

## Evaluating Environmental Impact Assessment Systems – Part 1: Theoretical and Methodological Considerations

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The paper addresses the problems of evaluating the functioning of Environmental Impact Assessment (EIA). It does so through an approach relating EIA to professional and organisational cultures in environmental management and planning. To understand and to learn from experiences with EIA the wider systems context within which EIA is operating must be taken into account. The paper offers a model of modes of evaluation and suggests that the understanding of implementation structures is urgently needed to complement other types of evaluation, which tend to focus on systems structure and document quality and to take an insider perspective on the efficiency of EIA.

**KEY WORDS:** *evaluation; environmental impact assessment; implementation; organisational culture; professional culture; strategic environmental assessment; EIA; SEA.*

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### BACKGROUND

This paper addresses theoretical and methodological problems of evaluation of the functioning of environmental impact assessment (EIA). It does so through an approach, unusual in studies of impact assessment, relating EIA to professional and organisational cultures in environmental management and planning. The argument behind this approach has been developed fully by Emmelin (1993) and Emmelin and Kleven (1995; in press). In short it is simple. Any system of assessment will be introduced, operationalised and implemented in the context of a more or less well developed environmental administration and in relation to a planning system. To understand and to learn from experience one needs to take the wider systems context into account. EIA can not be understood in isolation.

The Nordic countries are interesting from an international perspective in that impact assessment was introduced relatively late into well developed systems for environmental management and planning. This paper will therefore be followed by a paper containing an examination of Nordic EIA systems in relation to empirical material on the "paradigm" of the central and regional environmental administrations in Denmark, Finland, Norway and Sweden.

### ***The need for evaluation***

The need for evaluation of any system of decision making is obvious: to develop a system its present function must be understood. International studies of EIA have

repeatedly shown deficiencies in evaluation and thus in development of methods and concepts (Sadler, 1988, 1996). It is in fact a standard claim in EIA textbooks (cf. Weather 1988; Glasson *et al.*, 1994). There have been attempts at evaluation both in national systems and internationally (Sadler, 1996). In the Nordic countries there is a similar paucity of evaluation, most notably as an integral component of the system, but also in outside assessment of the functions of the system, although the situation varies between the countries.

The main argument of this paper is that evaluation in this field is in urgent need of better methods and theories. Evaluation of EIA can follow several theoretical and methodological lines. It is not the object of this paper to examine the relationship to standard evaluation theory, but rather to discuss evaluation in relation to some of the current issues in environmental assessment theory and practice.

Evaluation, which does not take the methodological problems into account, tends to produce rather predictable results which may be of limited theoretical interest or practical use. Critique is often waved aside as based on lack of interest in or understanding of environmental issues (Therivel *et al.*, 1992). Some of the results of the major attempt at an international study of effectiveness of EA (Sadler, 1996) discussed below will be used to illustrate the problems.

#### **Why is EIA interesting in a wider theoretical context?**

From the point of view of general planning and policy research EIA is interesting for several reasons. First, because EIA is a systematic approach to handling knowledge from complex scientific fields in planning and decision making. Second, because concepts and methods are dominantly rationalist and the tensions between different planning theories can be highlighted by the case of EIA. Third, because EIA attempts to be analytical in the sense of examining alternative means related to a goal at a well defined point in time and in the process. This is in contrast to the predominantly designing tradition of physical planning which entails an evolutionary approach to the designing one single, "best" plan.

The resistance to EIA, which was particularly noticeable in the Nordic countries, is a further reason why EIA is interesting for planning theoretical reasons. This is briefly discussed towards the end of this paper.

The general interest for planning research can be focused with the aid of some of the dichotomies, or unresolved issues, in EIA (Emmelin 1997b; Emmelin and Kleven in press): expert judgement versus political, the centralism of environmental management versus the decentralism of the planning system, the "communicative" versus the "calculating" modes of planning.

#### **EIA?**

Environmental assessment (EA)<sup>1</sup> is a wide concept covering approaches and methods for using environmental knowledge – in practice largely knowledge from the natural sciences, technology and to a lesser degree health and risk assessment – in decision making. From initial application to individual, large projects involving direct change of the physical environment – "environmental impact assessment" (EIA) – the application is being widened to include policies, sectoral programmes and physical plans – "strategic environmental assessment" (SEA). At the same time the scope of EA is being widened in two respects. First, the importance of indirect effects and of cumulative effects ("cumulative assessment", CA) of many small, individual

decisions is gaining increased interest, which gives an added impetus towards development of methods for SEA. Second, there has long been a tension over the subject matter for EA. At one end of the scale concentration is on environmental topics in a narrower sense of ecological, and at times health, effects. On the other hand a wide range of topics are included such as welfare, socio-economic effects etc., and methods aim at a more or less total weighting of all of the costs and benefits, often with the long term environmental effects given precedence as with the concept of "sustainable development". This of course in itself presents a problem in evaluation. Except when explicitly stated the following discussion deals with "EIA sensu stricto" i.e. the evaluation of environmental assessment of large projects; approximately the scope of the EU directive 85/337/EEC.

The trend towards SEA tends to blur the distinction between EA and other methods of planning; the impact assessment community seems in fact to be reinventing rationalist planning (Emmelin, 1997b).

#### **The Nordic EIA-systems**

EIA as a formal process was introduced relatively late in the Nordic countries if seen in an international perspective. NEPA, which introduced EIA in the US came into effect in 1969 and the EU directive (85/337/EEC) on EIA is from 1985. Denmark passed comprehensive legislation in 1989; Norway in 1990 and Finland and Iceland in 1994. Although a requirement in the Planning and Building Act for environmental assessment came into effect in 1991 it is highly debatable whether Sweden does in fact have legislation which conforms to a reasonable degree with what is internationally considered to be EIA. On the one hand there are general requirements for environmental assessment in a large number of laws apart from the Planning and Building Act. On the other hand the legislation specifies virtually none of the requirements concerning process, form or content that distinguish EIA from any other planning process – notably there are no requirements for screening or scoping<sup>2</sup> (Emmelin, 1997c). Whether Sweden in fact has an EIA requirement which fulfils the EU directive has not been tested. Differences between the systems will be further discussed in a coming paper.

#### **APPROACHES TO EVALUATION**

As Almås (1990) notes there is an interesting and potentially fruitful tension between the development of evaluation as an independent, theoretical area and the need to understand the actual field being evaluated. This can be seen as the tension between an inside and an outside perspective. This is an important distinction to bear in mind.

Sager (1995) claims that most studies of EIA deal mainly with systems aspects rather than actual function of EIA systems. Modifying his critique, it seems that there are three categories of EIA studies, with somewhat variable degrees of empirical foundation, that dominate evaluation. The purpose of this paper is to sketch a fourth category and give examples of the explanatory power of this dimension. The categories are formed from two dimensions of evaluation – figure 1.

The first dimension is a distinction between studies of *EIA systems structures* on the one hand and of *implementation structures* on the other. The second could loosely be called *the dichotomy between "theory" and "practice"*. This corresponds to the two categories "mind" and "behaviour" employed by Harris (1980) to discuss evaluating

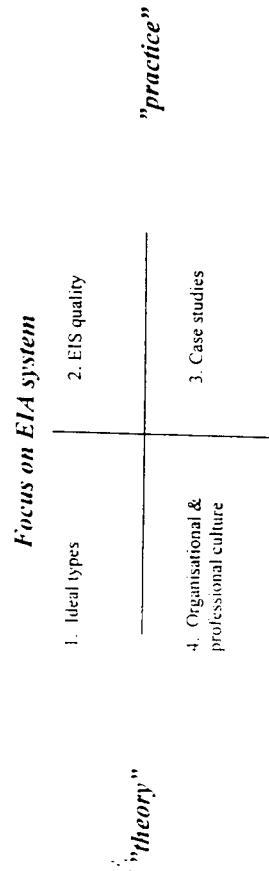


Fig. 1. Dimensions of focus of evaluation, with examples of types of evaluation.

the views expressed by informants in anthropological research. Any EIA system might be said to have a theoretical side in the sense that it is *designed to operate* on certain principles. On the other hand there is the practice of *how it operates*. As pointed out above an EIA-system does not operate in isolation: it relates to implementation structures which have both a theoretical and a practical side to them. Confusion exists along both dimensions in that system structure tends to be equated with actual function or function explained as uniquely caused by structure. This may be because of confusion of both theory and practice and of structure and function. A lack of observance of the distinction between interpretation by the researcher and respondents is also common in "effectiveness" studies: the interpretation by respondents tend to be accepted at face value, with little examination of the possible reasons for any particular standpoint (Emmelin, 1997a). In the following the four categories formed by crossing these dimensions are outlined.

#### **Four categories of EIA evaluation**

The figure defines four distinct types of evaluation of EIA. In the first category one finds the evaluation of EIA systems against a more or less explicit ideal such as that of NEPA or the EU, 85/337 EEC, directive on impact assessment. Such studies can reveal interesting national or sectoral characteristics. There are many international comparisons of EIA-systems based on more or less thorough material on systems structure (cf. Wood, 1995). The second category contains for example *ex ante* evaluations of EIA documentation against criteria for good documents or good practice. This approach sees the documentation, normally the environmental impact statement (the EIS), as a product where quality of the product determines its usefulness in decision making. Many papers have appeared over the last years using the "Lee-Colley" package for EIS evaluation (Lee and Colley, 1992). The third prevalent type of evaluation deals with the function of the system based on surveys, interviews and other statements, most often by those more or less closely involved. International and national, systems wide surveys and case studies adopt this approach (Sadler, 1996; Sadler and Verheem, 1996). Too often such studies neglect vested interest, problems of professional views, norms and ideals; essentially the criterion against which evaluation is made is a largely implicit perception of function by those involved.

The present paper deals with the insight that can be generated by understanding the function of EIA-systems and the quality of processes and documents in the context of the cultures of the implementation structures where EIA is to operate. Other approaches to the theoretical side of implementation structures are of course both possible and valid. One such which will be briefly touched upon here, is EIA in the field of tension between centralist and decentralist decision making. This would be particularly appropriate as an approach to evaluation of the environmental components of the EU documents relating to spatial development and structural funds.

#### **Understanding organisational and professional culture: a paradigm approach to evaluation**

The paradigm concept is well suited to application to schools or theories of planning and management (Emmelin, 1993). Such theories are in fact often combinations of ideology and method with a complex mixture of world views, thought styles, strategies and approaches, professional norms etc. This is precisely the kind of complex that the paradigm concept summarises. Examples of such complexes are "synoptic planning", the calculating and the communicating modes of planning (Sager, 1990, 1994), the "mixed scanning" of Elzioni (1967) or Lindblom's (1959) "muddling through" as well as the classic ideals of rationalist planning.

The paradigm concept used here is an adaptation of Törnebohm's more precise concept, rather than Kuhn's ambiguous and variable use of the term (Törnebohm, 1983; Kuhn, 1970). On the adaptation of Törnebohm's paradigm, which he has developed for analysis of the work of individual scientists, see Emmelin (1993) and Emmelin and Kleven (1995). The object of a paradigm approach is not to explain in simple causal terms. Rather, it implies the approach that Thompson *et al.* (1990) take to functional explanation. A paradigm interacts with the professional and organisational structures so as both to rationalise them and to underpin them. Functional explanation in this view throws light on the maintenance of a system rather than on how it arose.<sup>3</sup>

The practical and theoretical background to the paradigm approach used in our studies of Nordic environmental management and planning is compounded of several current lines of planning research. The theoretical view of policy and planning as "practical processes of argumentation" (Fischer and Forester, 1993) provides a powerful argument for the paradigm approach. The transformation of plans and policy in the process of implementation can partly be understood as a process of interpretation of the loose framework legislation that dominates technologically complex areas. This has lead to what Hernes, (1978) terms "mixed administrations" where traditional bureaucratic ideals are intermingled with professional patterns of thought. Here the "thought patterns" derived from professional or scientific paradigms will have an important bearing on how problems are defined, what knowledge is seen as appropriate and the choice of strategies and instruments (Emmelin 1993, Emmelin and Kleven 1985, in press). The role of EIA, the interpretation of general guide-lines and the way it implemented are all relevant factors where an organisational or professional paradigm will have an influence.

The importance of professional and scientific patterns of thought which determine or influence problem construction and solutions is a well known aspect of management theory (cf. Alvesson and Berg, 1988; Alvesson, 1993). For the global environmental arena the importance of paradigmatic problem construction has been discussed e.g. by

Lash *et al.* (1996). In evaluation of the functions of environmental bureaucracies the idea of professional modes of thought has also played an important role (Emmelin, 1983, 1993). Hajer's studies of discourse coalitions in the forming of policy is another instance of a demonstration of the concrete impact of paradigmatic problem construction (Hajer, 1992, 1993). Lundqvist (1997) has shown how the lack of impact of coastal zone management in Swedish municipalities can be explained in part by the different management paradigms of planning and environmental administration. In management of nature reserves Emmelin (1986, 1997d) and Vistad (1995) note major differences between Swedish and Norwegian approaches which can be characterised by largely unquestioned assumptions concerning pristine nature which outdoor recreation research capture by the dichotomy between a "purist" and an "urbanist" approach (Manning, 1986).

The validity of a paradigm approach is well demonstrated by the findings of Holling (1986, 1979, 1978) and Timmerman (1986) of the links between the approach taken by various agencies to natural resource management and different perceptions of stability of ecosystems. The modes of reacting to management challenges is well explained by the implicit models of ecosystem stability that an institution holds. In the colourful, if somewhat exaggerated words of Thompson *et al.* (1990:26): "...the interventions of the managing institutions were wildly heterogeneous. That is, different managing institutions, faced with exactly the same sort of situation, did very different things.... Whereas trees and budworms<sup>4</sup> and other natural components of the ecosystem could be relied on to behave fairly consistently, the managing institutions could not." A somewhat different demonstration of the operation of paradigms in natural resource and environmental management is Walters' (1986) discussion of the application of Allison's (1971) models of the behaviour of management institutions. The behaviour of several institutions can be described by the "standard operating procedures"-model. The procedures may have developed in relation to one set of problems but be inappropriately applied to others.

#### *Two uses of a paradigm approach*

The importance of a paradigm approach to EIA-evaluation is two-fold:

- As an approach in its own right i.e. as the basis for understanding and evaluating EIA systems
- As an interpretative tool in complementing other approaches to evaluation

Thus the paradigm approach is not the only useful approach, but a complement to other forms of evaluation.

The paradigm approach can be used to understand several aspects of systems. On the one hand, where there is correspondence between the attitudes and views expressed and special features of a particular system it throws light on the background of the special features. The whole complex of resistance to EIA is an example as well as some of the peculiarities of the Swedish system. On the other hand it can be used to illuminate interesting differences between systems.

#### **THE PROBLEM OF "THE INSIDE PERSPECTIVE" IN EVALUATION**

Evaluation of a system by those involved, or with vested interests in it, is of course problematic in a special sense. Evaluation based on the statements by EIA-

practitioners on the success or failures of EIA have to be compared to some standard or subjected to interpretation against some norm(s). The difference between perceived function by those involved and efficiency or adequacy measured against external criteria should be observed. This is the approach well known in ethnology and anthropology of distinguishing between the "emics" of a statement and the "etics" (Harris, 1980). The terms refer to whose terms of reference are used as the judge of adequacy of description and analysis. "Emic" analysis uses the respondents terms of reference as the criterion of adequacy. It is the ability to generate statements that the respondent accepts as real, meaningful and appropriate which is the criterion of emic analysis. "Etic" operations on the other hand are marked by the "elevation of the observers to the status of ultimate judges of the categories and concepts used in descriptions and analyses" (Harris, 1980, p. 32). These categories should not be confused for a simplistic division into "subjective" and "objective". The choice of criteria for evaluation by scientists can be highly subjective as when a particular interpretation of "efficiency" in the EIA-process, such as time used by agencies, is said to mirror how useful the system is to decision making.<sup>5</sup>

The lack of attention to this problem of "self-evaluation" is very marked in the EIA literature. Insufficient attention seems to be paid to the inherent limitations of the inside perspective and to the problems of interpreting the results. Such evaluation tends to produce rather predictable results which may be of limited theoretical interest or practical use. In Harris' brutal terms: "All notions of replicability and testability fly up the chimney when the world as seen by the observed is capriciously muddled with the world as seen by the observer" (Harris, 1980, p. 33).

This does not mean that the perceptions of those involved in a process are uninteresting or that the professional judgements by experts on various aspects of EIA are not worth considering in evaluation. It does however mean that they must be subjected to critical scrutiny and interpretation using methods well established in the humanities or the social sciences. Results of self-evaluation or studies limited to the inside perspective can, among other things, be interpreted with the aid of the paradigm approach to professional and organisational culture. It is important to note that the interpretation with the aid of a paradigm approach may throw light on and make the results of other types of evaluation understandable or more enlightening. This does however not necessarily imply a claim to causal explanation; organisational or professional paradigms are shaped by individuals and their education, background, socialisation etc. into a particular culture but also act to shape the perceptions and problem definition of the individuals in an complex and interactive manner (Thompson *et al.*, 1990; Emmelin and Klevén in press).

#### **"Does the Netherlands EIA-system have an impact?" – two examples of the problems of an inside view**

The problems of evaluating the concrete question "does EIA have an impact" are of course considerable. The "inside view" – letting those involved be the judge of this – is methodologically simple and direct; questionnaires and interviews can easily be employed. The theoretical objections are also immediately obvious: there are no outside criteria – no "etics" – against which to judge the evaluation. The remedy is, as Lawrence (1997) notes, not easily available. He argues that the approach normally taken – to compare EIA function or systems structure with the direct objectives of planning or decision making – should be replaced with evaluation against

"environmental sustainability objectives" but does not discuss the methodological problems of using such vague concepts in evaluation. These problems of evaluating EIA are just variants of a basic issue in evaluation research and policy analysis. Two illuminating examples of the problems of the inside view are provided by studies conducted as part of the mandatory review of the EIA system in the Netherlands carried out every five years.<sup>6</sup>

#### *Emic confusion – an example*

One is an example of self evaluation where entirely unsupported conclusions are reached. To assess the benefit of the EIA system a questionnaire was sent out to "all actors in the EIA process". Based on the results van Eck and Scholten (1996) address "current criticism on EIA" which they describe as being prevalent especially among decision makers: "it is sometimes stated that EIA takes too much time and is too expensive not sufficiently tailored to the decision". They note the important point that critics claim that "the rationality of the EIA-approach does not fit into the way political decisions are usually taken" (Eck and Scholten, 1996, p. 299). The authors claim that the results prove otherwise. Respondents agree that EIA had produced new relevant information resulting in better decisions and that it led to "more open attitudes in general which may have effects in future situations" (Eck and Scholten, 1996, p. 299). On cost-effectiveness EIA comes out reasonably well. The difference in view on effectiveness is seen by the authors as caused by a communication gap between "EIA-practitioners, who are familiar with EIA, and others, like many government executives, for whom EIA is not a daily practice" (Eck and Scholten, 1996, p. 300).

The conclusion is that "As the effectiveness of EIA is mainly dependent on the way decision makers use the instrument, it is important to close the gap by pointing out to them the potential added value of EIA drawing the attention to examples where added value has occurred" (Eck and Scholten, 1996, p. 300). These conclusions would undoubtedly be of more practical and theoretical interest if it were not for the way in which they have been reached. The "politicians who actually took the decisions on the selected EIA projects and plans were not interviewed" (Eck and Scholten, 1996, p. 299). Those who advise them – "like many government executives" – are apparently on the wrong side of the information gap since they express doubts about the usefulness of EA. In fact it is the practitioners and proponents of EIA who, based on their own evidence, conclude that their critics are wrong. The conclusions are not based on any independent indications that EIA is cost effective or that it does indeed address the needs of decision makers as perceived by themselves rather than by EIA practitioners! To rectify the situation information is the only avenue available since the authors sadly note: "The willingness on the part of decision-makers to make positive and creative use of EIA is difficult to control" (Eck and Scholten, 1996, p. 301).

The implicit assumption, that there is something wrong with decision making or decision makers, rather than with EIA may of course be entirely correct seen from a particular model of good decision making. The problem is that the method of evaluation employed by the authors does not allow such a conclusion to be drawn from data on perception of EIA by "practitioners" unless supported by, or interpreted with the aid of, other evidence or explicit theory or models.

#### *"Does it have an impact? – the "emic" nature of "objective" criteria*

A theoretically more interesting problem is posed by another evaluation of the Netherlands system. Based on a quantitative survey of the views of the central actors in the process ten Heuvelhof and Nauta (1997) evaluate effects of EIA against two types of criteria. Firstly, the direct effects i.e. a change in "level of action or actual behaviours" measured as "visible and tangible actions that obtain their definitive shape as a result of the EIA process". Secondly, the indirect effects i.e. for example learning by the project initiator, which influences the project initiator in other projects or decision processes. As the authors note the most drastic direct action is non-implementation of a project. However they also include changes in "the concepts that the actors have" in the category of direct actions. The level of success is the number of cases where both the project initiator and the competent authority "were of the opinion that the EIA had an impact on the action level and/or concept level". The success level in the 100 cases examined was 79 per cent using this criterion. What is being measured in the evaluation is thus the perceptions of central actors. The authors claim that the chances that the EIA-process causes direct effects are greater if the process is started early. However with no outside criteria, such as a quality evaluation of the EIS using some standard (evaluation of type 2 in figure 1), there is no way of judging whether what is being measured is simply the successive changes caused by negotiation between the central actors on the content of what is initially a document of relatively low quality.

#### *The need to understand "discourse coalitions"*

The Netherlands EIA-system is a very good example of a discourse management system with a strong scientific influence through the EIAC Committee, "a committee of independent experts" which must be consulted before the guidelines for the content of the environmental impact statement are drawn up. The EIAC also reviews the documentation. The authors claim that the EIAC has "great authority and no interest of its own". This seems to be a naive, realist view of science and scientific bodies. Seen both from a perspective of power and from the point of view of contending professional paradigms in EIA the EIAC can be considered to have considerable interests of its own. It has a position in a bureaucratic power structure to defend and its members would seem to have strong interests in the role of science in decision making. For the EIAC there would in fact seem to be a strong vested interest in claiming to have direct effect on the system and on quality of EIA. That such a claim may be substantially correct may be explained in terms of the scientific interests of the EIAC. With high scientific competence it is natural that the EIAC will be able to make many recommendations on content that the project initiator may not have the competence or broad knowledge to include initially. Lacking outside criteria this process seems to be the formation of a discourse coalition between the EIAC and the project initiator. Such a discourse coalition would serve to legitimise the EIA in relation to the competent authority. If the EIAC is satisfied with the EIS then an important formal criterion for the decision making of the competent authority has been fulfilled. That the increase in scientific content of an impact statement in any way helps decision makers or makes decisions in any sense "better" is the mainstay of rationalist planning. That the environment is in any way improved is thus a paradigmatic interpretation not an empirically shown result.

Forming a discourse coalition between project initiator and competent authority, with a strong scientific authority as mediator and guarantor, can procedurally be

considered as a formal mechanism of ensuring quality of the EIA process. However, as Hager (1992, 1993) has shown, discourse coalitions may also be detrimental if seen from an outside perspective: British action on the "acid rain" issue was delayed considerably because of a discourse coalition in defining the issue as a health problem rather than as an ecological problem. Strong, official bodies with a technological and scientific expertise were important in this process.

The discourse management of a system such as this can also be analysed in terms of the "expert versus politician" or the "communicative versus calculating rationalities" in planning. Further light, in this respect, is shed on the process by the findings of the study discussed above, which found that senior decision makers were less enthusiastic concerning the role of EIA than the involved practitioners. And, as noted, the responsible politicians have not been included in evaluating the system as an aid in decision making. Public participation is also notably lacking in the analysis.

The two evaluations seem to reinforce the picture of the Netherlands system as an effectively functioning system within an expert paradigm of environmental planning and management. The parallels to the Nordic systems, which Lykke has characterised as expert negotiation on matters of the environment (Lykke, 1992), are interesting and worth further study.

#### *Perceptions of practitioners: an example from the IAEA "international effectiveness study"*

As an example of problems of self-evaluation the "international effectiveness study" carried out under the auspices of the International Association for Impact Analysis by Saddler and co-workers (Saddler, 1994, 1996; Saddler and Verheem, 1996; Hildén and Saddler, 1995) provides interesting problems. Although an inside perspective on EIA and SEA is clearly taken these studies relate explicitly to models and perceptions of good practice.

These studies clearly illustrate how evaluation could benefit from a more theoretical approach. Complementing the kind of studies done in the effectiveness study, which are of type 1 and 3 in figure 1, with studies concerned with the theoretical aspects of implementation structures and professional paradigms would be useful for the interpretation of results. The data on what practitioners report as "aspects of success" and as the factors preventing the application of "best practice" exemplifies this. With these data one can quantify the biases of self evaluation. Figure 2 shows a diagrammatic summary of "Aspects of success".

Examining the answers to "overall perceptions of benefits" the results claimed are the general ones such as "contributes to more informed decision making" and that "benefits outweigh the costs of application"<sup>7</sup>. However on the result oriented questions -such as "ensures development is placed on a sustainable basis" - claims are much more modest.<sup>8</sup>

Three areas stand out as "relative successes". These are the claims that EA manages to include a "full range of considerations (e.g. social, ecological, risk, etc.)", that it manages to produce "appropriate mitigation measures" and finally - and most crucial to the argument that EA is worthwhile - that EA provides "clear, understandable information for decision makers on the potential consequences of development proposals". The "relative failures" on the hand are clearly aspects of method and technique.

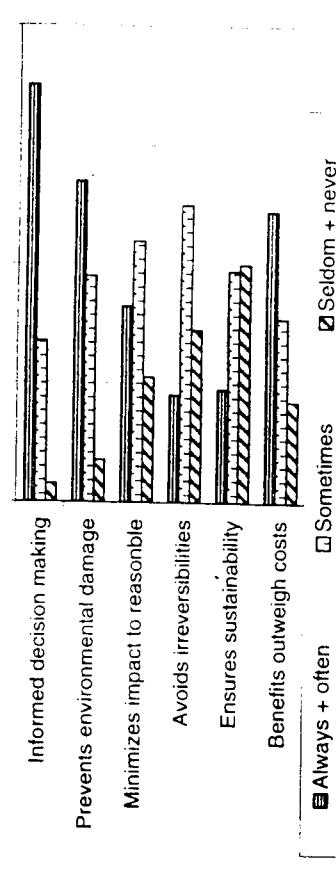


Fig. 2. Overall perception of benefits of environmental assessment according to the IAEA international effectiveness study. (Based on table 4.9, page 87 in Saddler, 1996).

It is noticeable that the relative failures are scientific aspects of method which could be easily quantified and verified: "making precise, verifiable predictions", "indicating confidence levels" and "specifying significance of residual impacts". The successes are in the areas which could perhaps better be evaluated by users and the relative failures in areas where practitioners should be most competent to judge. Thus the paradoxical claim is that what is essentially a rationalist approach to planning and decision making can contribute to more informed decision making ("always" according to 28 per cent and "often" to 42 per cent) while at the same time failing in important scientific areas.

Finally, what are the constraints - the factors preventing or limiting the application of 'best practice'? Figure 4 shows that factors imposed on the system - "time deadlines" and "budget restrictions" are considered very limiting. Methods, data, information systems and competence tend to be "somewhat limiting". There is not all that much wrong with the approach of the profession: "integrated approach" tops the list of "not limiting". These results are understandable in light of a paradigm of rationalist decision making, favouring expert judgement over political decisions and the power of science based information to make for better decisions regardless of political context (Emmelin, 1993; Emmelin and Kleven, 1995; in press).

The totality of the results may thus be seen as less of an impartial statement of efficiency of environmental assessment and more of an argument for more resources. The picture that emerges is one of an undertaking that is claimed to be useful to society. Potential areas for further professional development are identified which could make EA even more useful. The self-evaluation that emerges is roughly: if not constrained and if further development of methods and techniques takes place we could do an even better job in an area that has proved its use. What else would one expect an emerging profession to state?

These examples do not add up to an argument against self evaluation. Rather, they exemplify the caution needed in applying different techniques. The examples quoted

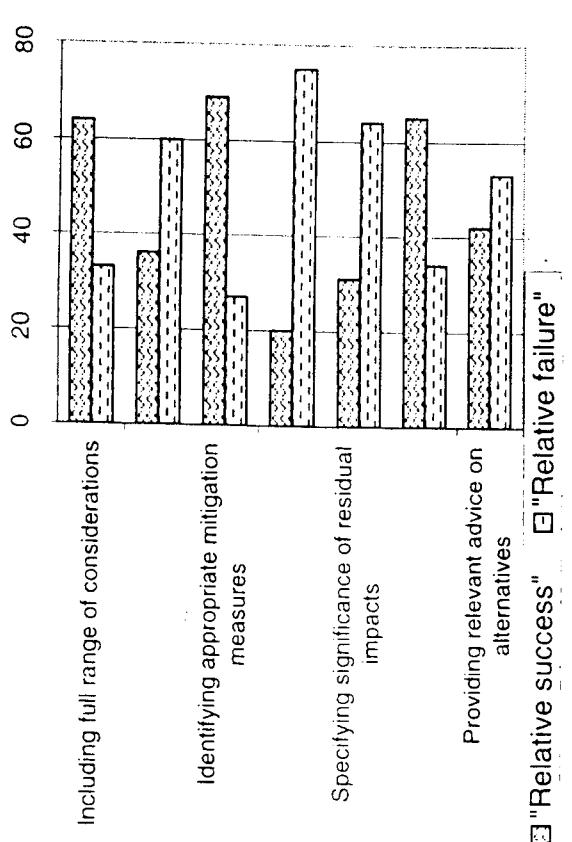


Fig. 3. Aspects of success of environmental assessment according to the IAEA international effectiveness study.  
(Based on table 4.7 page 85 in Sadler, 1996).

are from areas where self evaluation is likely to yield relatively little useful information on effectiveness but interesting insights into perceptions, professional thought styles and vested interests. The claim of this paper is that such information is indeed necessary to understand the function of a planning and management tool such as EA. Other areas of the international effectiveness study yield much more useful information. These are areas that lie within the scope of the paradigm of environmental management and of EIA: professional judgement appropriately applied.

#### **EIA seen as a matter of more data and better methods**

A strong belief in the power of science and the emphasis on knowledge as a means of solving environmental problems has been noted by Emmelin and Kleven (1995; in press). As with the examples discussed above from the Netherlands there is a strong tendency to assume that the main issue in environmental planning and management is better methods and more data (Emmelin, 1983). The consensus orientation of Nordic politics and administration (Rothstein, 1985) is worth analysing in relation to the rationalist notion of the power of data to resolve conflicts of interest over resources and the environment.

Douglas and Wildavsky have discussed the importance of views of consensus and of perceptions of the degree of knowledge existing on a given problem for the types of solutions sought or believed to be appropriate. Their analysis has been used by several

authors to discuss administration. Emmelin (1997b) has used it as an aid in understanding Nordic planning and environmental management – figure 5. Throughout the development of EIA, the objective of choosing the “optimal” or “best” solution from an environmental point of view has been a bone of contention. Similarly, the rationalist expert dominated planning ideal has been challenged by participatory planning ideals and ideologies. A third major issue in EIA has been the handling of alternatives, whether alternative ways of achieving the goals of a proposed project or the alternative outcomes and impacts of a given project under different circumstances.

Concerning the choice of the “best” or “optimal” alternative or solution it is notable that rationalist planning tends to assume that “the facts will speak for themselves” (Rothstein, 1991; Sager, 1994). Finding the “best solution”, in this view, makes further examination of alternatives unnecessary since “rational analysis and interpretation of facts are liable to bring about unanimity, at least among ‘men of good will’” (Meynaud, 1968). To a technocratic administration the importance of finding the “best solution” lies also in the notion that the quest for facts is assumed to unite those who would otherwise stay in separate camps due to ideological differences (Sager 1990). The ideological attraction of this approach to EIA will thus be powerful to a bureaucracy dealing with environmental problems which are construed as dominantly scientific (Lash *et al.*, 1996).

This analysis throws light on the preference for the “environmentally best alternative” as the object of EIA rather than the critical examination of parallel

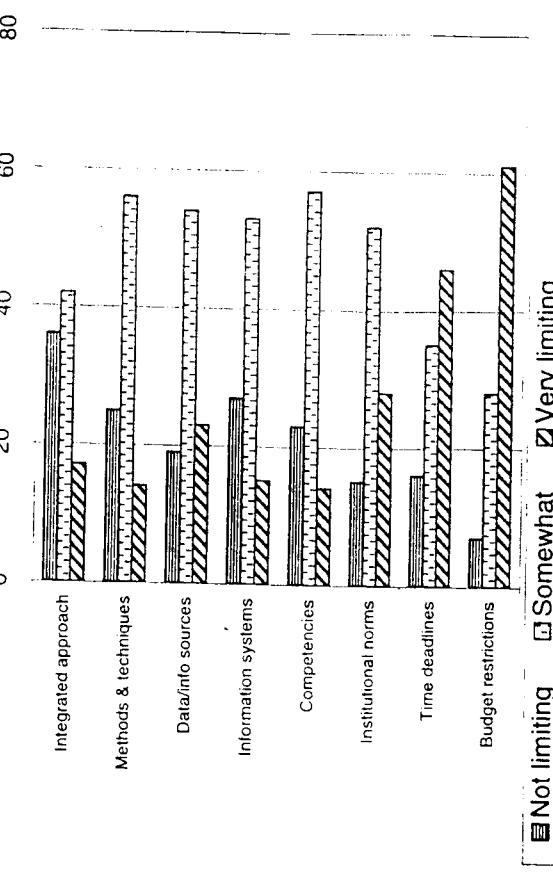


Fig. 4. Factors limiting the application of “best practice” according to the IAEA international effectiveness study.  
(Based on table 4.4 page 82 in Sadler, 1996).

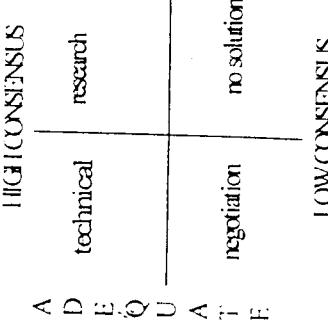


Fig. 5. The role of perception of consensus on values and knowledge related to the problems in determining solutions to societal problems (After Emmelin, 1997b; adapted from Beckman 1990).

approaches and alternatives shown by Nordic environmental administrators at central and regional level (Emmelin and Kleven in press; Emmelin in prep). If strong consensus is perceived to exist then many value operations can be seen as technical rather than political matters. The lack of distinction between the scientific concept of "effects" of a project and the value based concept of "environmental impact" is a case in point (Munn, 1979). The determination of "significance" i.e. the distinction between "effect" and "impact" becomes an expert judgement rather than a matter for public consultation or political decision (Emmelin, 1983, 1997b). It also throws light on the apparent paradox of a high frequency of agreement with both the view that what is needed to solve environmental problems is mainly a matter of more knowledge and with the view that what is lacking is action (Nenseth, 1996; Emmelin and Kleven, 1995; Emmelin in prep). With a high degree of consensus on values the need is either to act directly or to obtain sufficient knowledge in order to act. Seeing environmental problems as a matter of conflicts of interest would according to this schematic mode of thinking be less likely in a highly consensus oriented administration.

The consensus orientation of Nordic planning and environmental administration is also expressed in the increase in "visions" as an approach to physical planning at the regional and national levels. Visions such as "Sweden 2009" are presented as impact assessments of major trends in development, especially of infrastructure and regional development, and their object is explicitly stated as consensus building. The object of consensus is to co-ordinate actors over which the planner has little power. Again it is the rationalist assumption that "facts will speak for themselves" which is invoked (Emmelin, 1998, 1995).

#### EIA as negotiation

An entirely different approach to environmental problems seems to have been important in the early history of EIA. The role for EIA in the US environmental management and planning system is by Wandersford-Smith and Kerbavaz (1988) described in terms that places EIA in the lower left quadrant of figure 5. The problem seems to have been defined as one of sufficient knowledge but low consensus, making forms of negotiation rather than technical solutions or data gathering the essence of the problem. According to them NEPA "disrupted a pattern of continuing relations that

#### RESISTANCE TO EIA

Those advocating EIA often present themselves as reformers opposed by entrenched, conservative bureaucracies unwilling to change (cf. Therivel *et al.*, 1992). Prescriptions for change are often restricted to "good technical information and sound assessment methods" (Wandersford-Smith and Kerbavaz, 1988 p. 188). Unfortunately analysis of development in the field tends to adopt this stance also rather than trying to understand resistance as rationally motivated or as a function of professional strife, institutional cultures etc. In the Dutch evaluations discussed above this is clearly the case.

In the Nordic context there is a need to understand the resistance to and the adaptation of EIA in the light of three ideological or paradigmatic dichotomies. The first is the classic bureaucratic dichotomy between expert judgement and political valuation. This may, as Rothstein (1991) claims, be largely mythical and analytically misleading but is an important aspect of the self-understanding of a bureaucracy. The second is the shift in planning and management from a centralist and regulatory to a decentralist and negotiating ideology (Amdam and Veggeland, 1991). The third is the conflict between a formalised model of decision making represented by EIA in its original form as defined by NEPA (Wathern, 1988) and the incremental and ad hoc practice characteristic of Nordic planning in recent decades. In this case the central dichotomy of planning ideology takes the form of methods in the "synoptic" tradition versus an incrementalist practice.

One of the major arguments against EIA in Scandinavia was a general fear, enhanced by initial US experiences, of a complex process overloaded with information. This debate focussed especially in Sweden in the material generated by the National Commission on Natural Resources and the Environment around the material on EIA produced by Westerlund (1981) and the critique solicited by the Commission and appended to Westerlund's reports. Although not quoted, the critique very much resembles the classic critique of rationalist planning by Lindholm (1959) and Simon (1957). Critics of the EIA-concept in Scandinavia focused on the existence of a well developed planning system and on-going development of physical planning at the national level in Sweden and Norway, partly modelled on the already existing Danish system. Proponents, on the other hand, focused on the inability of the physical planning system, particularly at regional and national level, to make large scale

planning decisions in a rational way and the need to complement the planning system with less ad hoc approaches to decisions on large projects with major policy implications and environmental impacts (Westerlund, 1981).

The lines of conflict can be seen as the differences between a rationalist and formal approach to decision-making and the ad hoc approaches of the planning system. It can also clearly be understood in terms of outside critique of the planning system advocating better controls, transparency and formal checks, such as those characteristics of EIA according to NEPA. The Swedish system stands out as particularly interesting in this respect. The formal guarantees for transparency are to a considerable extent lacking, even though the context of the relatively wide access to information must be seen as the context of the Swedish system. Critics have pointed out that this context does not suffice as a guarantee (Lykke, 1992). The formal approaches such as criteria for screening, mandatory early consultation, independent review and formal decision on the acceptability of an EIA as sufficient to base decisions on, were all successfully resisted in the design of the Swedish system. The degree to which they are subverted or modified by strong planning systems in the other Nordic countries is a topic of great interest for further study.

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## CONCLUDING REMARKS

Understanding the professional and organisational culture within which environmental assessment is to be carried out can, on both theoretical and empirical grounds, be shown to be important in understanding, evaluating and improving environmental impact assessment practices. In a forthcoming paper empirical material from a study of the "environmentalist paradigm" of the Nordic environmental administrations will be used to discuss the Nordic EIA systems.

## NOTES

- Environmental assessment (EA) is used as the wide, loose concept covering many different concepts and methodologies; within this the others should be seen as specialisations with regards to subject of analysis, scope or methods, ambition etc.
- No formalised way of determining whether an EIA is needed or what it should contain.
- The distinction is similar to that between ecology i.e. a science concerned with the function of existing systems and their development in a short time perspective, and evolution i.e. the sciences concerned with the long term development of species.
- Spruce budworm (*Choristoneura fumiferana*) a North American pest species which was the object of a classic study in forest management by Holling and co-workers cf. Holling, 1978.
- The terms "etic" and "emic" perhaps need comment. They refer to the field of linguistics and are formed from phonetic and phonemic respectively (Pike, 1967). Phonetics deals with the sounds of language based on the anatomy of speech utterance. Phonemes are the minimal units of contrasting sound which are operative in changing the meaning. The phonemes can be measured with no understanding of a language, the phonemics presupposes and understanding of the particular language i.e. the "inside perspective".
- "Doorworking m.c.r. Evaluatiecommissie Wet milieubeheer, May 1996 reported in van Eck and Schooten (1996).
- "Always": 17 per cent; "often": 32 per cent; "sometimes": 31 per cent
- "Always": 4 per cent; "often": 15 per cent; "sometimes": 39 per cent; "seldom": 31 per cent and most remarkably "never": 9 per cent.
- The National Environment Protection Act.

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