Exploring the Dimensions of EIA Follow-up

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Abstract
There is growing interest in EIA follow-up both within government and industry. Follow-up includes EIA projects and SEA plans, programs or policies and there is increasing regulatory requirement for EIA follow-up around the world. Additionally industry often makes an important contribution to follow-up through self-regulation undertakings. This paper presents an overview of current insights in EIA follow-up based on recent experience from around the world. It reviews the theoretical foundation of EIA follow-up and provides answers to these questions:

- What is EIA follow-up?
- Why is follow-up important?
- Who is involved in EIA follow-up? and
- What factors determine EIA follow-up outcomes in practice?

The paper also considers the different levels at which follow-up can be conceptualised: micro (or project) level, macro (or EIA system) level and the meta (overall practice of EIA internationally) level. The theoretical framework is illustrated with best practice examples from around the world. The paper concludes with some challenges and future directions for EIA follow-up.

Introduction
Environmental Impact Assessment (EIA) is a process for taking account of the potential environmental consequences of a proposed action during the planning, design, decision-making and implementation stages of that action. Follow-up should be an integral part of this process. The ultimate success of EIA is determined by the outcomes of proposals. In its simplest conception EIA follow-up seeks to *understand EIA outcomes*. Implicit in this process are activities such as checking, feedback, learning and communication.

The purpose of this paper is to explore the theoretical foundation of EIA follow-up including the different levels at which follow-up can be conceptualised, to provide some best practice examples and to consider the challenges in this evolving field. Unless otherwise indicated the content of the paper is derived from Morrison-Saunders and Arts (2004) and Arts and Morrison-Saunders (2004).

What is EIA Follow-up?
The term 'follow-up' is used as an umbrella term for various EIA activities such as: monitoring, auditing, ex-post evaluation, post-decision analysis and post-decision management. Arts et al (2001) define EIA follow-up as comprising of four elements:

- *monitoring* (eg baseline data collection, impact monitoring, compliance monitoring, state of the environment monitoring etc.);
- *evaluation* (ie appraisal of monitoring results against established benchmarks);
- *management* (ie making decisions and implementing appropriate project and environmental management actions in response to monitoring and evaluation findings); and
- *communication* (ie informing all stakeholders in the EIA process of EIA follow-up outcomes).

Environmental assessment can be carried out at different planning levels. It has become common to refer to Environmental Impact Assessment (EIA) for project assessments and Strategic Environmental Assessment (SEA) for the assessment of policies, plans and programs. Follow-up can be applied to both EIA and SEA situations, although the greatest emphasis has been on the follow-up of projects to date. In this paper the term 'EIA follow-up' is used as a generic term referring to both EIA and SEA follow-up. If a distinction is needed the more specific term SEA follow-up is used.

Meta-, macro- and micro-scale follow-up

EIA follow-up can be conceptualised at three different *abstract levels*:

- the individual proposal level (micro-scale) focussing on aspects such as impact prediction, impact monitoring, compliance auditing and implementation of mitigation measures. It addresses the question: Was the project and the impacted environment managed in an acceptable way?;
- the EIA jurisdiction/system level (macro-scale) seeking to determine effectiveness which is measured by things such as influence of EIA process on decision-making, efficiency of procedures or utility of EIA products. It addresses the question: How efficient and effective is the EIA system (ie within a particular country or jurisdiction) as a whole?; or
- the conceptual and/or multi-jurisdictional level (meta-scale) examining the utility of the EIA (or SEA) concept overall. It addresses the question: Does EIA work?

Most EIA follow-up practice to date relates mainly to the follow-up of individual plans or projects that have been subject to environmental assessment (ie micro-scale), although significant macro-scale studies (eg Wood 2003) and meta-level studies (eg Sadler 1996) have been conducted. The relationship between follow-up at these three scales is depicted in Figure 1.

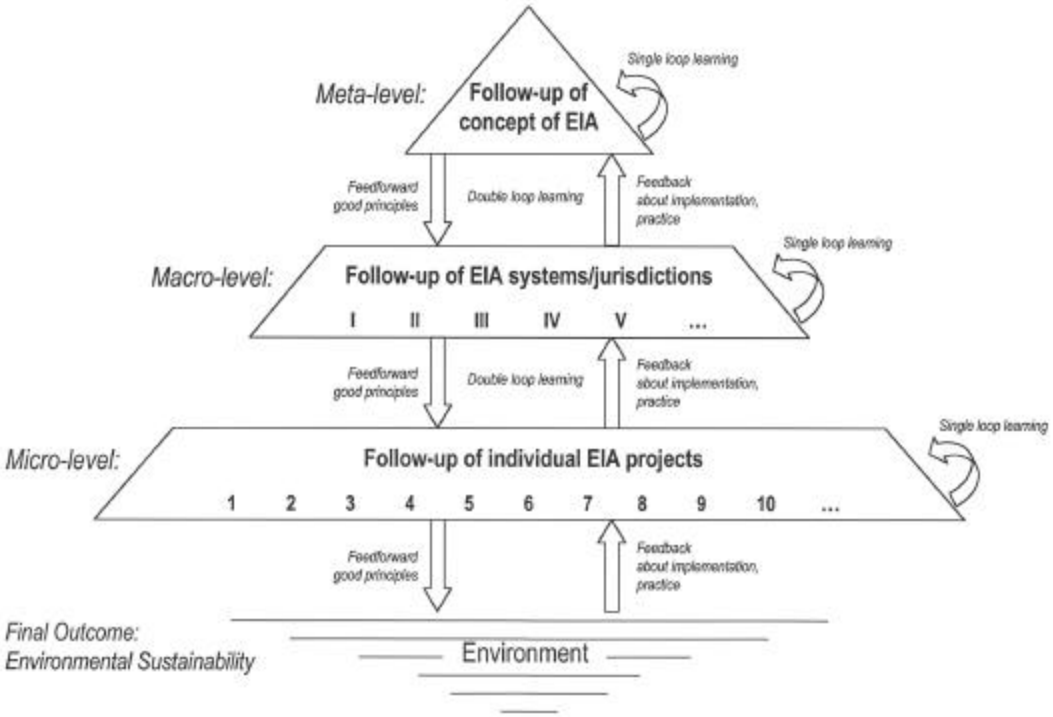

Figure 1 *EIA follow-up at different levels and their relationships* (Arts & Morrison-Saunders 2004)

Why is follow-up important?

Without some form of follow-up, the consequences of EIA activities will not be known. Through activities such as monitoring and auditing, EIA follow-up provides concrete evidence of environmental outcomes. It thereby enables EIA practitioners and stakeholders to move from a mainly theoretical perspective on a proposal (ie based on predictions and expectations prior to the consent decision being granted) to actual understanding and knowing of the real situation once projects are implemented. Ultimately it is not the predicted impacts, but rather the real effects that are relevant for protecting the environment. By incorporating feedback into the EIA process, follow-up enables *learning* from experience to occur.

At the micro-scale level, learning about the impacts of a proposal and the effectiveness of mitigation measures to control or contain impacts is especially important. Feedback from follow-up programs can also facilitate learning about pre-decision EIA activities (eg the accuracy of impact prediction methods). This knowledge can be utilized by regulators and proponents alike to improve future EIAs. At the macro- and meta-scales, learning about the outcomes of EIA enables the effectiveness and utility of EIA procedures and concepts to be evaluated; again with the aim of improving future EIA practice. The feedback and learning opportunities between the three scales of EIA follow-up are indicated in Figure 1.

Who is involved in EIA follow-up?

Generally, three principle groups of stakeholders (parties) are involved in EIA follow-up as initiator, conductor or participant:

1. *Proponent*: the private companies or governmental organizations who develop a project. Just as project management and mitigation of impacts is normally the responsibility of proponents in EIA, they are often expected to perform most follow-up activities. Voluntary, self-regulatory or industry-led initiatives such as environmental management systems (EMS eg the ISO 14000 series) may also incorporate some EIA follow-up functions and may fill the gap in EIA regulations in some jurisdictions (Morrison-Saunders et al, 2003). Follow-up initiated and carried out by proponents may be considered as *1st party follow-up*.
2. *EIA regulator*: a competent authority or other government agency responsible for administrating an EIA system. Here the emphasis is typically on ensuring that proponents comply with EIA approval conditions as well as learning from experience to improve EIA processes in the future. Follow-up carried out by regulators may be called *2nd party follow-up*.
3. *Community*: a body involving the public or other independent persons. The public may have special knowledge of local areas and being independent of both proponents and regulators, they may have interest in evaluating the performance of both of these stakeholders in the EIA process. Pressure arising from public scrutiny of development projects is often a driving force for proponents and regulators alike to implement EIA follow-up programs. The extent of public involvement may range from direct community involvement in follow-up programs to simply being kept informed of follow-up activities and outcomes. Follow-up activities carried out or initiated by the community can be considered as *3rd party follow-up*.

What factors determine EIA follow-up outcomes in practice?

Morrison-Saunders et al (2003) defined the theoretical context in which EIA follow-up occurs as a function of the interplay of four factors:

- regulations and institutional arrangements that have been put in place;
- approaches and techniques utilized in follow-up practice;
- resources and capacity to undertake follow-up; and
- type of activity that is being followed up.

These are addressed in turn and their relationships with each other and to the three stakeholder groups in the EIA process are summarised in Figure 2. It is important to realize that no two follow-up programs will be identical, even if undertaken in the same jurisdiction, owing to variation in these contextual factors. Naturally, EIA follow-up in different jurisdictions can be expected to vary considerably as the best practice examples provided for each of the contextual factors demonstrate.

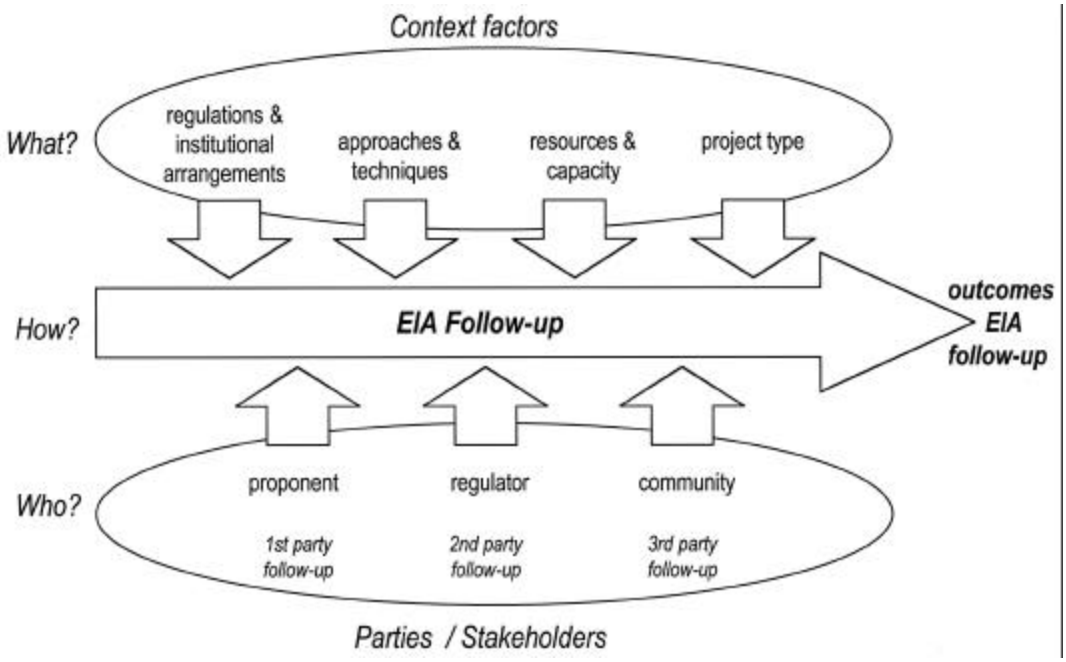

Figure 2 *Contextual factors and stakeholder groups for successful EIA follow-up* (Morrison-Saunders et al, 2003)

Regulations and institutional arrangements

The regulatory and institutional arrangements include the legal requirements and administrative framework for conducting EIA follow-up. There are many different institutional requirements for EIA follow-up in practice around the world and it is not possible to review them all here. Practices vary from voluntary commitments for monitoring and reporting on EIA outcomes through to specific command and control approaches, some of which provide for specialist independent follow-up review bodies. Generally jurisdictions with a long history of EIA tend to be more advanced in their requirements for follow-up. In many jurisdictions, EIA regulations are in their third or fourth generation of evolution (eg Canada, Hong Kong) and there is a trend for increasing requirements for EIA follow-up to occur. Generally, the existence of some formal requirements for follow-up are an important prerequisite for follow-up practice. The spectrum of follow-up approaches includes:

- self regulation by proponents (eg EMS);
- command and control by government regulators (eg permits, standards, surveillance, enforcement and prosecution/offences for non-compliance); and
- public pressure by community stakeholders (eg public concern, media attention, lobbying by interest groups).

Some best practice examples of each follow.

Voluntarism and industry self-regulation have been used to great effect by ScottishPower in the UK to achieve follow-up outcomes beyond those required in EIA regulations (Marshall 2004). Important initiatives include the use of environmental management plans (EMP) which act as a bridge between EIA documents and EMS, as well as a number of documents and procedures for

monitoring company performance , including the activities of contractors appointed by the proponent.

EIA practice in Hong Kong represents an excellent example of strong and comprehensive legislation for follow-up. Their environmental monitoring and audit system (EM&A) requires proponents to employ independent environmental checkers to report on project management outcomes to the regulator and includes full public accountability through dedicated project websites (Au & Hui 2004). In Western Australia more open interpretive arrangements are provided in EIA regulations. These emphasise the importance of environmental management and the requirement for proponents to meet established environmental objectives. Monitoring and reporting on the extent to which environmental objectives have been met is mandatory for proponents. However, methods for project and environmental management are not prescribed, leading to an adaptive management approach (Morrison-Saunders et al 2004).

An innovative example of pro-active public participation in EIA follow-up is that of the Independent Environmental Monitoring Agency established for a major mining project in Canada (Ross 2004). This Agency is independent of both the proponent and government and actively scrutinises the performance of each in the ongoing operation and administration of the mine. The public are important in a reactive capacity too when unacceptable environmental impacts in the community precipitate corrective action by proponents and regulators (Ross et al, 2001).

Approaches and techniques

The approaches and techniques used in EIA follow-up range from rigorous scientific studies to more informal and pragmatic approaches involving simple checks and use of existing management systems and data sources. The approaches and techniques will differ according to the purpose of follow-up (eg for understanding cause-effect relationships more extensive and precise measurements are needed than for determining proponent compliance with the consent decision) and the party who is doing follow-up (eg a local public interest group in a developing country vs a national government in a Western country). Overall, the approaches and techniques encapsulate the monitoring, evaluation and management activities identified in definition of follow-up previously.

Recognizing resource constraints as well as political sensitivities, a pragmatic approach has been advocated in the Netherlands to take advantage of existing environmental regulations and monitoring systems that exist independently of the EIA process (Arts & Meijer 2004). In contrast, follow-up in Hong Kong revolves around permits and contracts specially designed for this purpose, along with the provision of independent verification bodies (Au & Hui 2004). Previously mentioned examples from the UK (Marshall 2004) and Western Australia (Morrison-Saunders et al 2004) show how EMPs and other EMS-like mechanisms can be used as bridging tools between EIS proposals and post-decision project implementation. In such an adaptive approach to follow-up the responsibility is explicitly laid with the proponent corresponding to the 'polluter pays' principle.

The use of rigorous scientific monitoring programs can be useful to test impact predictions and determine environmental outcomes of cumulative developments on ecosystems. A long-term study to this effect has been conducted in the Colombia River Basin in the US to determine the impact of dams on fish (salmon) using the river system (Ortolano and May 2004). Scientific monitoring is also used in the Canadian mining project mentioned previously (Ross 2004), but equally effective use is made of traditional Aboriginal knowledge. Such use of expert knowledge is consistent with rational scientific expectations of EIA, but may be less demanding on resources than classic ecological monitoring programs.

Social impacts can often be detected by simple (but suitably rigorous) techniques such as the detection of odours by the human nose during site inspections (Ross et al, 2001). A risk here is that it may be reactive to actual impacts and based on responding to complaints. A pro-active approach such as stack emission testing could detect a rise in concentration of emission components known to cause odour and alert managers prior to an offensive odour event. To advocates of EIA as a rational-scientific process, it is desirable that scientifically rigorous and defensible systems are put in place. Where this is not feasible (eg as a result of time, capacity or resource constraints) the use of simple but suitably rigorous approaches may suffice for an adequate (adaptive) management of environmental performance. Ultimately it is important that some system of follow-up is put in place for significant issues in order to enable them to be controlled or managed.

EIA follow-up results can be benchmarked against EIS expectations, consent decision specifications and legal standards. As project planning and development takes place in a dynamic context a flexible and adaptive follow-up approach is useful to allow for adequate action in response to issues arising from monitoring and evaluation. Early warning (performance) indicators and pre-determined contingency plans for accommodating unwanted environmental outcomes have been successfully employed in Western Australia (Morrison-Saunders et al 2004) and Hong Kong (Au & Hui 2004) and can be linked to formal standards or criteria.

The diversity in approaches to EIA follow-up in different jurisdictions highlight different cultural approaches to EIA. There is no evidence to suggest that a particular approach is any more effective than the others. What will work in a given setting will be dependent upon cultural norms and expectations operating in that particular jurisdiction (Morrison-Saunders et al, 2003). For best practice EIA follow-up, it is perhaps most useful to adopt an open-minded approach during follow-up scoping (ie 'anything goes'), resulting in a creative mixed application of approaches and techniques.

Resources and capacity

EIA follow-up can easily comprise long periods of time, become complex and require considerable effort in money, time and staff resources. However, follow-up does not need to be complex and expensive. Effective outcomes can be achieved by a pragmatic approach using common sense. EIA follow-up necessitates some investment in both staff and financial resources by all stakeholders involved in the process – especially proponents and regulatory agencies. To be worthwhile, the benefits of follow-up need to outweigh the costs in terms of time, capacity and money. Careful scoping of follow-up programs plays an important role here.

The resources required for follow-up will depend on the program that is put in place and the administrative procedures that need to be addressed. For example, a sophisticated ecological monitoring program such as that implemented in the Colombia River Basin case (Ortolano and May 2004) will clearly cost considerably more in both financial and capacity resource terms than the community based air quality monitoring program reported by Ross et al (2001) for an industrial estate in Thailand. Here, the detection of volatile organic compounds, known to have been causing adverse health impacts in the vicinity of the estate previously, was undertaken by a small group of community representatives during site inspections simply by using their noses. Remedial action could then be undertaken by the industry proponents.

Although it seems inevitable that EIA follow-up will require some additional financial resources by proponents and regulators, there is also the potential to save money. By monitoring performance and enabling adaptive management to occur, follow-up enables adverse effects to either be avoided outright or addressed before a significant problem emerges. The benefits of industry-led audit programs such as EMS in terms of cost savings arising from environmental improvements in an

organization's operations have previously been well documented (eg Annandale et al, 2004). Several EIA follow-up case studies similarly reporting cost saving benefits are given in Morrison-Saunders et al (2003); however no empirical studies have been undertaken to date which quantify the financial benefits of EIA follow-up.

Project or activity type

The characteristics of the activity that has been subject to EIA are important for determining how to conduct EIA follow-up. For project EIA follow-up two important characteristics relate to the size of the project (eg small vs big investments) and initiator of the project (private vs government proponents). Generally speaking, major projects can be expected to cause greater environmental impact but also have a greater budget for follow-up activities. However, money and size is not a precursor for success. Case studies of effective follow-up for small projects and where limited amounts of money were invested are well documented (Arts et al, 2001; Morrison-Saunders et al, 2003).

Project type may be important in terms of the spatial extent of impacts and the timeframe in which a project operates (ie large projects operating over longer timeframes may warrant additional follow-up attention). Furthermore, some activities will be more strategic than others. These will not only require different approaches to follow-up but may also lead to future decisions and projects that will also require follow-up attention. The focus of SEA follow-up is more on tracking subsequent decision-making (ie tiering) about locations and/or operational projects as well as the cumulative impacts and sustainability questions that transcend individual projects and less on detailed, specific environmental changes associated with project level follow-up (Partidario and Fischer 2004).

The profile of the proponent organization may also affect the nature of EIA follow-up. For example, a government agency may be expected to behave differently to a private company, especially given that a government proponent would presumably be developing public resources. For private proponents, EIA follow-up undertaken by a large multi-national corporation could generally be expected to be more sophisticated relative to a small company involved in a single-site operation, owing to their experience and staff and finance capacity. It is important to realize that some small projects may cause significant environmental impacts that would require comprehensive and sophisticated follow-up approaches. Additionally, major companies often also operate small projects with only minor environmental issues, that may not always warrant EIA follow-up.

Challenges and Future Directions for EIA Follow-up

Many of the challenges for EIA follow-up reflect similar problems with the implementation of EIA. These have been well articulated elsewhere and were summarized by Arts and Nooteboom (1999) into five key problems:

- *Uncertainty and limited information* – This is a principal reason for initiating EIA follow-up in the first place, but these uncertainties do not necessarily go away and may continue to pose difficulties during follow-up investigations (eg linking projects to observed environmental impacts or change is not always straightforward);
- *Deficiencies in EISs* – As with uncertainty, deficiencies in EISs may provide a key reason for conducting EIA follow-up. Inadequacies in EISs have been well documented in the past and include problems with vague and qualitative impact predictions, extrapolation from little or no baseline monitoring or simply an absence in rigour with which projects are described and arguments constructed. The focus on impact monitoring and mitigation during EIA follow-up highlights the extent of these deficiencies but also enables actual environmental outcomes to be determined;

- *Lack of guidance* – While there is a wealth of available information on how to conduct EIA (particularly during the pre-decision stages of the process), there is little guidance currently on how to conduct EIA follow-up studies. The work of Morrison-Saunders and Arts (2004) makes an important contribution here. Additionally there is need for training and capacity building for EIA follow-up, especially in countries with little experience;
- *Legislative deficiencies* – Part of the reason why there is minimal guidance available on EIA follow-up is because there are relatively few jurisdictions with a formal legislative requirement for follow-up in place; and
- *Demands on financial and staff resources* – EIA follow-up requires considerable resources in terms of time and money as well as staffing in both proponent and regulatory agencies. Until the benefits of EIA follow-up are more widely recognized in terms of long-term cost savings and improved environmental management, the demands on financial and staff resources are likely to impede progress in this area. For example, environmental effects monitoring is generally costly, especially over the time and scale boundaries which are often needed to determine the extent and level of environmental change caused by a project. Additionally, when multiple projects with similar impacts occur together, it can be problematic determining which proponent(s) should be held financially responsible for area-wide and cumulative effects monitoring. Staffing continuity is another important issue. Personnel changes in both proponent and regulatory agencies may disrupt follow-up programs and impede learning from experience.

Two major future directions for EIA follow-up are to move beyond project-orientated follow-up and to better integrate follow-up at different levels.

Moving beyond project-based follow-up

One limitation of project based EIA (and follow-up), is the narrow focus on single developments in isolation of other activities in the vicinity (both existing and in the future). Multiple projects and events in an area can have synergistic interactions and can contribute to cumulative environmental impacts. Moreover, this context is often also highly dynamic over time and numerous parties may be involved in the process. A too restrictive focus on individual projects may ignore these combined effects which may mean that such follow-up is unable to offer much by way of sustainability assurance (Sadler 2004).

Once a project has commenced, its impacts should preferably be considered from the perspective of the area as a whole, including all ongoing and planned activities as well as changing environmental values and priorities. The situation before and after the consent decision may be different. In most jurisdictions the pre-decision stages of EIA are often narrowly focussed on the individual proposal of the initiating party and its immediate surrounds and this is the subject of consent conditions. For post-decision monitoring and evaluation, the scope of consent decisions for projects or plans may be less suitable in many cases as interest in environmental performance will often extend beyond individual project activities and boundaries. Promising future directions for follow-up that extend beyond individual projects include (Arts, 1998):

- area-oriented follow-up (eg based on regional approaches and state of the environment reporting);
- SEA follow-up (as discussed previously);
- sector-oriented follow-up (eg based on groups of similar industries or thematic similarities for different project types);
- multiple party follow-up (ie moving away from follow-up driven principally by a single stakeholder type to more integrated and participative programs benefiting all parties in the EIA process) ; and
- sustainability assurance approach to follow-up (ie as with the growing interest in sustainability assessment, there is a similar opportunity to expand follow-up tools into this important area).

Integrating follow-up at different levels

In this paper, the focus has been especially on micro-level analysis of EIA follow-up (individual activities). In light of strategic and sustainability considerations, movement to macro- and meta-level evaluation is needed.

At the *meta-level* it can be concluded that EIA (and SEA) is a highly successful policy tool in light of its wide adoption of use, its continued innovation and improvement, and its broadening scope (Sadler 2004). This success is especially true for the procedural dimension of EIA. However, the rate of success is less clear for the substantive dimension (eg added value to decision-making and condition setting) as well as the transitive dimension (eg cost-effectiveness and equity). To date EIA and SEA fall short as effective and efficient means in achieving their objectives – ie to support informed decision-making and achieve their ultimate aim of environmental protection. They have this in common with other instruments used for this purpose. In future application, there is need for better integration of (IAIA 2002):

- social, economic and environmental aspects (ie sustainability assurance);
- the various environmental management tools currently in employ (permit monitoring and enforcement, EMS, area-wide monitoring etc); and
- the various stages in the planning process (from the strategic to the implementation stages).

The picture at the meta-level is corroborated by evaluations of EIA/SEA systems at the *macro-level*. On basis of the collective learning from experience some main ingredients for success in EIA (and SEA) can be distinguished. Important elements are system monitoring and evaluation at the macro-level as well as micro-level evaluations individual activities. Macro-level evaluation should promote changes in EIA systems (eg regulations and practices) in order to adapt the instrument of EIA to new developments and needs in society.

At the *micro-level*, the control and learning functions are not clearly separable in EIA follow-up. Moreover, the evaluations at all three levels are closely related. The meta-evaluation underlines the need for macro- and micro-level evaluation. And the results of these evaluations provide useful information that can be used at the meta-level.

No hard and fast line can be drawn for differentiating evaluation based on follow-up of individual projects and those based on more generalized studies at macro- and meta-level. There exists both 'single loop' and 'double loop' learning cycles between them in that:

- the evaluation at either micro-, macro- or meta-level may result in some form of adaptive action on that same level (single loop learning);
- the evaluation of project implementation and EIA practice at the micro-level may lead to learning for EIA systems, while both micro- and macro-level evaluations may lead to feedback relevant to our insights about the EIA concept and its efficacy (double loop or 'deep learning'); and the other way around
- evaluation at meta- and macro-level may lead to improvements at the lower levels of abstraction through 'feeding forward' of, for example, good principles that will guide future practice.

Figure 1 depicts these learning cycles and the feedback and feed-forward relationships between the various levels. The final outcome of the three levels of follow-up is hopefully input to good principles of environmental management which contribute to meeting environmental sustainability goals (the ultimate aim of the EIA concept).

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