability (AfS)" (See: Table 1.1).  The SA process consisted of 9 steps.  These are listed in Table B1.2.

| **Table B1.1: Main procedural steps covered in the SA of the UDP's replacement plan** | |
|---|---|
| Step 1 | Screening, using the regional Action for Sustainability as a starting point for the appraisal |
| Step 2 | Appraisal of the Issues Paper (document that sets out topic by topic, the current policy approach, the drivers for policy change and key issues) against the AfS |
| Step 3 | Development of local sustainability objectives, indicators and targets |
| Step 4 | Appraisal of site selection criteria |
| Step 5 | Appraisal of the first draft policies |
| Step 6 | Appraisal of second draft policies |
| Step 7 | Appraisal on the future use of difficult sites |
| Step 8 | Consultation strategy |
| Step 9 | Future appraisal stages |

The assessment of environmental impacts approach: A discussion based approach was taken, with the sustainability appraisal team discussing proposed policies in terms of their sustainability impacts.  In this context, matrices were used to support the appraisal.  These showed impacts of proposed policies on sustainability objectives, based on qualitative judgements by the members of the group.

The SEA report: In August 2001, Oldham Borough Council published a report on the sustainability appraisal of the first deposit draft replacement UDP.  The UDP plan review had been an ongoing process, in 2003 it had reached the revised deposit stage, in which the objections submitted during the first deposit stage, had been considered by the Council and where appropriate, changes had been made to the draft plan.  At this stage the changes are placed for "deposit" for public comment.  A report on the appraisal of the revised deposit –changes to the draft plan– had been published in October 2003.

**Evaluation of the SEA**
Overall evaluation of the SEA: The SEA/SA brought many changes to the UDP.  It acted as a learning process for those involved, contributing to changing views of individuals and organisations.  The SEA/SA was considered a good practice case in North West England.

Crucial factors for success: Factors that were crucial for overall success include in particular, the widespread participation and consultation from various stakeholders to the process; furthermore, information was made accessible to the general public.

Problems and shortcomings: Some essential SEA stages and elements were missing in the process, including formal reporting of findings for all of the key stages of the process; the development of options and a comparative appraisal of those options – prior choices being made – as well as the appraisal of the option selected; and mitigation measures.  Furthermore, the report described the process of how the assessment was done, rather than providing information on the results, the alternatives and impacts considered.

**14.6.3 SEA for new development areas for Rotterdam and Leiden, The Netherlands (case C)**
This was a formal SEA conducted by the Dutch Ministry for Spatial and Environmental Planning for new housing and business development areas in regions surrounding the municipalities of Rotterdam and Leiden in the mid-1990s; development areas proposed by those municipalities were in conflict with national spatial and environmental policy, as they touched protected sites

**The Context:**

Location, population and development prospects: Rotterdam and Leiden are part of the Randstad , the main metropolitan region of the Netherlands. Rotterdam has a population of about 600,000 and Leiden of about 115,000. Between 2005 and 2010, Leiden was predicted to need 4,000 new homes and some 20 ha for economic activities, Rotterdam needs some 225 ha for economic development.

Political system: The Netherlands is a democratic country with a written constitution. There are democratically elected bodies at four levels, including national, provincial, municipal and local.

Spatial/Land use planning system and SEA: There are three main planning levels, with national and municipal levels matching those of the democratically elected bodies. In addition, there is a regional level that may cover a whole province or only parts of it.  At each of these three levels, formal spatial/land use plans are prepared.  There is no strict planning hierarchy.  While plans of a higher hierarchical level set the context for those of a lower hierarchical level, municipalities traditionally have had some rather strong autonomy in decision-making.  SEA has been applied for major development ideas and plans since 1986, based on the requirements of the project EIA Act.

**The Planning and SEA Action:**

The plan to be assessed: Leiden wanted to focus development activities in the 'Grote Polder' area, which is part of the Green Heart, a type of protected green belt between Amsterdam, The Hague, Rotterdam and Utrecht.  Rotterdam wanted to focus on industrial development in the 'Hoeksche Waard' area, which is currently a protected 'open area'.  Suggestions were not in line with development policy formulated in the VINEX Dutch National Spatial Plan.

The SEA: A formal SEA was prepared, as part of a statutory 'core plan decision' process for national spatial policy.  The decision to conduct a SEA was the outcome of considerations on whether national spatial policy should be changed in order to accommodate the proposed developments.  It

was decided to not only consider environmental, but also economic and social aspects.  Various alternative development areas were selected as the basis for evaluation, including those preferred by the municipalities of Rotterdam and Leiden. The preparatory administrative 'core plan decision' process lasted for than more two and a half years from mid-1995 until the end of 1997, before the plan and the SEA were submitted to parliament for approval.  The SEA took into account national transport policy (based on the Second Transport Structure Plan), 'green spaces' policy (based on the Green Spaces Structure Plan), military areas (based on the Structure Plan Military Areas), the economically driven note 'Space for Regions' and the Development Plan for the main Dutch international airport Schiphol, which lies adjacent to the Leiden region.

The actors involved: The SEA process was conducted by the national Ministry for Spatial and Environmental Development (VROM).  Various national ministries, the two affected provinces (North and South Holland), the city regions of Rotterdam, The Hague and Amsterdam and the Association of communities in the Leiden region were part of the main working group.  Institutional support was provided by the national EIA Commission, the Commissioner for Environmental Hygiene and the Spatial Planning Advice Council. The process included public participation and was concluded by a national parliament decision.

The SEA process: All main 'conventional' SEA stages were covered, according to national EIA regulations, including screening, scoping, report preparation, review, consultations and public participation.  Monitoring was done indirectly through national spatial and environmental monitoring.

The assessment of environmental impacts approach: In the SEA process, various alternative suggestions for development areas were assessed.  Evaluation was based on existing data. Most and least favourable development alternatives were identified in terms of five aspects: liveability (local environmental quality), environment, sustainability (global environmental effects, i.e. $CO_2$), economy and development

costs. Sub-elements to these aspects were evaluated. Visualisation of the impacts was achieved through an impact matrix identifying 'good' (+), 'mediocre' (0) and 'bad' (-) scores. In addition, flexibility in terms of opportunities for further future development was verbally discussed. Based on the results of the SEA, preferred development alternatives were formulated from the view of the national government. Whereas in the Leiden case, the 'Grote Polder' area was not confirmed as a preferred alternative, in the Rotterdam case, the 'Hoeksche Waard' was supported. Figure C1.1 shows the development alternatives for the Leiden region as an example. Table C1.2 shows most and least favourable alternatives for the five evaluation aspects.

**Figure C1.1 Development alternatives**
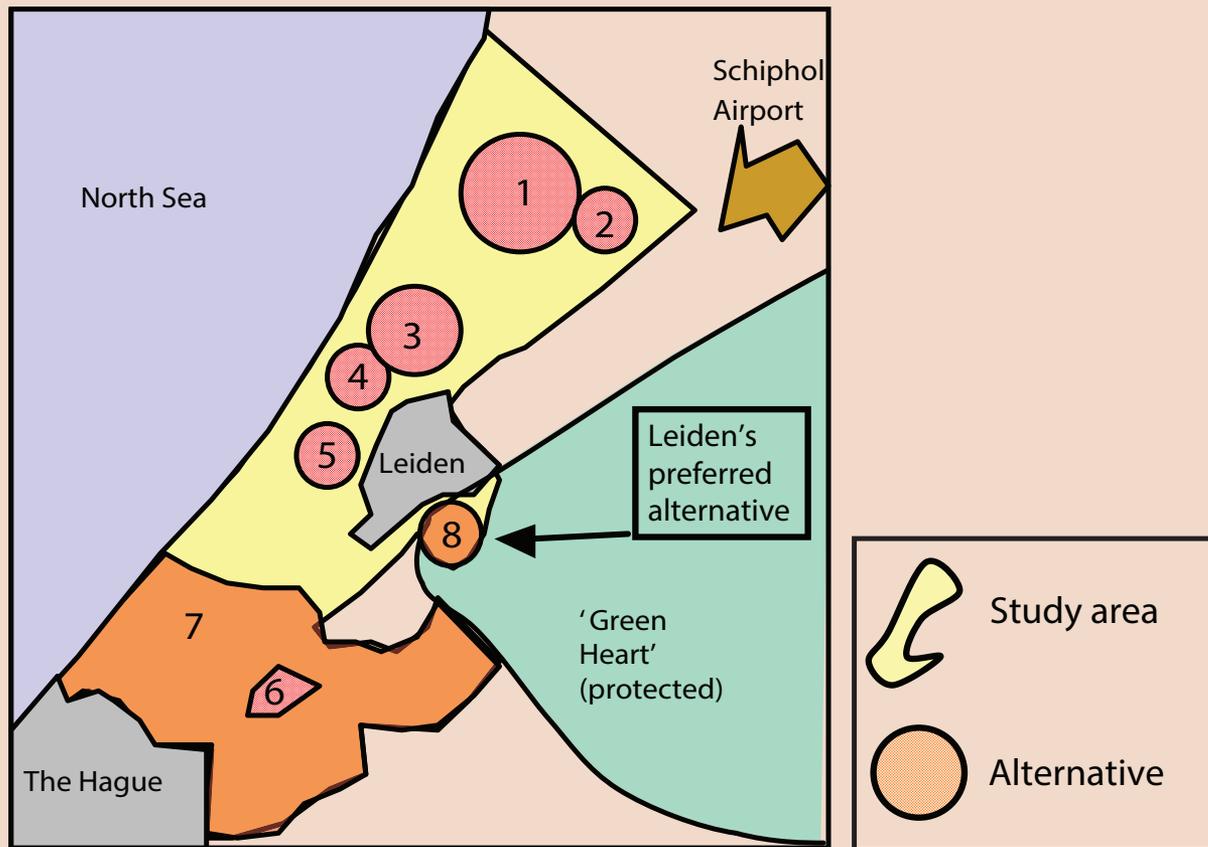


*Source: own design, following SEA for the Leiden and Rotterdam regions*

**Table C1.1 Final results for different alternatives**

|  | Most favourable | Least favourable |
| --- | --- | --- |
| Liveability | 5 | 3 |
| Environment | 2, 7 | 8 |
| Sustainability | 1 | 8 |
| Economy | 2, 8 | 1, 3 |
| Costs | 3 | 5 |

The SEA report: The SEA report consists of two main parts.  Part A presents the overall assessment results in four chapters, including an introduction, an explanation of the background to the assessment and a comparison of alternatives for the two regions.  Part B provides for some background information, with a general explanation of scoring, the presentation of the baseline for the two regions and a summary of knowledge and data gaps.  Furthermore, part B includes an annex, listing workgroup participants, sources, terminology used and a glossary.

**Evaluation of the SEA**
Overall evaluation of the SEA: Overall, the SEA can be considered a good practice case.  Sound methods and techniques were applied in a formalised process that was conducted in a rigorous manner.  However, the case also provides an interesting example in terms of long-term acceptance of planning decisions. Many years later in 2004, an internet search by the author found that the municipality of Leiden was still attempting to push forward their preferred development alternative, despite the significant environmental impacts, based on the perceived economic benefits.

Crucial factors for success: Factors that were crucial for overall success undoubtedly include the existence of a formalised and participatory EIA based process.  The supporting role of the EIA Commission was of particular importance and the involvement of all major stakeholders.  Problems and shortcomings: The SEA itself is a good practice case.  However, as mentioned above, it also provides for an interesting insight into what may happen if a planning decision is not in line with the interests of main economic stakeholders.  Political lobbying for Leiden's preferred development alternative (i.e. Grote Polder) was still ongoing many years later, seemingly unperturbed by the planning/SEA decision made earlier.

**14.6.4 SEA for Municipality of Weiz Urban Plan revision on future use of  27 areas, Austria (case D)**

This was a pilot SEA conducted at the beginning of the new millennium and sponsored by the Federal Ministry of Environment, Youth and Family for the Municipality of Weiz for its Urban Plan revision regarding future use of 27 areas.  A main objective of the exercise was to test the feasibility of the SEA Directive in existing plan making

**The Context:**
Location, population and development prospects: The Municipality of Weiz is a district capital in the Federal Province of Styria with about 9,200 inhabitants, covering 507 hectares.
Political system: Austria is democratic federal country with a written constitution.  There are democratically elected bodies at four levels, including national, provincial, municipal/county and local.

Spatial/Land use planning system and SEA: There are four main planning levels, including national, provincial, which has the main responsibility for spatial planning, district and municipal levels.  A hierarchical land use planning principle is in place, i.e. land use planning works in a top-down manner of decision-making.

**The Planning and SEA Action:**
The plan to be assessed: The Municipality of Weiz identified 27 areas with present or potential claims for new or re-development.  In order to support effective and efficient decisions on their best use, a decision was made to revise the existing Urban Plan and to conduct a voluntary SEA.  The municipality of Weiz was responsible for the preparation of both, Urban Plan revision and SEA, with the latter being sponsored by the Federal Ministry of Environment, Youth and Family (FMEYF).  The time horizon of the plan was five years (2000-2005).

The SEA: A SEA process was conducted that was in line with the 1996 draft of the European SEA Directive. Problems with the implementation of Directive requirements were to be identified. Furthermore, the development of a suitable SEA method and an effective communication strategy were key objectives of the exercise.

The actors involved: The SEA process was conducted by the City Council of the Municipality of Weiz. The Styrian provincial government approved both, plan and SEA. Furthermore, the Styrian Environment Ministry was included in the scoping exercise. There was public participation in both, plan making and SEA. An interdisciplinary team, consisting of air, noise, climate, nature protection and spatial planning experts was present at a total of three SEA scoping meetings.

The SEA process: Main 'conventional' SEA stages were covered, including screening, scoping, report preparation, review, consultations and public participation. Only monitoring was not considered, yet, in this pilot SEA. A scoping document was prepared, based on the draft revision plan. There was a high degree of integration of plan making and SEA processes. Public participation of plan and SEA were integrated and conducted according to the requirements of the Austrian Spatial Planning Act. Information on plan revision and SEA to the public was mainly done through the 'City Gazette', a local newspaper that was distributed to every household free of charge. A non-technical summary of the SEA was distributed to the general public in this way.

The assessment of environmental impacts approach: Each of the 27 development areas were assessed individually. In this context, three alternative development options were considered. Besides a 'no-action alternative', an 'intentions of the municipality of Weiz' alternative and a 'most environmentally friendly alternative' were considered. Furthermore, for reference purposes, the land use allocated by the existing urban plan was also included. Environmental and socio-economic criteria were used to evaluate different uses in each of the 27 development areas. Environmental criteria included soils, fauna and flora, water, air, landscape and climate. Socio-economic criteria included economic performance and development, settlement areas, technical and social infrastructures and the population. Evaluation was done, based on a scoring system from 1 (very positive effect) to 5 (very negative effect). If no data were available, a question mark was allocated. If criteria were not relevant in a certain situation, this was also marked. Table D2.1 shows how the alternatives were compared in terms of the evaluation criteria within an impact matrix. Furthermore, Figure D2.2 shows the development areas within the Urban Plan revision.

## Table D1.1 Impact matrix SEA Urban Plan Revision Weiz

| *Area no. x (from 1 to 27)* <br><br> *Alternatives Information provided* | *Old urban plan* | *no action* | *intentions of municipality* | *best environmental option* |
|---|---|---|---|---|
| Environmental criteria | | | | |
| Socio-economic criteria | | | | |
| weighting | | | | |
| Recommendations, mitigation measures and comments | | | | |

**Figure D1.1 Development areas that were assessed**
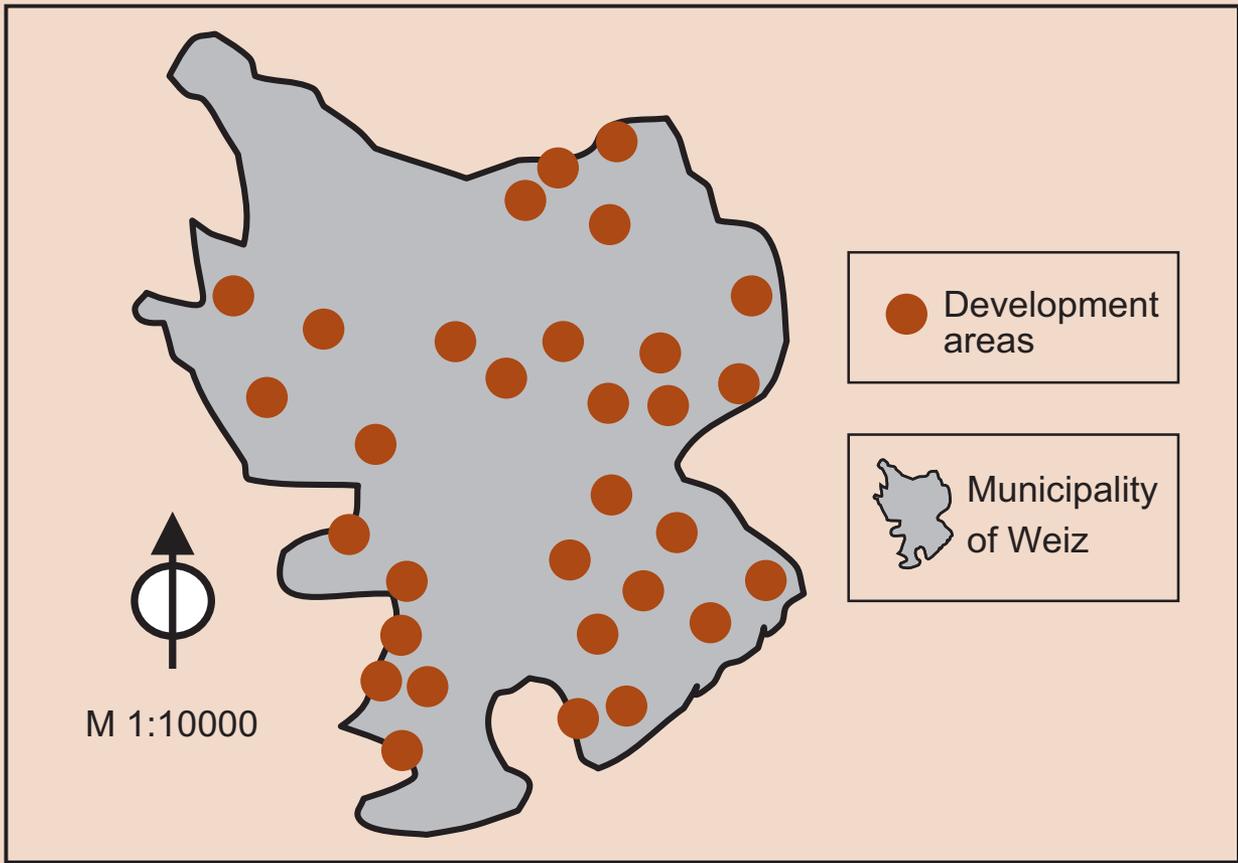


*Source: own design, following SEA*

The SEA report: The SEA report consists of eight chapters. An introduction describes aim, method and approach. An outline of the plan revision, a description of the environmental baseline, aims and objectives and potential significant effects follows, before alternatives are explained, reasons for rejecting certain alternatives are given and mitigation and compensation measures are introduced. Finally, problems and data gaps are identified and a non-technical summary is provided. Appendices include the scoping document and a glossary.

**Evaluation of the SEA**
Overall evaluation of the SEA: Overall, the SEA can be considered a good practice case. The process was positively perceived and had a positive impact on a more environmentally sustainable revised Urban Plan. However, not all

SEA recommendations were included in the plan, due to investor interests and political pressures, i.e. in certain instances the final decision did not reflect the best possible environmental option.

Crucial factors for success: Factors that were crucial for overall success particularly include the cross-fertilisation of experts from different subject areas. In a participatory plan making approach, the SEA was perceived as not having delayed the plan making process, raising its acceptance among those involved. Effective communication and co-ordination processes were considered to be of particular importance in achieving an effective SEA process.

Problems and shortcomings: While the SEA itself is positively perceived, there were also a few problems and shortcomings. Most importantly, the SEA started much later than the initial informal

meeting on the plan revision. Furthermore, only a few persons from the general public actively participated in the plan making / SEA process, despite the wide distribution of relevant information.

**14.6.5 SEA for the Gothenburg – Jönköping Transport Corridor, Sweden (case E)**
This was a pilot SEA conducted in the second half of the 1990s.by the Swedish National Road Administration for a transport corridor between the two cities of Gothenburg and Jönköping, which are located at a distance of 95 km. In the study several multi-modal transport options were assessed.

**The Context:**
Location, transport situation and prospects:
Gothenburg is Sweden's second largest city with about 500,000 inhabitants. Jönköping is a medium-sized town with about 90,000 inhabitants. The corridor SEA was triggered by a perceived need to make traffic on the main existing national road connection, No 40, safer with fewer accident related deaths and injuries. Currently, there is no direct rail link between the two cities and a rail journey means taking the bus for parts of the trip. Only very limited population and economic development is expected in the corridor, particularly in the rural areas. Linking together the urban areas in the corridor was part of the vision of the National Board of Housing Building and Planning for Sweden. Figure E1.1 shows the corridor region considered in the SEA in its broader context.

Political system: Sweden is a democratic country with a written constitution. There are democratically elected bodies at three levels, including national, regional and local.

**Figure E1.1 Corridor region in broader context**
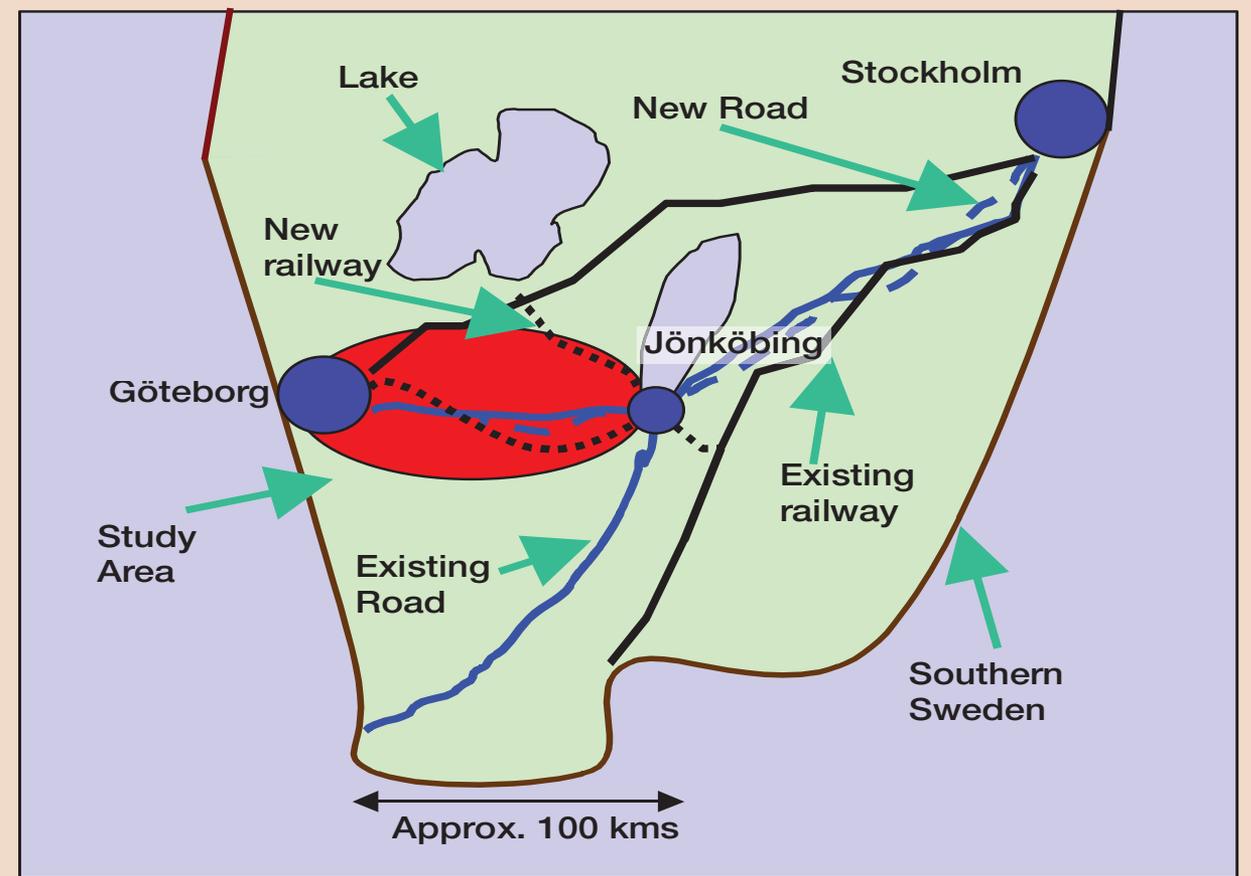


*Source: own design, following SEA of Gothenburg-Jönköbing Transport Corridor*

**Transport planning system and SEA:** There was an extensive national road and rail network, administered for the government by national road and rail administrations. National Transport Planning is organised in a tiered manner, with a national transportation policy, summarised in one policy document, setting the context for regional infrastructure plans and action programmes.

**The Planning and SEA Action:**

The plan to be assessed: There is no plan as such. The Chamber of Commerce for Western Sweden had previously studied economic impacts of six main transport corridors on development potentials in the region. The corridor considered in the SEA was found to offer the greatest development potential. Subsequently, county boards stressed the importance of improving the existing rail connection, particularly for environmental reasons.

The SEA: A pilot SEA was conducted, aiming at developing suitable methods for transport corridor-SEAs. The corridor was about 95 km long and 40-55 km wide. An objectives-led approach was followed, with the formulation of environmental objectives for the corridor, based on existing national and regional environmental goals standing at the beginning of the process. Seven alternative combinations of road and rail, plus a zero alternative were assessed. The extent to which each of the alternatives was able to contribute to environmental objectives was identified. The SEA report was prepared in 1997/8 and the time horizon of assessment was 2010.

The actors involved: The SEA was conducted on behalf of the Swedish National Road Administration. Most of the technical studies were done by consultancies. Views on the SEA study were obtained from national and regional authorities and from nature conservation bodies.

The SEA process: The main aim was to produce a SEA report to be used later in project specific planning and as a basis for transport related political decision-making. Traffic modelling was the basis for the assessment. Stages included scoping, where environmental goals were

identified and adapted for the specific situation of the corridor, considering the opinions of various experts. This was followed by an impact assessment of the various alternatives, considering impact minimisation and mitigation measures. Conclusions were drawn within the SEA report and recommendations given for later political and project related decision-making.

The assessment of environmental impacts approach: The assessment aimed at establishing the extent to which the seven combinations of road and rail and the zero alternative were compatible with environmental goals, taking into account impact minimisation and mitigation. Existing data were largely used in assessment. Environmental goals considered in the SEA included climate, over-fertilisation and acidification with a focus on regional scale impacts of harmful emissions. They also included the conservation of natural resources, use of fossil fuels, agricultural land, ground and surface water resources, the natural and cultural environment i.e., formally protected area, other valuable areas and ancient remains, ecological infrastructure and the landscape with a particular focus on cultural and historical aspects, recreation and outdoor activities and living conditions and health (viable town centres, public communications, residential severance, air quality, noise, visual environment and road safety). In addition, the socio-economic development of the corridor region was taken into account. Main methods and techniques employed included the use of theme specific sensitivity maps, forecasting based on computer modelling and an impact matrix, showing the impact of the various alternatives on the environmental goals, with a scoring system based on nine main scales, ranging from very large positive contribution to extremely large negative contribution (+++, ++, +, (+), 0, (-), -, --, ---). In addition, combinations of scores were used.

The SEA report: The SEA report consists of twenty chapters plus references and appendices. These include background information, aims, baseline data description, a detailed portrayal of key issues, alternatives studied, minimisation and mitigation measures, road safety effects, a cost-benefit analysis and conclusions. Furthermore, a summary of the results is provided. The report

concludes that the two alternatives that include the development of railway infrastructure with some minimal upgrading of National Road 40 are the preferred transport solutions in the corridor. It was noted that road and rail alternatives did not appear to have influenced each other very much. The report stresses the fact that rail transport modelling currently has major shortcomings.

**Evaluation of the SEA**

Overall evaluation of the SEA: Various pilot transport corridor-SEA studies were conducted in the context of methods' development of the trans-European transport networks. In this context, the SEA described here is one of the best known examples and can be considered a good practice case. The SEA report came up with a clear recommendation, while at the same time being open about problems and gaps in knowledge. However, while the SEA report provided a basis for discussion on suitable methods, the report was not subsequently used as a basis for decision-making, as the overall corridor development strategy had subsequently changed.

Crucial factors for success: Factors for success particularly include a very experienced person in charge of the project in the Swedish National Road Administration. Furthermore, the expertise provided by the involved consultants and the inputs by external experts were crucial.

Problems and shortcomings: The main problem is that the case is a pilot study that was not integrated into any formal planning process. While it aimed at providing recommendations for decision makers in later decisions, this did not materialise, due to a changed development vision in the region. Furthermore, while some experts were consulted, there was no wider participation. Finally, the scoring system appeared somewhat too detailed and complicated.

**14.6.6 SEA of the bridge over the Messina Strait, Italy (case F)**
This was a 'big-project' SEA for the planned bridge between Sicily and mainland Italy, conducted in the first decade of the new millennium.

**The Context:**
Location: The Messina strait is a stretch of sea, separating the island of Sicily from mainland Italy. The narrowest part of the strait is about 3 km wide, connecting the cities of Messina (in Sicily) and Reggio Calabria (in Calabria). There is currently a ferry service for people, cars and rail.

Political system: Italy is a parliamentary democracy with a written constitution. At a political-administrative level, Italy is subdivided into twenty regions, five of which have a special autonomous statute; provinces, some of which are still being instituted; and local governments.

Transport planning system and SEA: There are four main levels of decision-making, matching the administrative governments, i.e. national, regional, provincial and local. Due to devolution, major responsibilities – including planning and environmental assessments – have been delegated to the regions. Transport decisions are made at the national, regional and provincial level. Multi-modal transport decisions are made at the national level (see Table F1.1.). Multi-modal projects tend to follow an accelerated design and EIA process because of their national value.

| Table F1.1: Transport planning tiers for the Bridge over the Messina Strait | |
|---|---|
| *Planning level* | *Transport planning instrument* |
| European Union | Transport European Network Plan |
| National | Programme of the Strategic "Productive" Infrastructures and Settlements; National Transport Plan |
| Regional | Regional Transport Plan |
| Provincial | Provincial Transport Plan |

Legal system: A legislative decree declared the road and railway link between Sicily and the mainland a project of national interest.  Therefore, it could follow an accelerated planning process.  Table F1.2 shows the relevant regulatory framework for this case.

**The Project and SEA Action:**

The project to be assessed: The Bridge is supposed to complete one of the main European north-south axes; at the national level, it closes an infrastructure gap; at the sub-national level the bridge aims to improve the situation of the underdeveloped Southern Italy.

The SEA: The SEA was set in a sustainable development context, aiming to achieve an integrated approach according to regional development objectives. The SEA assessed environmental impacts; transport efficiency; economic efficiency, urban and regional benefits of the project.

The actors involved: Stretto di Messina (SdM) is the concessionaire company, responsible for the design, construction, operation and management of the connection between Sicily and the mainland.  It is governed by public law.  The company needs to assign all activities related to the construction and management, to a general contractor, by public tender.  The environmental assessment was prepared by a temporary group of societies.  The Ministry of the Environment and Territorial Protection (METP) were also involved.  Various companies acted as advisors and there was a Technical Scientific Committee instituted at the Ministry of Infrastructure and Transport.  Various responsible ministries, Italian Rail and

SdM signed a Framework agreement in November 2003.

The SEA process: The SEA was integrated with energy balance assessments to compare alternative scenarios and hypotheses.  It included (a) a transport analysis and economic feasibility study, (b) a multi-criteria analysis to compare two alternatives, (c) mitigation and compensation measures and (d) EMAS certification, to monitor the impacts of the proposed project and better control the expected impacts during the construction and operating phases.  The SEA was conducted in a reactive manner to an existing design.  The SEA was applied to comply with existing and, at the time, forthcoming legislations i.e. the SEA Directive.  The process started in 1992 and was updated in 2002 to comply with new regulations, and in 2003 a Special Commission of the MEPT granted "environmental compatibility" to the project.  In January 2005, tender notice for project management was published.

The assessment of environmental impacts approach: Two alternatives were compared, the Messina Strait Bridge and an upgraded ferry solution.  Current demand and supply of transport from and to Sicily were considered, including maritime services, traffic flows, passenger numbers, vehicles, goods, trains and freight.  Various hypotheses were considered within macro-economic scenarios in order to decide on economic and financial feasibility.  The hypothesis set for the cost/benefit analysis was based on the GDP growth for Southern Italy (high and low) and on transport growth (favourable and non-favourable).  Table F1.3 summarises the four scenarios considered.

| Table F1.2: Relevant regulatory framework for the bridge over the Messina Strait | |
| --- | --- |
| Law 443/01 "Legge Obiettivo", Law 190/02 and Law 166/02 | Regulations on Infrastructure and Public Works facilitating Government plans on infrastructure |
| Strategic Infrastructure 2001 | The Strait of Messina Bridge is part of the Government Programme for "Fast Tracking" Strategic Infrastructures |
| Law 1158/71 | Stretto di Messina S.p.A. is the concessionaire to study, design, build and operate the bridge |

The SEA report: The SEA report consists of sections on the legislative framework, the existing planning framework (all regional plans and programmes, sectoral plans as well as environmental and archaeological aspects); the project design framework and the environmental framework (water, vegetation, flora, fauna and ecosystems; atmosphere; noise and vibrations; ionisation and non-ionisation radiations; public health; and landscape). Figure F1.1 shows the project.

According to the SEA findings, from an environmental, transport and economic point of view, the permanent bridge connection was advertised as the best option. The cost/benefit analysis proved the economic feasibility of the project even in the worst scenario (scenario 4) and benefits exceeded costs in all scenarios.

**Evaluation of the SEA**

Overall evaluation of the SEA: The environmental assessment was politically driven. The following aspects were not given due consideration:

- Geo-seismic-tectonic problems: the area has the highest risk for significant earthquakes;

- The bridge will destroy a unique landscape

| Table F1.3: Four scenarios for the Bridge over the Messina Strait | |
|---|---|
| *Scenario 1* | *Scenario 2* |
| High Growth | High growth |
| Favourable transport | Unfavourable transport |
| *Scenario 3* | *Scenario 4* |
| Low growth | Low growth |
| Favourable transport | Unfavourable transport |

**Figure F1.1 Messina Strait Bridge**
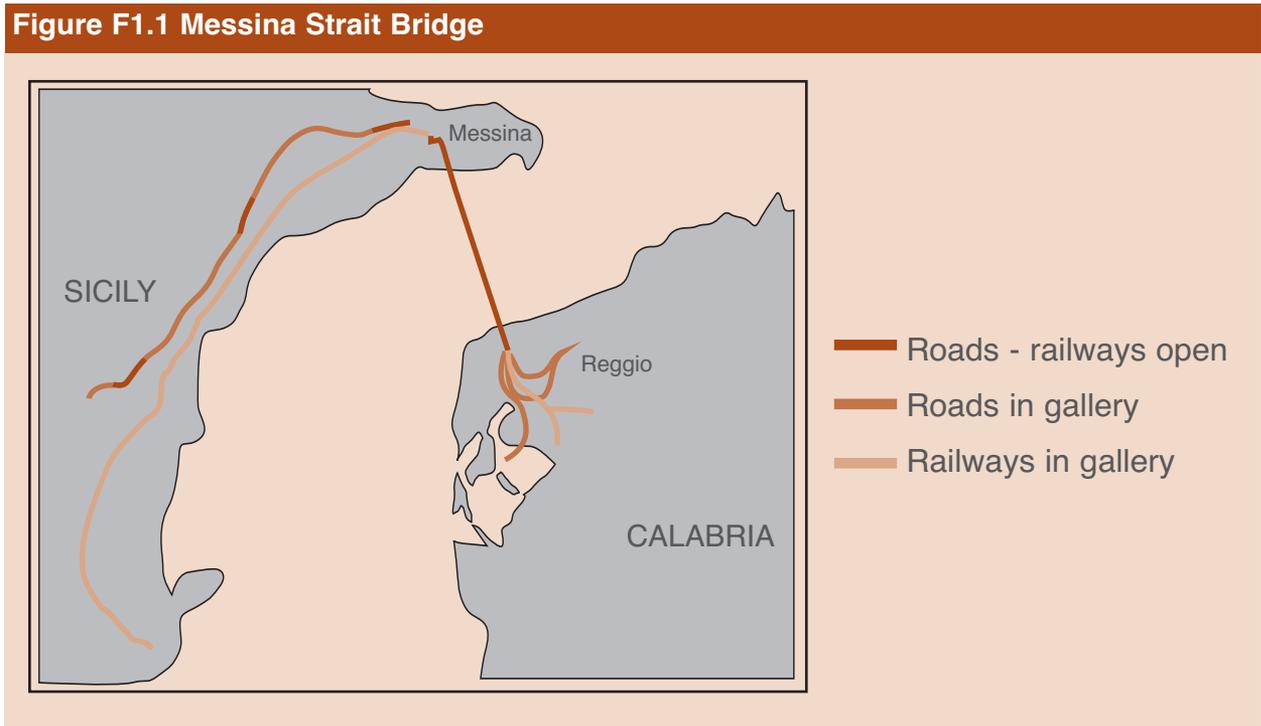


*Source: own design, following the bridge over the Messina Strait project*

and precious ecosystems, the opportunity to improve the local economy based on those resources will be lost. The bridge will touch eleven sites of European Community importance;

- Migration of sensitive species, noise and light pollution;

- Impact on aquifer layers;

- Traffic growth is overestimated; there's a gap between project costs and estimated incomes;

- The finances for the project (4,732 M Euro) could be used to improve the region's infrastructure; and

- The bridge is not connected to the railway system in Calabria.

Crucial factors for success: The SEA cannot be considered a success, as it did not suggest a go-ahead with the most environmentally friendly option.

Problems and shortcomings: The relevant regulatory framework made the bridge over the Messina Strait project "untouchable" because of its national, strategic importance.

## 14.7 Practical element
Students to write a summary document on how SEA differs from EIA.

# 15. SEA application at the policy level and in Pakistani planning processes

This chapter is divided into five sections. First policy level SEA is introduced. Next, evidence for the effectiveness of SEA at the policy level is presented. Then specific challenges with applying SEA at policy levels of decision-making are discussed before a policy SEA case study is introduced on renewable energy policy in Scotland. Finally, different planning processes in Pakistan are explained with regard to a possible integration of SEA. The main sources this chapter draws on include Au et al.(2008), Sadler and Canter (1997) and World Bank Sustainable Development Network Environment Department (2010).

## 15.1    Introduce policy level SEA

Policy SEA is frequently distinguished from plan and programme SEA. This is because the policy-making processes usually follow different methodological paths from plans and programmes. Following Sadler (2005, p.2), policies are understood to include the following:

- "Legislation, including draft bills, regulations, rules and agreements;
- Government strategies, papers, memoranda or statements of intent that outline new policies or proposed directions or options at the highest level; and
- Norms, guides, principles or arrangements that are understood or acted upon as if they were policy or law".

The same author suggested that a policy can be expressed as a strategic aim or a broad vision which proposes a direction of development and/or legislative or fiscal commitments and that set the context for courses of action that governments intend to pursue. Being on top of the decision-making hierarchy, policies usually set objectives that serve as overall frameworks for lower tiers, i.e. for plans and programmes.

Policies can take many different forms. They may be very general or rather detailed. They may also be sector-specific, formal or informal, transformational or incremental in character (Bregha et al., 1990). From the perspective of SEA, major policy reforms or legislative proposals that are environmentally significant are of particular interest. Policies with potentially wide-ranging interest also include government expenditure priorities or procurement strategies. Sadler (2005) defined types of policy and legal

proposals that are potentially subject to SEA. These are shown in Box 15.1.

The US National Environmental Policy Act (NEPA) distinguishes between different tiers of actions subjected to SEA, policies, plans and programmes, and EIA projects.  Article 3 of the European SEA Directive 2001/42/EC and Article 4 of the SEA Protocol to the Espoo Convention on Trans-boundary EIA defined plans and programmes only to be subjected to SEA.  However, the Protocol also includes a non-binding commitment to cover policy or legislation (Article 13), without defining those further.

In the UK, the term 'policy' is said to comprise "the Government's strategic objectives in a particular area and framework for deciding programmes and projects" (DETR 1998).

The Aarhus Convention on Information on Environmental Matters, Public Participation and Access to Justice on Environmental Issues also applies to policies (Article 7), making reference in this context to laws and rules (Article 8).  After many years of negotiations for the EC SEA Directive, policies were not included, mainly because they were seen as being 'too' political.  Furthermore, institutional, procedural and methodological problems were seen to be too big (Sadler, 2005).

It is crucially important to apply SEA at policies, as it is here where potential impacts can best be prevented.  Policies are the ultimate source of impacts at decision-making levels further down the line, i.e. at the levels of plans, programmes and projects.  If applied early-on, major alternatives should still be open.  In this context, it is of interest to note Dovers' (2002) distinction between 'deep' and 'shallow' SEA.  He portrays 'deep SEA' as the one that deals with the root causes of unsustainable development.  This includes e.g. policies dealing with patterns of production and consumption, mobility or settlements.  'Shallow SEAs', on the other hand, are more reactive, focusing on the immediate impacts on the environment.  Dovers (2002) noted that 'deep SEA' is more complex and challenging than 'shallow SEA' but the latter, when systematically applied to government policies, can still significantly advance the sustainability agenda".

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### Box 15.1: Types of policy and legal proposals potentially subject to SEA

- Government proposals and consultative documents that outline new policy directions (e.g. draft national strategies);

- Bills, draft regulations or proposed rules (e.g. relating to private or common property rights);

- International agreements and treaties that a government is negotiating or proposes to enter into (e.g. trade agreements);

- Budget, financial appropriation and expenditure priorities;

- Government or departmental purchasing and procurement policies or strategies;

- Government or Ministerial statements of intent that are commonly accepted or can be reasonably interpreted to be policy;

- Policies that are contained in or govern plans or programmes, including objectives, directives, guidelines, etc.; and

- Standing policies or arrangements that promote or are permissive with regard to development activities with potential cumulative effects (e.g. land clearance, habitat alteration, wetland loss).

Source: Sadler (2005, p.4); adapted from Buckley (2000), Sadler (1994)

## 15.2    Evidence for the effectiveness of SEA at the policy level

In 2010, the World Bank published a report on the application of policy-SEA.  In this, they drew some lessons on its effectiveness, based on the evaluation of various case studies.  These lessons can be summarised as follows (World Bank, 2010):

- Policy SEA can, under conducive conditions, contribute to an improved formulation and implementation of sector reform, stemming from an ability to raise attention to priority environmental and social issues affecting stakeholders;
- Ownership, capacity and trust are necessary conditions for effective environmental mainstreaming at the policy level, including governments, civil society organisations and local communities;
- There is a need for long-term constituency-building, as policy SEA is but a small and bounded intervention in the continuous process flow of policy-making; and
- Contextual factors are of overriding importance in hindering or facilitating the attainment of the main benefits of policy SEA.

The report then also provides a key message, namely the need to clearly articulate the potential benefits of policy SEA.

*"Developers of policy SEA must recognise that incumbent actors have certain interests when engaging in SEA activities.  Their participation will be driven by the benefits from engaging being greater than the risks and costs.  First and foremost, policy SEA must be understood as a strategic decision support process that will enable governments to put in motion better policy-making, and not merely as an environmental safeguard.  Speaking directly to the development priorities of the country, policy SEA not only works towards improving policy-making from an environmental mainstreaming perspective,*
*but also supports better planning and policy-making from an overarching development point of view.  As analysis of the potential economic and growth impact of sector reform is undertaken in the "sector review", policy SEA could complement this analysis by exploring the economic and growth implications of environmental and social priorities" (World Bank, 2010, p.88).*

## 15.3    Present the specific challenges with applying SEA at policy levels of decision-making; the need to consider different policy situations

A particular challenge is to accommodate SEA within the different modes of policy-making (Sadler and Verheem 1996).  This has to start with developing an understanding of how policy-making processes work (Nitz and Brown 2001).  In this context, suggestions have been made that important insights can be gained from the theories of the policy and decision sciences.  These can help when designing or strengthening SEA activities (Kørnøv and Thissen 2000).  Experiences gained to date with the application of SEA at the policy level confirm that it is important to adapt it to the 'political culture' of norms, rules and relationships that shape national policy-making.

Factors to be considered when designing policy SEA include the style of policy-making, e.g. open or closed, the mechanisms used to monitor and enforce accountability and the opportunities for public and stakeholder involvement (O'Riordan and Sewell 1981).  Constitutional conventions, including cabinet confidentiality or parliamentary sovereignty are important when deciding on what is feasible or practical with regards to policy SEA arrangements.

Sadler (2005, pp.7-8) introduced other aspects and issues that need to be taken into account when attempting to conduct SEA at the policy level.  These include:

## 1) Communicating the benefits

Even if SEA of policy has gained political acceptance, its application may be resisted or circumvented because it intrudes on territory and prerogatives that traditionally have been off limits to outside scrutiny. Many in government still doubt that SEA can add real value to policy formation or fear that it will metamorphose into EIA 'with all its procedural bells and whistles'. While often overdrawn, these concerns need to be addressed if the SEA process is to work effectively. How to 'sell SEA' has been a perennial theme of discussion among the converted, e.g. at IAIA annual meetings. A much better job needs to be done of communicating the contribution that this process can make to policymakers (Verheem and Tonk 2000).

## 2) Dealing with variability

Policy-making is a highly variable, often non-uniform process that calls for a range of adjustments to SEA procedure. For simplicity, two main approaches to policy formulation may be contrasted. A structured process follows identifiable steps that lend themselves to some form of SEA application, for example, the formalised procedures for legislation and the centralised policy apparatus of many ex-socialist countries. By contrast, unstructured policy development is fluid, issue-driven and reactive to events as they unfold, and likely to be accessed best through the application of simple, rapid appraisal tools that provide immediate insights. Other policy-making processes may combine features of both approaches, for example beginning as unstructured and moving toward greater formality in the final stages when documenting options and consequences (Renton and Bailey 2000).

## 3) Focussing on realities

Often policy-making may be not so much the exercise of a specific choice as the creation of what O'Riordan (1976) called a 'decision environment' through which proposals and options are formulated and filtered. In such circumstances, policy and institutional 'mapping' can help SEA practitioners to gain a firmer grasp of the context and nature of policy-making and the agencies and stakeholders involved (See: Dalal-Clayton and Bass 2002). This analysis can indicate areas and junctures at which SEA can contribute and add value to government policy-making. A parallel review of environmental law and policy can help to identify the key objectives and policies that should provide the referents for identification and evaluation of effects in SEA.

## 4) Addressing key issues and links

Policy initiatives in certain sectors, such as energy, transport and trade, are known to have potential environmental effects or consequences. At this level, cause-effect relationships are modulated by a range of intervening factors and often expressed as implications or issues rather than impacts. In many cases, the environmental effects of policy will be long-term, transmitted through the subsequent preparation of plans or programmes or other processes. These include the 'knock on' effects of policies on environmental objectives across other sectors, which are little discussed in the SEA literature compared to vertical integration or 'tiering'. Further attention should be given to the horizontal dimensions or boundary conditions for SEA.

## 5) Capitalising on opportunities

All reforms of the policy-making process provide an opportunity to introduce or strengthen SEA. Such changes have taken place recently or are underway in a number of countries and international organisations [...]. For example, the recent UK initiative on modernising government and World Bank environment strategy were instrumental in introducing new forms of SEA [...]. In some cases, the implementation of measures may involve long lead times as exemplified by the introduction of the first crop of SEA-equivalent policy statements under the New Zealand Resource Management Act (1991) [...]. Looking ahead, international trends and developments indicate there will be a number of opportunities for the further development of SEA at the policy level [...].

**6) Learning by doing**

This will be particularly important in capitalising on opportunities or introducing new systems [...]. More generally, the 'variable geometry' of policy-making underscores the need for a flexible, trial and error, learn and adapt approach to SEA (Sadler and Verheem, 1996). So far, the means to do so are largely missing. Even though SEA practice at the policy level is increasing and diversifying, there is relatively little systematic monitoring and follow up including ex-post reviews of process effectiveness and performance (Partidario and Fischer 2004, Sadler, 2004). Much can be learnt in the first instance from an understanding of current SEA systems and their implementation." (Sadler, 2005, pp.7-8)

## 15.4 Case study: Renewable energy policy in Scotland

This section introduces a policy SEA case study, namely the SEA of two Supplementary Planning Guidance (SPG) documents on Renewable Energy for Fife Council (a local authority in the East of Scotland, UK) for (1) wind energy, and (2) renewable energy technologies other than wind energy. This was originally published as Fischer T B and Phylip Jones J., (2008). Strategic Environmental Assessment of the Fife Supplementary Planning Guidance for Renewable Energies (pp. 141-149); in: SEA – materials for China's 'International Conference on Strategic Environmental Assessment (SEA)', SEPA. http://content.undp.org/go/cms-service/download/asset/?asset_id=2083586.

Subsequently, first an introduction to the planning system and to SEA in Scotland is provided. Then the case study is described. Finally, an evaluation of the case study is presented.

### 15.4.1 Introduction to the Scottish planning system

The planning system in Scotland is established by statute, principally in the Town and Country Planning (Scotland) Act 1997). Scotland is one of the four constituent parts of the United Kingdom (besides England, Wales and Northern Ireland). The Scottish Executive considers planning to

have a key role in achieving policy objectives. This is particularly evidenced by the fact that planning is the responsibility of the Social Justice Minister.

One area that causes particular problems for Scottish planning and the Scottish Executive, is the diversity of needs within Scotland. Thus, pressures in the sparsely populated areas of the country are very different from the central belt around Glasgow and Edinburgh, where the case study is located.

Until 1996, Scotland had a "two-tier" system of local government with regional and district councils. Then, the regions were responsible for strategic policy by the preparation of structure plans, while district councils were responsible for more project oriented local plans and development control issues. Now, there is a unitary system in place, with local authorities having a wide range of responsibilities and a range of tasks to fulfil. They are, for example, obliged to prepare both, structure plans and local plans, i.e. development plans. Together, these plans contain policies for the future development and use of land in an area. In addition, district councils also prepare the policy oriented supplementary planning guidance for specific planning aspects. Plans and guidance can cover a wide range of issues such as housing, transport, employment, shopping, recreation and conserving and protecting the countryside.

### 15.4.2 SEA in Scotland

The Environmental Assessment (Scotland) Act 2005 (EAA 2005) came into force on February 20th, 2006. The Act repealed the Environmental Assessment of Plans and Programmes (Scotland) Regulations 2004 (EAPP, 2004), which was in force prior to the Act. As opposed to most other EU member states, Scottish legislation not only aims at plans and programmes, but also at strategies, i.e. policies – including planning guidance. Guidance on the form and content of the Environmental Report is set out in SEA Toolkit published by the Scottish Executive in

September, 2006. The Scottish Executive is also producing an annual SEA report which outlines the progress made with SEA. Table 15.1 indicates the plans, programmes and strategies that have been subject to SEA in 2005 and 2006.

As indicated in Table 15.1 'Town and Country planning and land use' plans, at 53%, made up the largest proportion of plans, programmes and strategies entering the SEA process in 2006, followed by 'Transport' at 17%. Together, these sectors accounted for over 70% of SEA activity in 2006. Telecommunications was the only sector in which no SEAs were submitted in 2006. For energy, the subject of this section, only 5% of SEAs (i.e. six in total) were undertaken.

### 15.4.3  Energy planning and SEA in Scotland - the context

The Scottish Executive has set some ambitious renewable energy targets for Scotland. Thus, by 2020, 40% of the country's electricity supply should be from renewable energy sources. Attaining this target is thought to be possible thanks in part to the wealth of natural resources which Scotland possesses, including wind, both onshore and offshore, wave and tidal energy potential.

### 15.4.4  Introduction to the case study

Fife is a council area of Scotland, situated between the Firth of Tay and the Firth of Forth. Fife is a peninsula in eastern Scotland bordered on the north by the Firth of Tay, on

| Table 15.1: Plans, programmes and strategies (policies) entering into the SEA process | | | | |
|---|---|---|---|---|
| **Sector** | **Number of PPS carried over from 2005** | **Number of PPS started in 2006** | **Total number of PPS in 2006** | **Percentage** |
| Agriculture | 0 | 3 | 3 | 2.5% |
| Forestry | 1 | 2 | 3 | 1% |
| Fisheries | 1 | 0 | 1 | 1% |
| Energy | 1 | 5 | 6 | 5% |
| Industry | 0 | 3 | 3 | 2.5% |
| Transport | 3 | 18 | 21 | 17% |
| Waste management | 1 | 2 | 3 | 2.5% |
| Water management | 0 | 1 | 1 | 1% |
| Telecommunications | - | - | - | - |
| Tourism | 0 | 1 | 1 | 1% |
| Town and country | | | | |
| planning and land use | 13 | 51 | 64 | 53% |
| Miscellaneous | 0 | 14 | 14 | 12% |
| TOTAL | 20 | 100 | 120 | 100 |

Source: Scottish Executive (2007)

the east by the North Sea and the Forth of Firth to the south. Fife is Scotland's thirteenth largest local authority area with a resident population of just over 350,000 (see Map 15.1). Almost a third of the population live in the three principle towns of Dunfermline, Kirkcaldy and Glenrothes.

Two SPGs were prepared and subjected to SEA. One was an SPG on wind energy (wind farms, both onshore and offshore) and the other was an SPG for renewable energy technologies other than wind.

The SEA conducted was based on a rigorous framework for assessing the nature of the impact and likely time scale of any impact consistent with the requirements of the legislation. The various policy elements were assessed against evaluation criteria specified in Schedule 2 (6.a-e) of the SEA Regulations (See: Box 15.2).

The aim of the SEA was to demonstrate that the various policy elements for renewable energy
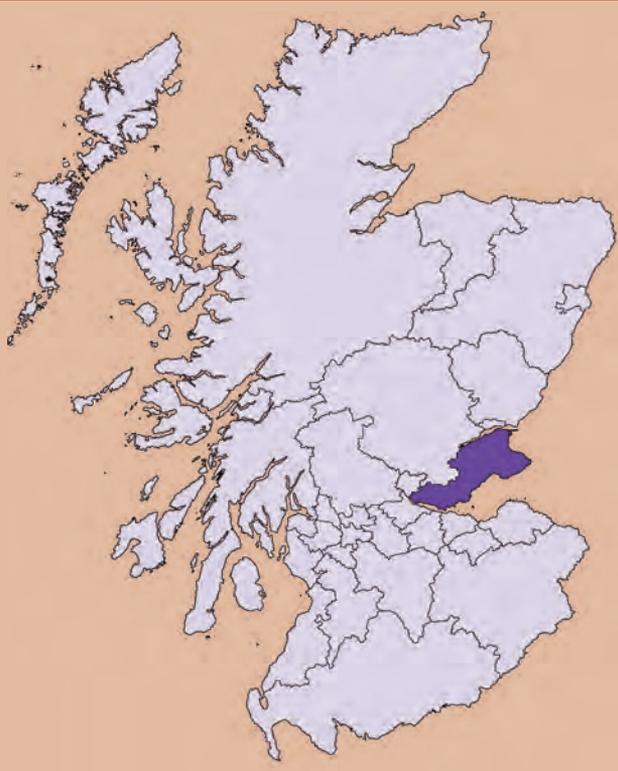
| Box 15.2: List of evaluation Criteria according to the Scottish SEA Regulations |
|---|
| 1. Biodiversity/Flora/Fauna; |
| 2. Population; |
| 3. Risk to Human Health; |
| 4. Soil; |
| 5. Water; |
| 6. Air; |
| 7. Climatic Factors; |
| 8. Material Assets; |
| 9. Cultural Heritage (Including archaeological and architectural); |
| 10. Landscape; |
| 11. Secondary, cumulative and/or synergistic effects of criteria 1-10; and, |
| 12. Natura 2000 sites |

uptake in the Fife area contribute positively to securing a sustainable energy supply.

The SEA was conducted as follows:
(1) Screening: SPGs in Scotland formally require SEA (according to EAA 2005, EAPP 2004);
(2) Scoping: a scoping document was submitted to the Scottish Executive on 31.01.2007, and
(3) formally commented on by three statutory consultees (consultation): Scottish Environmental Protection Agency (SEPA), Scottish Natural Heritage (SNH) and Historic Scotland (HS);
(4) an environmental (SEA) report was prepared, which was subject to
(5) public consultation (8 weeks; March 26th – May 21st,2007);
Furthermore, in the future, compliance with the terms and conditions of the SPG/SEA will need to be

(6) monitored.

This is happening based on the incorporation of the SPGs into the area's local planning (2007-2010).

The main aim of the SEA was to ensure that no adverse environmental impacts would arise when

**Map 15.1: The fife area**



Source: Scottish Executive (2007)

the Supplementary Planning Guidance is implemented in conjunction with other Development Plan proposals. Furthermore, SEA for the SPG on Wind Energy aimed at identifying suitable sites for wind farms.

Finally, SEA for the SPG on Renewable Energy Technologies other than wind aimed at providing advice to potential developers on the range of technologies which could be developed in Fife, including:

1. hydro power;
2. heat pumps (air/water);
3. geothermal;
4. combustion plants (biomass-based);
5. shoreline and offshore technologies (wave and tidal power); and
6. solar technologies (heat and photovoltaic).

Fife Council used a simple matrix method for evaluating the significance of impacts that each of the policy elements of the SPGs may have on the environment. This matrix method and scoring mechanism are demonstrated below in Figure 15.1. Furthermore, Box 15.3 shows the list of assessment criteria.

Finally, Figure 15.2 shows how the scoring was done, using a qualitative approach of justifying each score assigned to an individual policy element.

The potential impact of each policy element (i.e. wind farm sites for the SPG on wind energy and the six renewable energy technologies for the other SPG) on each of the factors listed in Box 1 was considered and a score was allocated. The method provided scope to indicate situations

### Figure 15.1: Framework for Assessment

| Evaluation criteria / Policy Element | Assessment Criteria (See Box 15.2) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| SS1: Settlement Strategy | +/-- LT | +/-- LT | + LT | +/-- LT | +/-- LT | -- | -- | + LT | +/-- LT | +/-- LT | +/-- LT | -- |

### BOX 15.3: Symbols for assessment matrix

| | |
|---|---|
| + | Significant positive environmental effects |
| - | Significant negative environmental effects |
| -- | No significant environmental effects |
| ? | Don't know |
| +/-- | In the positive spectrum if any effect |
| -/-- | In the negative spectrum if any effect |
| +/-/-- | Range of possible scores |
| LT | Long Term |
| MT | Medium Term |
| ST | Short Term |
| P | Permanent |
| T | Temporary |

| Figure 15.2: Speciment Policy/Proposal Scoring | | |
|---|---|---|
| **Component of Plan** | **Impact Duration Biodiversity/ Flora/Fauna** | **Justification** |
| Policy element SS1: Settlement Strategy | +/-- LT | Policy element requires that allocation of land for new development must avoid damage to natural environment features.  Long term over life of Plan. |

where it may not be possible to predict effects, i.e. taking into account uncertainty.  Not only significant negative effects were identified, but also those that were deemed positive.  Where appropriate, the duration of effects was considered with the option to value it as long-term, medium-term or short-term.  In addition, it was indicated whether effects would be temporary or permanent.  The assessment was on the basis that any later development plan proposals would need to be in line with what was set out in the SPG.

### 15.4.5   Strategic Environmental Assessment Results – Main Findings

The main aim of the SEA was to ensure that any renewable energy developments consistent with the Supplementary Planning Guidance should not have an adverse impact on the environment.  Figure 15.3 shows the assessment results for the various policy elements.  It can be seen that none of the policy elements have a significant negative effect on 1 (biodiversity, flora, fauna), 8 (material assets), 9 (cultural heritage), 10 (landscape) and 12 (Natura 2000 sites).  Furthermore, all policy elements score positive on 7 (climatic factors).

While it was found that the main significant negative environmental effects of the SPG policy elements related to soil disturbance and soil removal for placing the foundations of the wind farms, overall, no major significant negative effects were identified.  Rather, positive effects

| Figure 15.3: SEA of SPG policy elements – Summary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Policy element of SPG | Criteria | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| SG1 : Wind Farms (also policy element R1: Wind Turbines) | -- | +/-- LT | + LT | -/-- LT/T | -/-- | + | + | -- | -- | -- | +/-- | -- |
| SG2 : Shoreline  Technologies and Landfall Installations | -- | -- | -- | -/-- LT/T | -/-- | + | + | -- | -- | -- | -- | -- |
| SG3 : Renewable Energy – All Technologies | -- | -- | -- | -/-- LT/T | -- | -- | + | -- | -- | -- | -- | -- |
| SG4 : Renewable Energy Technologies | -- | -- | -- | -/-- LT/T | -- | -- | + | -- | -- | -- | -- | -- |
| SG5 : Combined Heat and Power Plant | -- | -- | -- | -- | -- | -- | + | -- | -- | -- | -- | -- |
| PSG1 : Offshore Activities | -- | -- | -- | -- | -- | -- | + | -- | -- | -- | -- | -- |

were predicted as a result of SPG implementation on the local population in terms of job creation, reducing greenhouse gas emissions and improving local air quality.  Therefore, overall, the SEA found that the SPGs should be leading to improvements to environmental quality.  This is not to say that the SEA is not, therefore, required for such SPGs in the future as the SEA process did flag up some very important environmental issues which will need to be mitigated against when the SPGs are implemented and integrated into the Fife Local Plan.

Figure 15.4 summarises the justifications given within the assessment of the SPG policy elements, taking the evaluation criterion 'soil' as an example.

The main concerns that the statutory consultees had, related to the fact that the scoping process, and, thus, the SEA process in general, started late into the preparation of the draft SPGs.  Both, SEPA and HS picked up on this point and stated that:

| Figure 15.4: Justifications of scores given for the evaluation criteria soil | | |
|---|---|---|
| **Policy element** | **Impact Duration Soil** | **Justification** |
| SG1: Wind Farms (also Policy element R1: Wind Turbines) | -/-- LT  T | Development of turbines would have small effect on soils as area required per turbine and associated works is limited.  Sites probably restored after use.  Long-term use but temporary. |
| SG2: Shoreline Technologies and Landfall Installations | -/-- LT  T | Development of shoreline technologies and landfall installations likely to have limited impact on soil which can be addressed through conditional planning permission.  Policy seeks to prevent shoreline technologies and landfall installations causing coastal erosion and any associated loss of soil.  Long-term use but temporary. |
| SG3: Renewable Energy – All Technologies | -/-- LT  T | Development of renewable technologies would have small effect on soils as area required for most technologies and associated works is limited.  Sites probably restored after use.  Long-term use but temporary. |
| Policy element SG4: Renewable Energy Technologies | -/-- LT  T | Development of renewable technologies would have small effect on soils as area required for most technologies and associated works is limited.  Sites probably restored after use. Long-term use but temporary. |
| Policy element SG5 : Combined Heat and Power Plant | -- | Policy promotes more efficient use of energy which would reduce greenhouse gas emissions with associated environmental benefits from a reduction in waste combustion materials. |
| Policy elements PSG1: Offshore activities | Not applicable | Not applicable |

"It is noted that the draft Supplementary Planning Guidance on "Wind Energy" and on "Renewable Energy Technologies other than Wind Energy" are in an advanced stage of preparation while the SEA is still at the early stage of scoping.  Please note that the purpose of the SEA is to inform decision-making as the plan is prepared as well as before its adoption and that SEA should be undertaken during the plan preparation and not after substantial decisions about the plan direction and content have already been taken" (SEPA, 2006).

It was suggested that the scoping report should have included more information on the types of renewable energy technologies covered i.e. not just wind.  Furthermore, it was felt that more detailed baseline environmental data should have been produced than those that were available and which were rather limited.  It was also proposed that the scoping report should have asked for the SEA to assess the evolution of the local environment in the absence of any renewable energy development, i.e. the 'no-action alternative' should have been included.

Furthermore, it was also suggested that the baseline data on existing "brownfield sites" could have been linked to the percentage of renewable energy facilities located on brownfield land.  As the SPGs set out policy elements and advice for planning for renewable energy developments in Fife's coastal waters, it would have been appropriate to include baseline data on the Fife marine environment and consider potential impacts on the marine environment, marine infrastructure and particular areas of importance for fisheries or recreation and tourism.

Finally, the consultees stressed that "Economic Development" should not be a SEA topic and is not relevant to the environmental assessment.  It was stated that the consultees supported the matrix based approach.  However, it would have also been helpful to demonstrate how the SPGs will be monitored to ensure that any wind energy developments conform to the SPGs policies and

that any mitigation is effective.  The latter was seen by the consultees as an integral and important part of the SEA process.

### 15.4.6  Evaluation

The SEA was conducted for a policy level activity, focusing on evaluating the policy elements set out within the two SPG documents prepared by Fife Council.  The policy elements within the SPG were scrutinised and impact significance valuations were assigned to each policy area in a qualitative manner.  It was found that the policy elements advocated in the SPGs would have no significant adverse long-term effects on the local or regional environment.  Furthermore, it was found that there would be long-term positive impacts in the reduction of carbon dioxide emissions in the area.

The matrix method adopted was simple but effective in the evaluation of significance. Following the consultees' responses on the SEA scoping document, the final environmental statement was greatly improved, taking into consideration the 'no-action alternative', i.e. the evolution of Fife without a renewable energy policy.  The SEA was considered very useful in outlining the main areas of concern with regard to the uptake of renewables in the Fife area and the subsequent integration of the SPG into the local area plan will ensure that the local plan is more sensitive to the needs of environmental protection, while balancing the global need for increased renewable energy uptake in light of the global warming dilemma the world faces.

### 15.4.7  Success factors, problems, shortcomings and outlook and conclusions

Producing an initial scoping report which three statutory consultees had a chance to comment on served to greatly improve the overall SEA quality.  Without the scoping stage and the comments by the consultees, the quality of the SEA process would have diminished.  The consultees identified some highly relevant points, most importantly that the scoping stage may have been carried out too late in relation to the preparation of the draft SPG, stating that the

purpose of SEA was to work in tandem with the policy (guidance) making process in order to pro-actively influence its content. Also, the scoping stage ensured that additional and crucial baseline data was collected and inserted into the environmental statement.

Consultees stated that Fife Council had handled the input of the consultees very well and included all of the additional information that was requested. Overall, the SEA process most definitely ensured that the SPG became more environmentally sensitive and the process of integrating the SPGs into the local plan will now be undertaken in Fife between 2007 and 2010. The only criticism of the SEA procedure was that it started too late in relation to the initial preparation of the draft SPGs, which may have potentially reduced the level of influence that the SEA exerted on the final SPG version. Nevertheless, this study illustrated that policy level SEA for renewable energy policies and strategies is beneficial and results in more environmentally considerate guidance.

## 15.5   Planning system and processes in Pakistan

Planning, in the broadest sense, is usually considered to be a process for assessing the nature and extent of present as well as future economic, social and spatial needs, resulting in a decision on how to cater to those needs within available resources and timeframe. Its outcome may take the form of a policy, programme, plan or at times specific projects. Essentially, "a plan is a package of economic and social policies expressed with quantified targets and objectives to be achieved during a laid-down period" (PC/GoP, 2010, p.2). Planning in Pakistan stems from the identification of development needs and allocation of economic resources. Other forms and manifestations of planning also exist in the country. The planning system and processes can better be understood by analysing institutional set-up and nature of planning activities at various levels. Generally speaking, planning in Pakistan is done at three levels, including national,

provincial and district levels. Institutional set-up and planning process or activities at each of these levels are explained in the following sections, depicting possibilities of the integration of SEA.

### 15.5.1   Planning at National Level

At the national level, the Planning Commission is mainly responsible to periodically prepare national plans or strategies and annual development programmes (ADP) for the economic and social development of the country. It is also responsible to seek approval of such plans from the Federal Government and coordinate its activities with the Ministries and concerned Departments or Agencies for implementation of the development programmes. It prepares a Public Sector Development Program (PSDP) for providing financial resources for various projects to facilitate economic development and reduce poverty. The Federal Ministries and Divisions prepare programmes and projects relevant to their respective areas of responsibility. These are approved by the Departmental Working Party (DWP) up to certain financial limit. The programmes and projects exceeding certain financial limits are then submitted to the Planning Commission for approval by the Central Development Working Party (CDWP). The schemes costing Rs. 100 million and above are submitted to the Executive Committee of the National Economic Council (ECNEC) for final approval (PC/GoP, 2010).

The Planning Commission has so far prepared nine five-year plans from 1955 to 2003. The ninth plan was halted due to a change of government and the draft 10th five year plan has not been approved. While recognising the need for sustainable development in the country, these plans are mainly comprised of policies and targets for economic development as well as sectoral policies and programmes regarding physical planning, housing and infrastructure provision, etc. The Environment Section of the Planning Commission of Pakistan has been assigned the task of ensuring consideration of

environmental aspects in the policies, plans, programmes and EIA of projects. However, due to its limited resources, this section has not so far been able to provide an effective support for strategic environmental assessment (SEA) of policies.

A few years ago, the Planning Commission prepared a Medium-Term Development Framework (MTDF) 2005-10. This suggested that the

"integration of social and environmental considerations into development processes of crosscutting sectors of economy, in a holistic manner, is essential to achieve positive environmental outcomes. Strategic Environmental Assessment in development planning process is, therefore, a pre-requisite for integration of environment at policy, planning and programme level of different sectors" (PC/GoP, 2005, s.11.1).

For the purpose of integrated rural and urban development, the MTDF envisaged to preparing National Spatial Development Strategy, Provincial Spatial Plans, District Structure Plans and Tehsil Master Plans (PC/GoP, 2005). It is worth mentioning that the National Environmental Policy 2005, prepared by the then Ministry of Environment, Government of Pakistan, particularly emphasised the need for promoting SEA as a tool to integrating the environment into decision-making (MoE/GoP, 2005). The more recently prepared 'Pakistan: Framework for Economic Growth', 2011 recognises environmental issues "as an essential element contributing to the quality of life" (PC/GoP, 2011, p.43). It suggests "climate proof economic growth from the impacts of climate change, in particular on the agricultural, water and energy sectors" while promoting 'green growth' by attracting investment in low-carbon technologies (PC/GoP, 2011, p.143) .

Policies or programmes pertaining to drinking water and energy (power generation) sectors have been identified by some experts as

opportunities of possible integration of SEA at higher levels of planning decision-making during the first phase of institutionalising SEA in the country (NIAP/IUCN, 2011; Khan and Ahmad, 2011). The following National level policies or programmes may be considered for integration of SEA:

- Pakistan: Framework for Economic Growth 2011;
- National Flood Reconstruction Plan 2010;
- National Sanitation Policy 2006;
- Clean Drinking Water for All Programme 2006; and
- National Transport Policy (Draft).

### 15.5.2 Planning Provincial Level

The Planning and Development Department (P and DD) is the principal planning organisation at the Provincial level. Its functions include the formulation of Provincial Government visions, policies and strategies for economic planning and development, preparation of an Annual Development Programme (ADP) or Medium-Term Development Framework (MTDF), Public Sector Development Programmes (PSDP), including short-term and long-term provincial development plans. Other than the P and DD, departments of Provincial Ministries also formulate sectoral development policies or plans in the light of the Federal Government Policies. These policies or plans are scrutinised by the Provincial Development Working Party (PDWP) and approved up to certain financial limit. Projects exceeding the financial limit of the PDWP are submitted to the CDWP for approval.

The Provincial P and DD is responsible for monitoring the implementation of policies, plans and projects in coordination with Provincial and Federal Government departments. It is also entrusted with the task of capacity building of the Provincial Government departments/agencies for good governance (P and DD/GoPb, 2013). Like the Planning Commission, P and DDs of two Provinces (Punjab and Khyber Pakhtunkhwa - KP) have also got separate Environment Sections, while other P and DDs have assigned

this function to allied sections/cells, e.g. Food and Agriculture. These sections and Provincial Environment Departments are responsible to promote environmental considerations in development projects. But in many cases public sector development projects obtain financial approval prior to EIA. The EIA of such projects is normally carried out as a result of frequent reminders from the Provincial Environmental Protection Agencies (EPAs) once the construction work starts (Nadeem and Hameed, 2008).

The MTDF 2012-15 and Development Programme 2012-13 of Punjab envision "promotion and attainment of sustainable development in the province through integration of economic development and environmental consideration" (Pand DD/GoPb, 2013). Its urban development strategic intervention includes the provision of water supply schemes, rehabilitation and augmentation of trunk and secondary sewerage systems and provision of wastewater treatment plants in three big cities. The regional planning strategy allocates funds for mini dams, water and infrastructure projects as well as poverty alleviation through economic development (Pand DD/GoPb, 2013). Thus, socio-economic development is given due consideration, but how the socio-economic development can be achieved in an environment friendly manner needs more attention, for example, through SEA.

The Punjab Power Generation Policy, 2006 (revised in 2009) prepared by its Energy Department reiterates that all the relevant provisions of the PEPA 1997 and EIA requirements shall be followed but it does not suggest a need for SEA (GoPb, 2006). The Disaster Risk Management Plan 2008 of the Sindh Province indicates the deteriorated environmental conditions and assigns the responsibility of implementing the requirements of the PEPA 1997 and the NEQS, but it does not say anything about SEA (PDMA/GoS, 2008). Once the legal and institutional mechanism for SEA is in place, some of the provincial policies, as suggested below, may possibly be revised to

undergo a formal SEA.
- Punjab Power Generation Policy 2006;
- Disaster Risk Management Plan Sindh Province 2008;
- Khyber Pakhtunkhwa Hydel Policy 2006; and
- Provincial Disaster Risk Management Plan for Balochistan (Draft).

Nevertheless, it is worth mentioning that the Environmental Protection Agency of the Azad Government of the State of Jammu and Kashmir has initiated SEA for the A.J. and K Hydro Development Plan, under the National Impact Assessment Program (NIAP), at Muzaffarabad. In this regard, the AJK-EPA has also organised capacity building and training workshops (AJK-EPA, 2013). Once completed, review of this SEA experience would provide lessons for the future course of action.

### 15.5.3 Planning at District Level
The Provincial Local Government and Community Development/Rural Development Department is the third tier of government to act as administrative/umbrella department for the planning and development management of urban and rural areas at the District level. For this purpose, various rules or regulations are prepared by the department. It is also responsible for coordinating activities with other provincial government departments and allied agencies.

During the year 2001, a Provincial Local Government Ordinance (PLGO) was promulgated in every province as part of the devolution plan of the then military regime. Under this Ordinance, the rural and urban local councils had been merged to form City District Governments (CDGs)/District Governments (DGs) and Tehsil/Town Municipal Administrations (TMAs). Every province has a few CDGs and several DGs and TMAs. For example, the Punjab province had been divided into 34 districts having CDGs in its five big cities and the DGs in the rest of the districts. Every CDG consisted of several Town Municipal Administrations and every DG consisted of Tehsil Municipal Administrations.

Development Authorities also exist in the big cities, working as part of CDGs. Similarly, other provinces had been divided into this District level administrative hierarchy commensurate with their number of big cities and districts and tehsils, etc.

Due to a lack of trust in the devolution plan of the past military regime and the changing political interests/environment within the country, the PLGO 2001 has been replaced by a new Local Government Acts in all four Provinces of the country. In the province of Sindh, the PLGO 2001 was initially repealed in July 2011, while the PLGO 1979 was restored. The Sindh Local Govt. Ordinance 2012 was promulgated. Karachi, being the largest city of Pakistan, has got five Districts now working under the Karachi Metropolitan Corporation. The city has also got a building control authority. In KP, the PLGO 2001 has been replaced by the KP Local Government Act 2012 and the CDG/TMAs have been renamed as Metropolitan Corporation (MCL)/Municipal Committees (MC). The rural areas have been given under the control of Zila Councils (ZC). In Balochistan, the same set up was restored through the Balochistan Local Government Act, 2010. More recently, the Punjab Local Government Act 2013 has been approved. The city of Lahore will soon have a Metropolitan Corporation and a Distrcit Council/ZC in place of CDG. Other big cities shall have Municipal Corporations; whist intermediate cities would have Muncipal Committees, to manage urban areas and District/ZCs for rural areas.

Whatever the administrative set up, each CDG/TMA/MCL/MC is responsible to execute provincial government rules/regulations for land use classification, reclassification, housing and other issues. These are also responsible for the provision of infrastructure services, including, but not limited to, water supply, sanitation, solid waste management, maintenance of parks, construction of roads and streets and others. Master plans are required to be prepared for the area under each municipal administration to guide the future growth of cities as well as the

provision, operation and maintenance of infrastructure services. Big cities have also got traffic engineering and transportation planning agencies and transportation plans for their respective jurisdictions.

Preparation of the Master Plan for Greater Lahore marked the beginning of master planning in Pakistan in 1961. However, it was only approved during the year 1972 due to some political and administrative constraints. The second Master Plan was prepared for Karachi during 1970 to 1974. Subsequently, a number of master plans were produced for various cities of the country including, for instance, Quetta, Peshawar, Rawalpindi, Faisalabad and Multan. Some of these were named Structure Plans. Most of these plans were prepared with foreign assistance. Besides, a large number of, what may be termed mini master plans, had also been prepared under the name of Outline Development Plan (ODP) using local technical and financial resources. Such plans are approved by the respective local council or development authority.

All the land uses viz. residential, commercial, industrial, public buildings, etc. in a town or city and now even in suburban areas are supposed to be developed in the light of the proposals contained in the respective master plan of that city. Furthermore, the building regulations are formulated in line with the master plan. But unfortunately, all of the above mentioned plans were prepared without considering cumulative environmental impacts of development proposals for various land uses in cities. Consequently, adverse impacts on natural resources and human health are on the rise and the environment in cities is deteriorating (World Bank 2006; Hameed and Nadeem, 2007). This situation calls for a formal strategic environmental assessment system with necessary legal and institutional framework at district/local level as well. Thus, the following Metropolitan/City level strategic/master plans may possibly be revised and subjected to SEA:

- Karachi Strategic Development Plan 2020;

- Integrated Master Plan for Lahore-2021;
- Integrated Strategic Development Plan for Lahore Region 2035 (ToR);
- Quetta Master Plan 2011-2032; and
- Muzaffarabad Master Plan 2007.

### 15.5.4. Integrating SEA with policy formulation in Pakistan

The following course of action is proposed to integrate SEA with policy formulation and higher level planning and development decision-making processes in the country:

1. **Legal Framework:** The foremost requirement is to introduce an amendment in the PEPA 1997 and Provincial Environmental Protection Acts, making SEA of policies, plans and programmes a mandatory requirement. In the light of such an amendment, SEA regulations and guidelines would need to be developed in consultation with all the stakeholders, including representatives from the Planning Commission, Federal and Provincial Ministries and attached departments or agencies engaged in formulating polices which may have adverse cumulative economic, social and environmental impacts, for example, water and power, oil and gas, communication and works, industries and mineral development. These should also include the representatives from the Local Government or District Government and Urban Development Authorities. This should be followed by amendment in the Rules of Business pertaining to approval of policies, plans and programmes. Relevant forms (e.g. PC-II) for allocation of funds for surveys and feasibility studies should also have SEA requirements added during the hiring of consultants for this purpose. As an interim arrangement, amendments in the Rules of Business and relevant forms may help kick-start the process.

2. **Institutional strengthening:** once the legal framework is in place, institutional strengthening/capacity building of the concerned departments/agencies including EPAs and training of concerned staff should be done.

3. **Draft policy and stakeholders' consultation:** after formulation of draft policy in consultation with concerned departments/agencies, the draft policy may be submitted to the concerned environmental protection agency for screening.

4. **Screening:** screening lists should be prepared and made part of SEA regulations. Since this is policy level screening, setting thresholds in terms of project cost and capacity may not be possible. Screening criteria should, therefore, be based on the nature and extent of policy in terms of types and nature of ecosystems and human beings to be affected. While screening the policy, concerned EPA should decide the level of SEA, whether 'shallow or deep SEA' (section 15.1).

5. **Scoping:** consultants should be hired to undertake the scoping and SEA of the policy in consultation with the concerned departments/stakeholders and the EPA.

6. **Report preparation:** this should necessarily include but not limited to: impact identification, assessment, mitigation measures and others following SEA guidelines.

7. **Stakeholders' consultation:** this should be jointly organized by the proponent department/agency, EPA and the consultant. Stakeholders may include officials of concerned departments/agencies, SEA experts/academia, NGOs, and well educated and or elected representatives of potentially affected communities.

8. **Proposed modifications:** the concerned department/agency should look for alternative policy options to achieve the

objectives of policy in the light of SEA and stakeholders concerns and make modifications in the policy accordingly.

9. **Approval of SEA:** final SEA of the modified policy, as prepared by the consultant, may be sent to the concerned EPA for verification/evaluation and granting environmental approval.

10. **Final approval of modified policy:** after following the aforementioned steps, the concerned/proponent department/agency should seek final approval of the policy by the competent authority.

## 15.6    Practical element

Students to reflect on the way in which policy, plans and programmes are prepared in Pakistan and how SEA may fit into existing procedures.

# 16   Developing EIA and SEA further: Integrating different aspects and sustainability assessments

This chapter is divided into three sections. First, the rationale for integrating different assessment aspects in assessment is explained.  Secondly, potential problems of integration in assessment are outlined and thirdly, possible solutions for integrating economic, social and environmental aspects are discussed.  Finally, a real life integrated assessment system is introduced. The main sources this chapter draws on include European Commission (2009), Department of Justice (2006), HIA Gateway (2007), and Morrison-Saunders and Fischer (2006).

## 16.1   Rationale for integrating different aspects in assessment

Recent years have seen an intensifying debate about the most appropriate form of environmental assessment, both at project and at strategic levels. This debate has particularly revolved around two questions:

(a)   whether economic and social aspects should be considered  at par with environmental aspects; and

(b)   how impact assessment can be integrated better into decision-making.


An important rationale behind the desire to integrate different aspects is to streamline processes and to be able to present results to decision makers that are easy to understand and digest.  Therefore, more integrated forms of assessment have been and are being developed.  There are different types of integrated assessment.  The two most common are:

(1)   integrated assessments that function as reporting instruments and that aim at presenting information on phenomena or products in an integrated manner (see, for example, The Integrated Impact Assessment Society, http://www.tias-web.info/); and

(2)   integrated ex-ante assessments that are used to assess possible impacts of proposed policies, plans, programmes or projects (see for example, sustainability assessment or appraisal, Pope et al., 2004 and integrated assessment, Kidd and Fischer, 2007).


The focus here is on (2) ex-ante assessments of policies, plans, programmes and projects.  Essential features of these assessments are the bringing together of environmental, social, and economic considerations and the

balancing of these different substantive concerns in a single appraisal exercise. Although still at a relatively formative stage in comparison to environmental impact assessment (EIA) and strategic environmental assessment (SEA), there has been growing international support for integrated approaches to appraisal. Governmental institutions have been particular advocates of this development. For example, both the United Nations (UNEP, 2003) and the European Union (CEC, 2002) are encouraging the use of integrated-appraisal methods within their own activities.

Although in theory there are many positive features connected with integrated appraisal of policies, plans, programmes, and projects, in practice its use also presents some significant challenges. These relate to tensions between the two main driving forces behind the development of integrated appraisal, the promotion of sustainable development and the promotion of good governance. The HIA gateway (http://www.apho.org.uk/resource/view.aspx?RID =48174) provides several arguments for integrated impact assessments, as follows:

- "There is a problem of "impact assessment fatigue". People are being urged to do too many different impact assessments;
- Many of the issues covered in the different forms of assessment are the same. There is no sense in covering them twice in different assessments;
- People working in organisations such as local governments and government departments are very busy and need to use their time as efficiently as possible;
- Integrated Impact Assessment simplifies and reduces work for policy, programme and project developers;
- Champions for different issues can work together to ensure that "their" issue is properly considered; and
- Those cases, for which a single issue such as health needs more detailed consideration, can be singled out for a separate HIA or other single issue impact assessment."

However, the same author also sees potential problems and pitfalls when attempting to integrate. These are said to include:

- "Health (or whatever is your favourite issue) will not be properly considered or receive adequate attention;
- There is a danger of superficial treatment of issues and encouraging a "tick box approach";
- The need to involve people representing all areas covered by an IIA could create additional work; and
- An Integrated Impact Assessment can only be as good as the people who contribute to it."

In the subsequent section, potential problems of integration in assessment are discussed in further detail.

## 16.2   Potential problems of integration in assessment

There are five main problems for why a cautious approach should be taken towards integrating different aspects in assessment (Kidd and Fischer, 2007). These are connected with the overall objectives for assessment, the main driving forces behind the move towards integration, availability of time and resources, potential loss in depth in assessment and 'double-dipping' of socio-economic issues when compared with environmental issues. These are subsequently explained further.

The first problem is connected with the use of objectives in EIA (and SEA) from sustainable development strategies that, in many systems, are insufficiently defined and work within an overall economic growth paradigm. In the UK, for example, the national sustainable development strategy (Prime Minister, Cabinet Office, 1999) aimed at four main objectives, namely:

- social progress which recognises the needs of everyone;
- effective protection of the environment;
- prudent use of natural resources; and

- maintenance of high and stable levels of economic growth and employment.

Here, only economic growth and employment levels appear sufficiently well defined. All other aspects are open to interpretation. Furthermore, there are problems of compatibility, as it is questionable whether an effective protection of the environment can be achieved in the presence of 'high and stable levels of economic (GDP) growth.'

The second problem is connected with the main driving forces behind the move towards integration. In the UK, for example, the main drivers of integration are the aims formulated in the 'White Paper on Modernising Government' (Prime Minister, Cabinet Office, 1999), revolving around an 'open government' and 'good governance'. Environmental aspects only play a minor role in this context. Therefore, generally speaking: 'integrated appraisal may reflect a subtle, but perhaps significant shift in the focus from substantive environmental and sustainability concerns to the procedural aspects of effective governance' (Kidd and Fischer, 2005). In this context, Kidd and Fischer (2005) suggested that the loss of environmental emphasis is a product of: 'An over-reliance on participatory and qualitative methods (that) may promote dominant economic perspectives at the expense of sustainability and environmental concerns and result in inadequate appraisal processes'.

The third problem is connected with the availability of time and resources to devote to impact assessment. EIA practitioners have long been criticising that in EIA, insufficient time and effort goes into pre-decision activities such as baseline monitoring and other investigations and the preparation of environmental impact statements (EIS) (e.g. Sadler, 1996; Dalal-Clayton and Sadler, 2005). It is likely that the move to integrated assessment processes will further exacerbate this. As Scrase and Sheate (2002, p.283) have argued: 'The limits of time and resources going into any assessment mean that there will necessarily be a loss of depth in consideration of the environment if social and economic objectives and criteria are considered simultaneously.'

The fourth problem follows on from the loss in depth and concerns the way in which the different components of sustainable development are integrated. The previously noted trend for EIA to expand into numerous different categories beyond the biophysical environment, along with the addition of social and economic considerations favoured in integrated assessment

**Figure 16.1: Extent of integration of different assessment and their effectiveness**
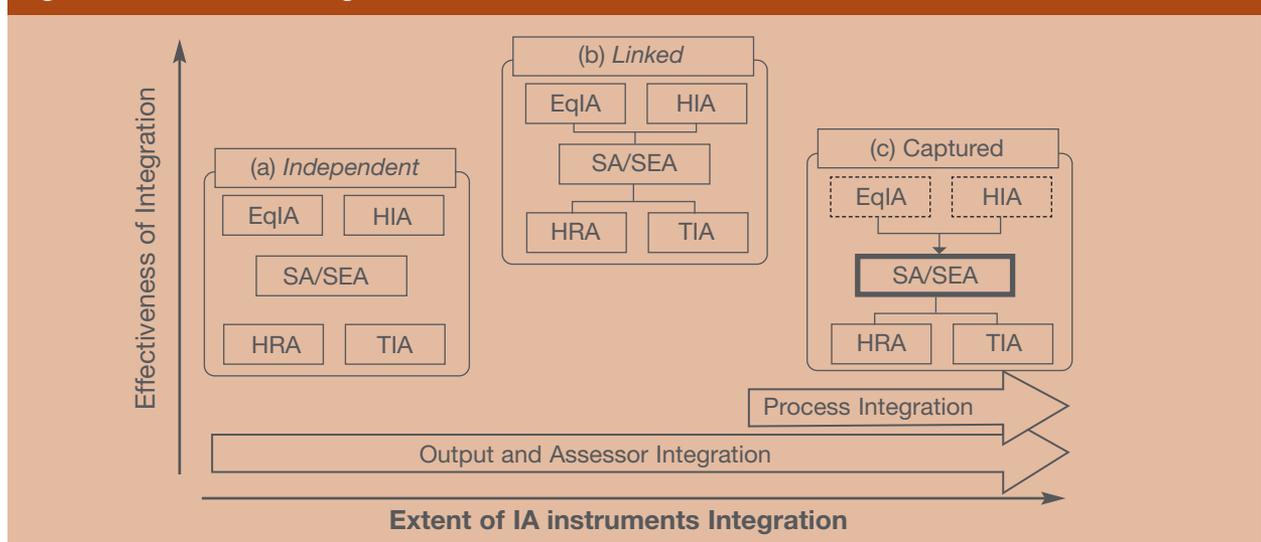
Source: Tajima and Fischer, 2013

processes runs the risk of sustainability assessment taking on the whole world; i.e. people may want to include any possible factor. In this context, there is a real danger that with everything included in the impact assessment process, quantity may eventually overcome quality and no aspect of the assessment is done well.  More recently this was supported by research findings of Tajima and Fischer (2013). They established that assessments in English spatial planning appear to be most effective in achieving their aims when applied in close co-operation ('linked'), but not fully integrated ('captured').  This is shown in Figure 16.1, resulting from seventeen spatial plan making exercises that had four other types of impact assessment conducted, as well, including Health Impact Assessment (HIA), Equality Impact Assessment (EqIA), Habitats Regulations Assessment (HRA) and Transport Impact Assessment (TIA).

The fifth and final problem concerns the presentation of sustainability elements to decision-makers regarding the possibility that socio-economic factors are presented or considered more than once during the process, i.e. a kind of 'double-dipping', but that the same does not apply for environmental elements. The environmental assessment of plans is supposed to occur in conjunction with normal planning procedures which are based on socio-economic assumptions.  In land use planning, for example, most developments considered will relate to socio-economic benefits and the land use plan making process already seeks to trade-off between environmental, social and economic factors to find the optimum land use.  EIA and SEA come into this process as advocacy instruments that are supposed to support the weakest aspect in this trade-off process, namely the bio-physical environment.  Therefore, if SEA processes are expanded to include social and economic factors, then double-dipping of these factors will occur and the environment will be disadvantaged (See: Kidd and Fischer, 2005; Fischer, 2005).  In this context, criticism has been

expressed, for example, in Australia at the national level, where Dovers (2002, p.32) stated that in the federal SEA system: 'We have the situation where an implicitly lower priority is attached to the discretionary environmental considerations compared to the mandatory economic and social considerations in SEA provisions of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.  That reflects a policy position at odds with sustainability principles, and most importantly allows a 'double trading off' of environmental — and probably social—concerns against economic concerns when decisions subject to SEA then are considered by core economic agencies and Cabinet.'

## 16.3    Possible Solutions for Integration of Economic, Social and Environmental Aspects

Subsequently, a range of solutions are identified on how to best go ahead with integrating the different substantive elements in assessment (following Morrison-Saunders and Fischer, 2006). Probably the most important approach is to develop sustainability criteria and indicators which stem from fundamental sustainability principles (George, 2001a; Gibson, 2000, 2005). Here, rather than treating environmental, social and economic elements as individual 'pillars', the approach is to start from principles which are intended to reflect the changes needed in human arrangements and activities to move towards sustainable behaviours.  The assessment process must be based on objectives 'by which sustainable development can be defined' (George, 2001b).  This is necessary, because as Gibson (2000) notes the pillars approach tends to pitch the economic pillar and the environmental pillar as 'foundations of warring houses'.  In this context, it is important that clear minimum threshold levels are identified for economic, social and environmental criteria.  Sadler (1999, p. 20) identifies different win-lose relationships against a hypothetical minimum threshold to which trade-offs must conform for decision-making to be integrated and for development to

be classified as sustainable and notes that: 'beyond these boundaries, one set of criteria are being either unduly promoted or unduly discounted against the others'. In case any of these threshold levels are violated, alternative solutions should be sought, as otherwise 'where trade-offs between the economy and the environment are seen as legitimate in the pursuit of sustainability, sustainability assessment could be regarded as a means for economic requirements to override those of the environment or the social context' (Fuller, 2002).

An important prerequisite for effective integration is transparency. In this context, Sheate et al., (2003) advocated that: 'Trade-offs should be transparent and carried out by the decision-making process, rather than by the tool being used'. Similarly, while advocating a sustainability assessment approach, George (2001a) cautioned that: 'When the assessment is done in aggregate, any trade-offs between individual aspects or components are hidden. Deterioration in quality of life for some social groups may not become apparent, and potentially unsustainable environmental effects may go undetected'. Rather than focus on separate environmental, social and economic elements in an integrated SEA process, George (2001b), Gibson (2000, 2005) advocate a process in which sustainability criteria and principles are the driving consideration. The aim of assessment would thus be to seek positive gains over all such principles and over the long-term. In this context, a number of authors have advocated the definition of sustainability criteria or thresholds which should not be crossed (Sadler, 1999; George, 2001b; Pope et al., 2004).

However, there are several problems inherent in this approach. For the purposes of assessment it would be crucial to specify in advance what these criteria are in order to allow proposals to be

| Table 16.1: Trade-off decision rules for Sustainability Assessment (Gibson, 2000) |
| --- |
| 1  Trade-offs in (all or specified) sustainability-related matters are undesirable unless proven otherwise; in other words the burden of proof falls on the proponent of the trade-off. |
| 2  No significant trade-offs with adverse sustainability effects are acceptable. These include: <br> • trade-offs of permanent losses against temporary gains; <br> • trade-offs of nearly certain losses against highly uncertain gains (precautionary principle); <br> • significant compromises to ecological integrity; <br> • significant increases in inequity of opportunity and influence; <br> • significant increases in energy and material flows, except where the gains address serious deprivation and inequity; <br> • trade-offs where the adverse effects are uncertain and the undertaking is not designed for adaptive response; and <br> • trade-offs where more than one aspect of sustainability may suffer adverse effects. |
| 2  Only undertakings that are likely to provide neutral or positive overall effects in each principle category e.g. no net efficiency losses, no net additional inequities, can be acceptable. |
| 3  No significant adverse effects in any principle category can be justified by compensations of other kinds, or in other places, this would preclude cross-principle trade-offs such as ecological rehabilitation compensations for introduction of significantly greater inequities. |
| 4  No displacement of (significant, net, any) negative effects from present to future can be justified. |
| 5  No enhancement can be accepted as an acceptable trade-off against incomplete mitigation if stronger mitigation efforts are feasible. |
| 6  Only compromises or trade-offs leading to substantial net positive long term effects acceptable. |
| 7  No compromises or trade-offs are acceptable if they entail further declines or risks of decline in officially recognised areas of concern, set out in specified official national or other sustainability strategies, plans, etc.. |

*Source: Gibson (2000), as summarised by Morrison-Saunders and Fischer (2006)*

evaluated in accordance with them. This has not been undertaken to date. Secondly, the approach implies that there are certain factors that should not be traded off during the assessment process and yet it is rather unlikely that all sustainability factors can be maintained all of the time. Thus some trade-offs are likely to occur in practice.

Gibson (2000) established some 'trade-off decision rules' to guide the trade-off process (See: Table 16.1). These rules are intended to maximise positive outcomes for all sustainability categories and eliminate net losses or negative effects. Proponents would be required to justify their proposals in accordance with these rules as a means of demonstrating the sustainability of their activities. Subsequently, Gibson (2000) defined a number of process requirements to put such a SA process into effect. These include:

- explicit commitment to sustainability objectives and to application of sustainability based criteria;
- mandatory justification of purpose; and
- provisions for transparency and effective public involvement throughout the process.

## 16.4   Real life integrated assessment system

The system considered here is the European Commission impact assessment (IA) of policy initiatives (http://ec.europa.eu/governance/impact/commission_guidelines/docs/iag_2009_en.pdf. There are guidelines, summarising the process. These guidelines are for Commission staff preparing impact assessments. They consist of a core text and annexes. The core text explains what IA is, presents the key actors, sets out the procedural rules for preparing, carrying out and presenting an IA, and gives guidance on the analytical steps to follow in the IA work. The annexes contain more detailed guidance that may also be of help. Additional guidance material to help with analysing specific impacts has been prepared by various Directorates General and is available on their internal websites.

According to the guidelines, Impact assessment is a set of logical steps to be followed when you prepare policy proposals. It is a process that prepares evidence for political decision-makers on the advantages and disadvantages of possible policy options by assessing their potential impacts. The results of this process are summarised and presented in the IA report. In doing an IA, the assessor will have to answer a number of questions:

- What is the nature and scale of the problem, how is it evolving, and who is most affected by it?
- What are the views of the stakeholders concerned?
- Should the European Union be involved?
- If so, what objectives should it set to address the problem?
- What are the main policy options for reaching these objectives?
- What are the likely economic, social and environmental impacts of those options?
- How do the main options compare in terms of effectiveness, efficiency and coherence in solving the problems?
- How could future monitoring and evaluation be organised?

The IA work is a key element in the development of Commission proposals, and the IA report will be taken into account when decisions are taken. It is important that the IA supports and does not replace decision-making – the adoption of a policy proposal is always a political decision. The key analytical steps which the assessor has to follow when carrying out an IA are summarised in Table 16.2.

## 16.5   Practical element

Student to give a personal account whether integration is desirable or not.

| **Table 16.2: Summary of key analytical steps of the European Commission's IA guidelines** | |
|---|---|
| 1 | **Identifying the problem** <br><br> Describe the nature and extent of the problem. <br><br> Identify the key players/affected populations. <br><br> Establish the drivers and underlying causes. <br><br> Is the problem in the Union's remit to act?  Does it pass the necessity and value added test? <br><br> Develop a clear baseline scenario, including, where necessary, sensitivity analysis and risk assessment. |
| 2 | **Define the objectives** <br><br> Set objectives that correspond to the problem and its root causes. <br><br> Establish objectives at a number of levels, going from general to specific/operational. <br><br> Ensure that the objectives are coherent with existing EU policies and strategies, such as the Lisbon and Sustainable Development Strategies, respect for Fundamental Rights as well as the Commission's main priorities and proposals. |
| 3 | **Develop main policy options** <br><br> Identify policy options, where appropriate distinguishing between options for content and options for delivery mechanisms (regulatory/non-regulatory approaches). <br> Check the proportionality principle. <br><br> Begin to narrow the range through screening for technical and other constraints, and measuring against criteria of effectiveness, efficiency and coherence. <br><br> Draw-up a shortlist of potentially valid options for further analysis. |
| 4 | **Analyse the impacts of the options** <br><br> Identify (direct and indirect) economic, social and environmental impacts and how they occur (causality). <br><br> Identify who is affected (including those outside the EU) and in what way. <br><br> Assess the impacts against the baseline in qualitative, quantitative and monetary terms.  If quantification is not possible explain why. <br><br> Identify and assess administrative burden/simplification benefits (or provide a justification if this is not done). <br><br> Consider the risks and uncertainties in the policy choices, including obstacles to transposition/compliance. |
| 5 | **Compare the options** <br><br> Weigh-up the positive and negative impacts for each option on the basis of criteria clearly linked to the objectives. <br><br> Where feasible, display aggregated and disaggregated results. <br><br> Present comparisons between options by categories of impacts or affected stakeholder. <br><br> Identify, where possible and appropriate, a preferred option. |
| 6 | **Outline policy monitoring and evaluation** <br><br> Identify core progress indicators for the key objectives of the possible intervention. <br><br> Provide a broad outline of possible monitoring and evaluation arrangements. |

*Source: European Commission (2009)*

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