

Mission Impossible: Does EIA secure a Holistic Approach to the Environment?

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Abstract

This paper focuses on the holistic approach to the environment within EIA. The concept of the environment used in EIA can be described as holistic because it addresses a multitude of different aspects of the environment. Firstly, definitions of the different environmental aspects that should be assessed are broad, encompassing a host of different environmental conditions. EIA also addresses cumulative aspects: potential environmental effects as well as socio-economic aspects. Thence, it is not only holistic but also in line with the notion of sustainability. This broad definition of the concept of environment is found in the EU-directive as well as in Danish EIA legislation

Based on a comprehensive evaluation of the EIA regulations in Denmark, it is elucidated how this holistic concept of the environment is managed by the authorities, both in their EIA regulations and also in the process leading to regulation. An important observation is that the environmental concept is narrowed considerably during the EIA process. From a broad concept in the initial stages, it is reduced in subsequent phases, ending up as a rather narrow concept of the environment. We conclude that in the Danish implementation of EIA instruments we have not succeeded in maintaining the high ambitions of the directive. Though the EIA process starts out as very holistic, ultimately we find that mitigation measures and the actual regulatory efforts largely mirror traditional regulations, such as the law of environmental protection and other sectoral legislation.

The broad environmental concept is important to maintain in a holistic approach to EIA. The holistic approach ensures that the design of the project, plus changes and alternatives to it, are based on broader aims, which ultimately leads to more comprehensive regulation of the project. Benefits of a holistic approach are obvious but often difficult to obtain in practice. Based on the empirical findings of the evaluation, the paper finally addresses some of the difficulties facing the authorities, i.e. lack of a knowledge, adequate models and assessment tools, and uncertainty about what kind of regulatory measures to use when it comes to the more 'soft' environmental aspects.

1. Introduction

The EIA system was introduced into the Danish planning system in 1989. Since then, it has been widely discussed by the public, the central administration, academia and, last but not least, the counties (county councils), who are the authorities responsible for practical implementation of the rules. Initially, EIA was seen as an unnecessary intruder, coming from the EU and in many senses dealing with regulatory tasks that were already taken care of, only doing it differently. EIA deals with these tasks in a more comprehensive manner, however, and the points arising from discussions during EIA processes have been many.

In the beginning EIA was not taken very seriously. As pressure from the EU has increased, however, implementation has improved. Successful EIA on larger infrastructure projects also changed the view of many people. In addition, the increased focus of the directive on agriculture, resulting from changes made in the late 1990s, coincided with a dramatic rise in Danish production of pigs, from 15 million in 1990 to 23 million by 2001. In many parts of the country, this coincidence served to make EIA the most discussed and employed environmental instrument. In this process of appropriation, the EIA regulation has gradually developed and will naturally continue to do so. There is a realisation that the EIA rules are here to stay, and even that they are becoming a more dominant element in the Danish planning system. Also, many of the advantages of the EIA system are becoming more apparent, especially the ambitions of being more holistic and fostering stronger public participation.

To evaluate the experiences of EIA so far, our research group at Aalborg University was asked to evaluate existing EIA practice in Denmark under the heading: “What do we get out of EIA?” The evaluation was performed for the Ministry of the Environment during the period 2001 – 2003. Table 1 shows the different parts of the evaluation. This paper is based upon results from investigations 4 and 5.

As mentioned, the focus is on the holistic approach, i.e. whether the ambitions of the EU Directive for EIA are satisfactorily implemented in Danish EIA regulations. This is pursued by elucidating the environmental concept in the EIA process and following it through the environmental statement to the final approval/permission. How cumulative impacts and assessment of indirect socio-economic impacts are handled will also be dealt with. Moreover, we look at how different actors participating in the EIA process influence this holistic approach.

The results are based upon in-depth studies of 36 EIA cases. The case studies cover three different types of projects: Industry (N=12), infrastructure (N=11) and livestock projects (N=13)ⁱⁱ. In this paper the focus is on the results for infrastructure and industry.

Besides scrutinizing a host of documents and environmental reports, interviews with officials, consultants and applicants have been carried out.

Experience and competence:

1. Investigation into experience and competence amongst officials, politicians and consultants.

Quality objective and quality assurance:

2. Investigation of politicians and officials criteria for: a) good quality of EIA statement and EIA process and for b) quality assurance.

Indict and direct environmental effects:

3. Investigation of the environmental impacts because of EIA - based upon:
 - The magnitude of changes in the project design;
 - The time for the changes;
 - The characteristic of the changes.
4. Investigation of whether the intentions in the EIA Directive on a holistic approach are fulfilled – based upon:
 - The environmental concept in the EIA process, in the environmental statement and in the approval/permission;
 - Assessment of cumulative impacts;
 - Assessment of indirect socio-economic impacts.
5. Investigation of the different actor’s participation in the EIA process, their influence on changes in project design and in fulfilling the holistic approach.
6. Investigation of the administration of the EIA rules.
7. Investigation of the potential for developing the future EIA work and EIA regulation.

Table 1 Overview of the content of the evaluation of EIA in Denmark

2. The holistic approach and the concept of environment in the EIA Directive

The concept of the environment in the EIA Directive primarily focuses on the physical environment. It does not directly include the social and economic environment, although the effects on human beings are underlined. Article 3 in the Directive stipulates that:

”The environmental impact assessment will identify, describe and assess in an appropriate manner, in the light of each individual case and in accordance with the Articles 4 to 11, the direct and indirect effects of a project on the following factors:

- *Human beings, fauna and flora,*
- *Soil, water, air, climate and the landscape,*
- *The interaction between the factors mentioned in the first and second indents,*
- *Material assets and the cultural heritage”.*

The concept of environment found here is broader than that which the Danish Environmental Protection Act and similar sectoral legislation are founded upon. Besides the traditional concept of the environment, the EIA Directive also contains considerations linked to landscape, nature and cultural heritage. Furthermore, the cumulative and indirect socio-economic impacts have to be assessed. All in all, a very broad and comprehensive concept of the environment emerges, i.e. a long list of many different aspects that have to be taken into consideration.

If we look back on the concept of environment used in Danish regulation before the early 1970s it is characterised by a focus on regulating local problems. With the introduction of the Environmental Law in 1974, the environmental concept was expanded so that not only local but also regional problems could be addressed. The emphasis, though, remained on the traditional problems of “smoke, noise and waste”. During the 1980s not only did the character of environmental problems become more aggravated, but the understanding of them also changed dramatically. The more global character of many problems, as well as their pervasiveness, fostered a revolution – or paradigm shift – based on new concepts, such as cleaner production, prevention and precaution. Mitigation measures, such as abatement, waste treatment and dilution, were no longer credible strategies. With the reform of Danish environmental protection law in 1991, another important shift in the concept of the environment occurred. First and foremost, the concept of sustainability became the cornerstone of the law. Furthermore, the principle of “cradle to grave” was introduced as fundamental, alongside the principle of cleaner production. Although the law of environmental protection has broadened, the concept of environment employed is not as broad as the one found in the EIA directive, wherein nature, landscape and aesthetics are integral.

The job of handling the broad environmental concept in the EIA is not experienced as easy by the administrative staff of the counties. An important reason for this is that the administration is divided into different sectors related directly to different laws or types of policies, i.e. environmental office, nature protection, groundwater protection and so on. Traditionally, each office sticks to its own problems and many questions are treated without involving other offices. A Danish administration is built up of perhaps ten different divisions, which together take care of environmental and nature considerations. Most problems are addressed and solved according to “jurisdiction”, and solutions do not involve the other offices, i.e. sectoral rather than comprehensive reasoning is used. Thus, the organisation of the administration can be said to be constructed in such a way that it creates barriers for thinking and acting holistically. EIA, with its emphasis on the broader concept of environment, presents a definite challenge to such an administration.

3. Managing the broader concept of the environment in EIA

The theme here is to investigate whether, at present, EIA lives up to the ambitions of analysing and assessing the environment in a more holistic way. More specifically, we examine how broad the environmental concept is, whether cumulative effects and socio-economic considerations are taken into account and, if so, how this is achieved in different phases of the EIA process. We look at the use of the concept both in relation to "what is being discussed" in the different phases and also how it is presented in the final environmental report. Finally, we analyse how different actors have an impact on the use of these concepts during the process.

3.1 The environmental concept in the EIA process

To briefly introduce the EIA process in Denmark, some information should be presented. The counties perform most of the EIAs, and the process that each case goes through is depicted in Figure 1.

On average, an EIA takes approximately 22 months. Industry cases can be handled in 13 months, while infrastructure cases can take up to 2½ years. Though this may seem a long time, one has to remember that the EIA process includes public hearings as well as political processes. There also has to be time to carry out a comprehensive analysis, which is based upon a dialogue with the applicant and other stakeholders and which is very broad and holistic in nature.

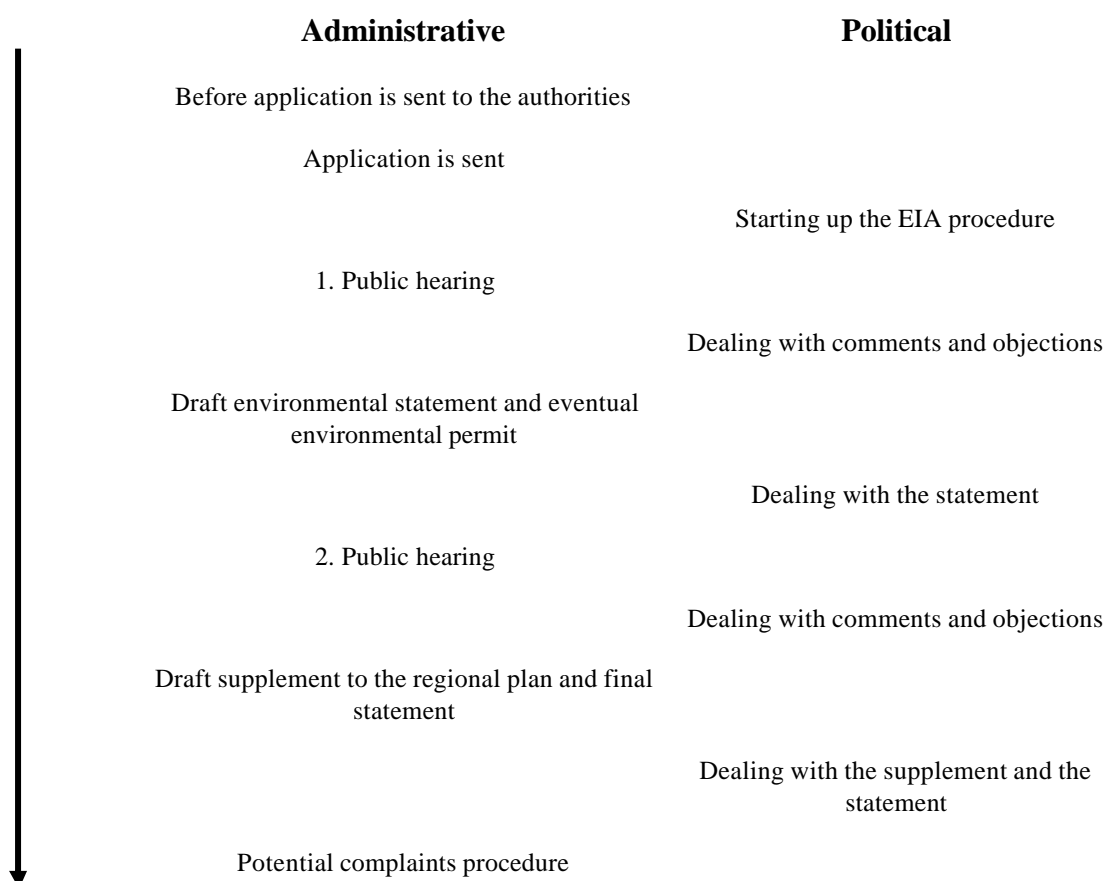


Figure 1: The EIA process, administrative and political phases ⁱⁱⁱ

Analysing the 36 EIA cases, we have identified a number of points where projects have been discussed. These “points of discussion” generate inputs to the process of performing an EIA. Not all points of discussion raise issues that are subsequently dealt with, but some do, even leading to changes to the project. Issues raised include, of course, those based upon comments and objections put forward in the public hearing. However, there are also instances where the authorities, the applicant, consultants or politicians have made an input to the process in order to influence and change the project or to stimulate an assessment of specific impacts. Analysis of points of discussion therefore gives a valuable picture of the environmental concept being addressed in the EIA process.

Throughout the EIA process, projects are intensely discussed. In the 36 case studies, we have identified 725 points of discussion. The greatest activity takes place in infrastructure cases. On average, we have identified 47 point of discussion per case. This compares to industry cases, where we found 10, and to livestock projects cases, where we found only 7.

The following figures, 2 and 3, show the overall picture of which themes are examined at the different points of discussion in industry and infrastructure cases, respectively.

For industry cases, by far the greatest number of themes result from the two public hearings. Only 11 out of the 116 themes were raised during the normal administrative and political handling of the projects. Themes raised are primarily landscape, flora/fauna, noise and transport, see figure 2. Input into the EIA process seems to be based on a broader perspective than that which is normally seen in the traditional regulation of such cases.

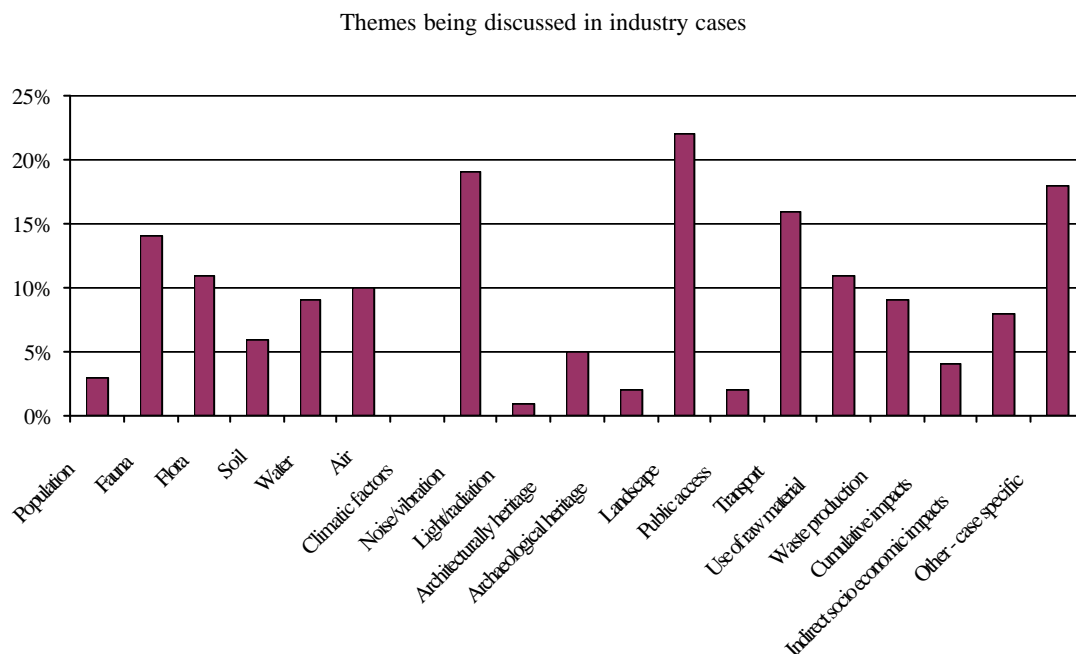


Figure 2: Overview of themes being discussed in industry cases. (The reason for a sum greater than 100% is that a theme may emerge at more than one point of discussion. The analysis covers 116 points of discussion.)

For infrastructure cases, 515 points of discussion have been registered. In general, infrastructure cases are those wherein the most discussion takes place during the EIA process. In these cases, the source of greatest input is also public hearings. From figure 3, we see that the primary themes discussed are landscape, flora/fauna, noise and population. These themes are those that could be expected in infrastructure projects. As such undertakings normally covers larger areas, landscape, biodiversity and so on will typically be discussed alongside more traditional environmental impacts such as wastewater and air pollution.

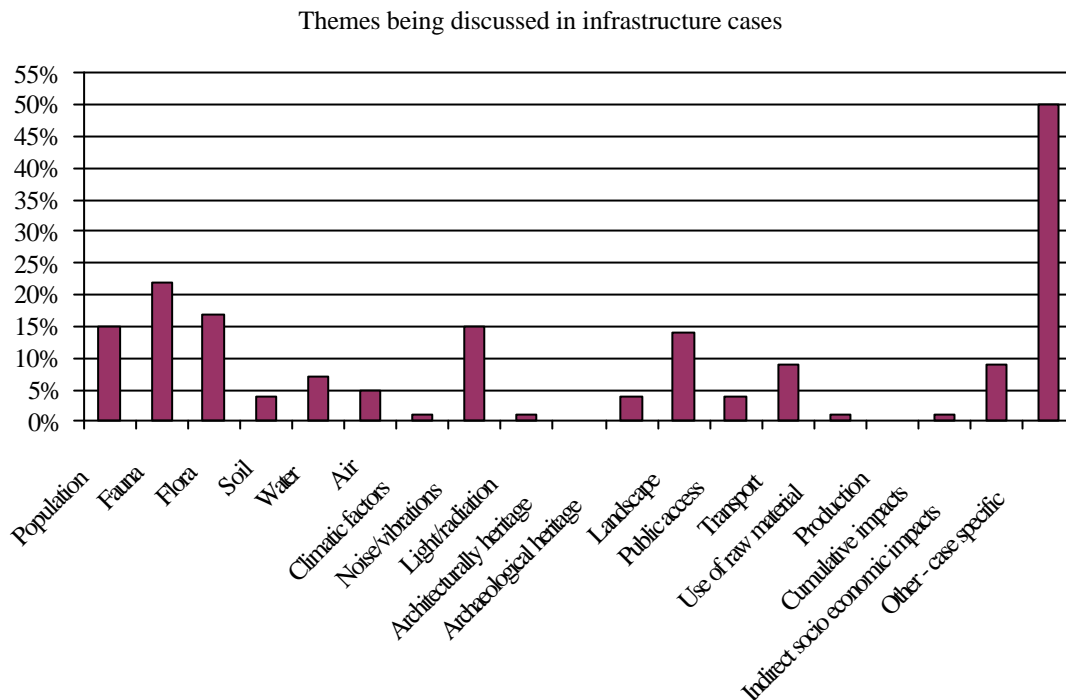


Figure 3: Overview of themes being discussed in infrastructure cases. (The reason for a sum greater than 100% is that a theme may emerge at more than one point of discussion. The analysis covers 515 points of discussion.)

The role of the public in the EIA process

Generally, we find a lot of activities going on in the EIA process. In the evaluation, we also examined what was being discussed, by whom, and in which phases of the process. Not surprisingly, activity is concentrated around the two public hearings.

More than 80% of the identified points of discussion arise from the two public hearings. This underlines how important public hearings are for the EIA process. Many of the topics raised are already addressed by the authorities, of course. Others, though, emerge as a result of the dialogue that takes place with the public. Some of the new issues raised represent genuinely new knowledge or different attitudes, inputs that the authorities are obliged to consider.

As they concern not only negative local impacts, such as noise and odour, but also broad topics like landscape, aesthetics and biodiversity, comments put forward in the two public hearings reflect the broad environmental concept. In other words, public participation significantly stimulates the EIA process. It does this not only by introducing and underlining new and broader aspects of the cases in

question, but also by acting as a watchdog, ensuring that many different interests are taken into consideration during the process of decision-making.

3.2 The environmental concept in the environmental statement - from description and assessment to regulation

In the previous section we looked at the whole EIA process. This section examines the content of the EIA statement. We have analysed the environmental topics that are being described in the statement, which of these are assessed as significant, and which mitigation measures - and thereby specific regulation - this leads to.

The environmental considerations being described in the EIA statements nicely reflect the broadness of the concept of the environment as described in the annexes to the EIA Directive. This breadth can be clearly appreciated from figure 4 and 5. The same observation holds for all three types of project, and is demonstrated by the frequency with which elements like flora/fauna, landscape and culture are described.

Contrary to the positive use of a broad concept of the environment is that considerations of socio-economic aspects are seldom taken into consideration. Moreover, the assessment of cumulative aspects never takes place. Socio-economic impacts are described in 82% of infrastructure cases, 50% of industry cases, and only 15% of livestock projects cases.

Description of aspects of the environment likely to be affected - industry cases

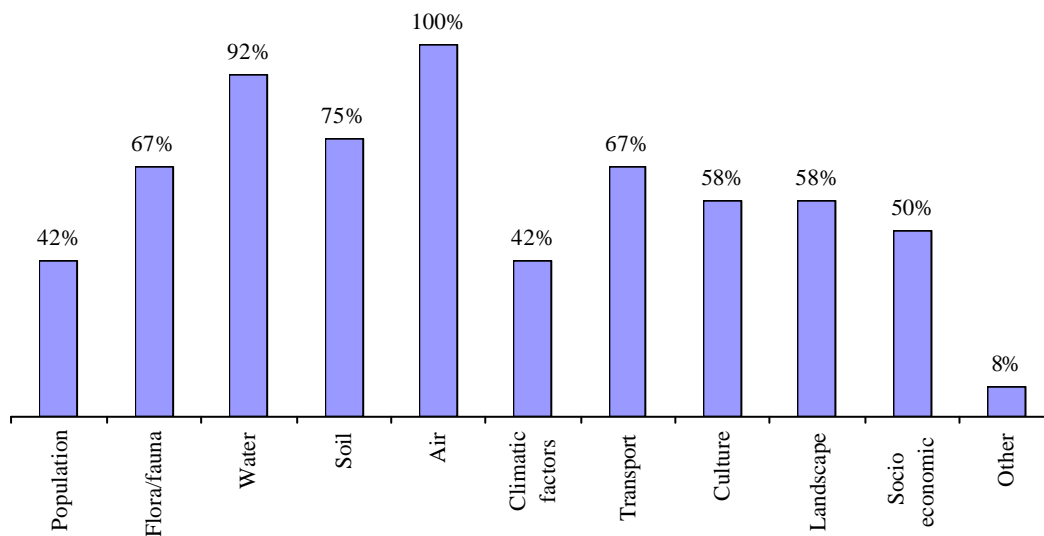


Figure 4: Different aspects of the environment being described in industry cases

Description of aspects of the environment likely to be affected - infrastructure cases

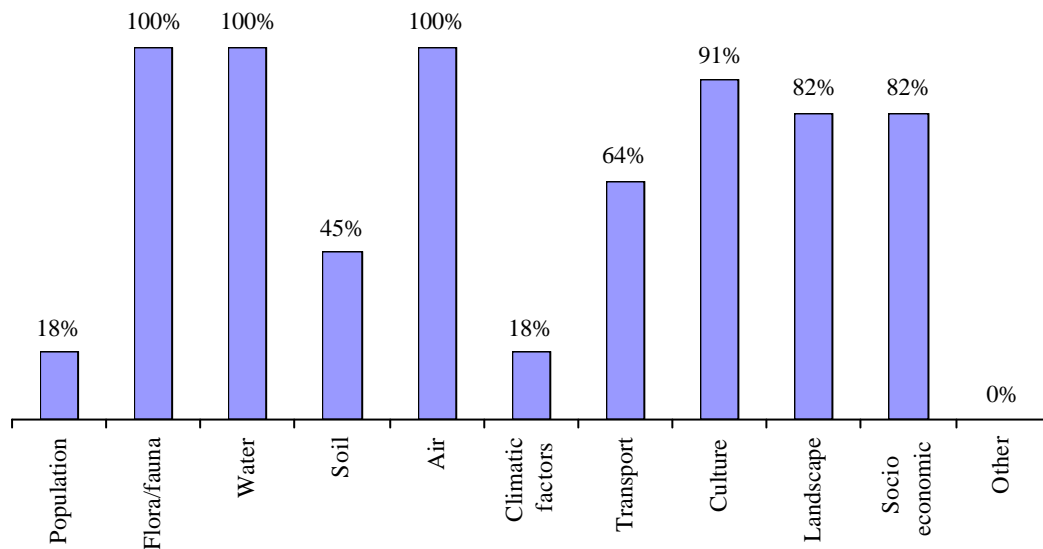


Figure 5: Different aspects of the environment being described in infrastructure cases

After describing the environment likely to be affected, the directive presupposes that the effect on the environment is elucidated. When it comes to this phase, however, we often find a narrowing of the concept of environment. Obviously, not all the environmental parameters being described will afterwards be assessed as significantly affected. The way in which assessment and exclusion takes place provides food for thought, however.

For industry cases, the environmental parameters assessed as significant are mainly limited to the "ordinary and traditional" ones, such as smoke, smell and waste, see figure 6. This could be because of the character of the problems. However, it could also be because the correct and necessary analytical tools to describe, and eventually quantify, these impacts are unavailable. Flora/fauna can be difficult to deal with. It is also accepted that analysis of landscape is still a new topic, and one often not given priority. The conclusion is that industry projects start out being analysed from a broader perspective, but this narrows when it comes to assessing whether effects will be significant^{iv}.

Assessment of significance - industry cases

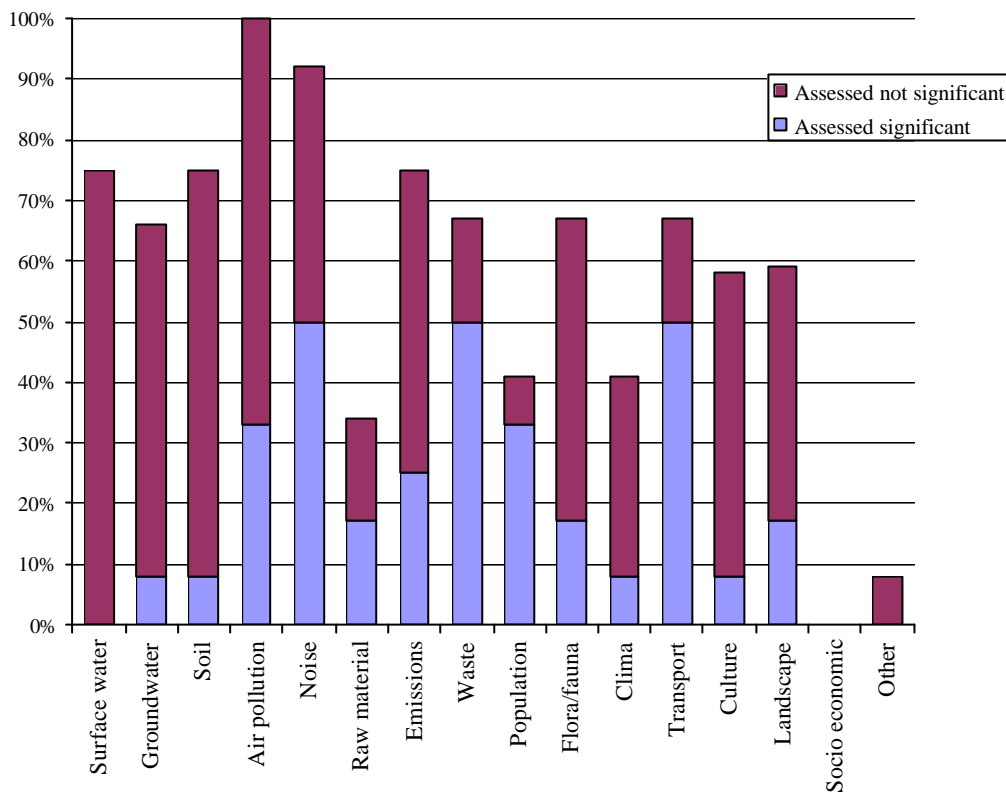


Figure 6: Environmental parameters assessed as significant in industry cases

For infrastructure projects, the narrowing is not as pronounced as for industry projects. The outlining of significant environmental impacts results in a broader range of topics to be addressed, cf. Figure 7. There is no doubt that this has to do with the intrinsic character of the cases. Infrastructure projects, for example roads, characteristically result in both traditional problems, like drainage, noise and air pollution, and also, by virtue of their physical extent, significant scenic, landscape and biodiversity problems.

Assessment of significance in infrastructure cases

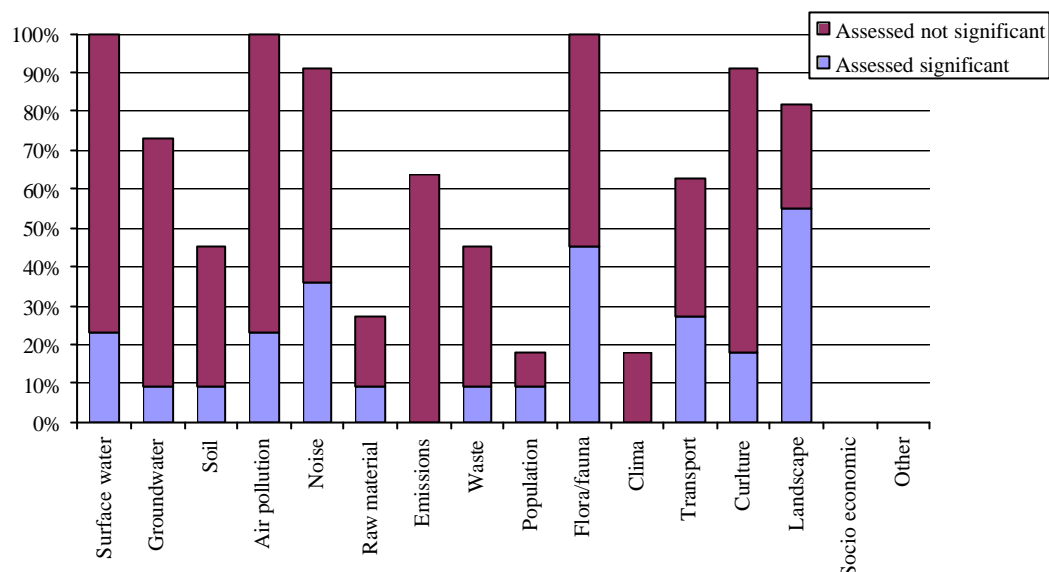


Figure 7: Environmental parameters assessed significant in infrastructure cases

The narrowing of the analytical perspective in industry cases, particularly, is quite problematic for the value of the EIA instrument. It highlights the importance of maintaining the broader concept of environment when analysing the significance of impacts.

There can be several reasons for this narrowing of perspective. It can be due simply to “thinking in grooves”. It can also be caused by a lack of methods for analysing the “softer” aspect of the broad environmental concept. Authorities therefore fall into a trap wherein they rely on well-known and quantifiable methods and feel on safe ground. Finally, narrowing can occur because of uncertainty about legitimate issues for regulation. Officials know they can regulate traditional environmental aspects, but find themselves on thin ice when it comes to imagining how the other aspects of the broad environmental concept can be regulated. An EIA-permission covers aspects that the traditional environmental permit does not. This adds to the confusion because the authorities have not spelt out the possible content of this regulatory instrument.

Whatever the reasons, the fact remains that in the analysis of the significance of the problems a narrowing of the objective within the EIA process occurs. In general, this is not beneficial and should be avoided in the future so the broad analytical ambitions better can be fulfilled.

After assessing the significance of impacts, the next step is to consider whether projects can be allowed. If they can, conditions will often be proposed for the single project with respect to different kinds of mitigation. In line with the relatively frequent characterisation of environmental impacts as significant in infrastructure project, we also find that the greatest number of mitigation measures is demanded amongst these cases. Mitigation measures for infrastructure projects are often in line with the broad environmental concept. For industry projects, on the other hand, it is often the narrower and traditional environmental parameters that are the basis for mitigation measures, see figures 8 and 9.

Mitigation measures in infrastructure cases

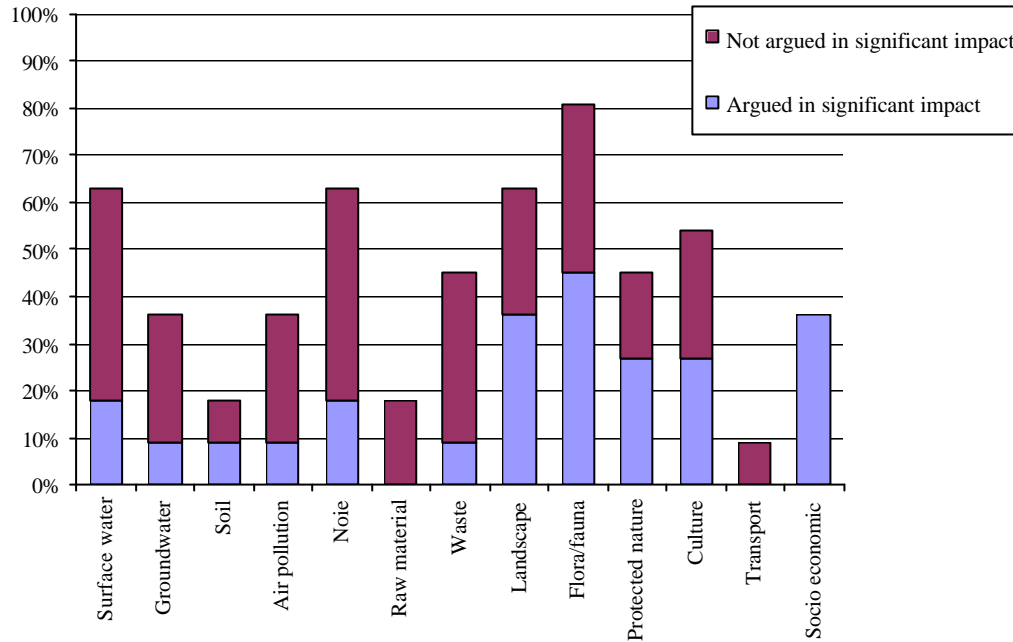


Figure 8: The number of mitigation measures in infrastructure cases grouped according to environmental effects and whether or not they are argued as significant environmental impacts

Mitigation measures in industry cases

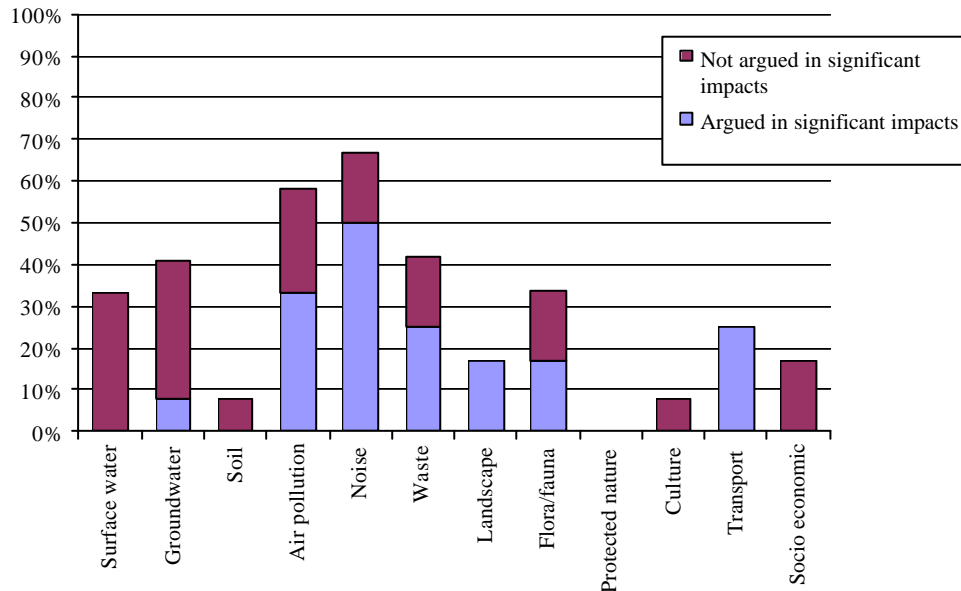


Figure 9: The number of mitigation measures in industry cases grouped according to environmental effects and whether or not they are argued as significant environmental impacts.

Few mitigation measures live up to being real prevention measures, such as cleaner technology and “good house-keeping”. By far the most common is traditional mitigation in the form of add-on/end-of-pipe solutions.

Not all the mitigation measures demanded are discussed and justified solely on the grounds that the relevant environmental impacts were assessed as significant. At first this seems quite strange, but the reason for this phenomenon is probably one of two. First, there could exist in the statements a “circular argument” where the authorities proposes that environmental impacts are not significant because they know that mitigation measures will definitely be demanded thus improving the conditions that then no longer will seem to be significantly impacted. On the other hand, mitigation may be demanded solely because certain solutions (e.g. noise screens, waste water treatment etc.) have become routine practice that are demanded no matter what.

4. Conclusion – is EIA Regulation holistic?

Whether the EIA regulation can be described as holistic is assessed in this paper on the basis of investigating the environmental concept being used by the authorities in the EIA work, concentrating particularly on the way they handle cumulative and socio-economic impacts.

Based on the EIA projects we have investigated, it seems that the authorities are working with a broad environmental concept. The authorities interviewed also express that EIA is suitable for giving a holistic description of projects. In general, it can be concluded that the EIA cases give a broad, holistic description and analysis of the environment likely to be affected plus impacts relevant for the cases.

The evaluation also clearly demonstrates that public participation in the process helps to secure the broad environmental concept. In our analysis of public participation in the EIA process, we conclude that the public help ensure that the authorities stick to the broad environmental concept. The public must therefore be seen as an important source to secure other perspectives in the assessments of specific projects.

Unfortunately a narrowing of perspective takes place when the significant environmental impacts have to be assessed.

In relation to the different types of projects, the narrowing is frequent in cases of infrastructure projects, but even more prevalent in industry projects. For industry cases, only traditional environmental parameters – smoke, noise and waste – covered by sectoral regulation are being assessed. Analysis of EIA-project documents reveals that authorities do not systematically assess cumulative impacts, i.e. cultural heritage, biodiversity and natural habitats worthy of preservation. In the following discussion we offer some explanations for why this is the case.

The broad environmental concept is important in relation to securing a holistic approach in the EIA cases. It ensures both that changes in the project have a broader aim, and also a more holistic regulation of the individual projects. Even though there are benefits connected with the broad environmental concept, there are also some difficulties in dealing with it in practice. The knowledge base for the broad environmental concept is limited. Many officials interviewed find that there is not sufficient knowledge at hand to assess the cumulative aspects and the potential environmental impacts in different areas. When there is insufficient knowledge there are typically fewer available methods for analysis and assessment. Especially regarding “the softer” aspects of the broad

environmental concept, such methods are in demand. Seen from the point of view of the county administration, there is a fundamental uncertainty connected with the broad environmental concept. This includes lack of data and general knowledge, lack of models and quantifiable parameters, seminal experience with this new way of thinking, and a lack of acceptance - or even bureaucratic hindrances - in a very sector-organised administrative structure. Officials are not short of arguments for clinging to the more well-known and quantifiable traditional and specialised methods, where they feel on safer ground.

Amongst the officials there is also a significant insecurity in relation to what can be regulated. Authorities know that traditional environmental aspects can be regulated, but they are on thin-ice when they have to consider how the other aspects of the broader environmental concept should be regulated. This has to do with wide insecurity in relation to how to regulate through EIA-permission^v. The term EIA-permission was implemented in 1999, and there is still great insecurity in the authorities in relation to how this instrument can be used to perform a broader regulation than that known from environmental permits and other more specific and specialised regulation. Because of the insecurity about the possibilities in the EIA permissions, officials tend to regulate only the traditional environmental aspects.

It is concluded that EIA regulations do not reflect the broader environmental concept. Although the first step in the EIA process, the description of the environment affected, is broad in focus and in accordance with the intentions laid down in the EU directive, a continuous narrowing of the environmental concept takes place as soon as the analysis of the significance of the impacts takes place. This tendency is more pronounced for industry projects than it is for infrastructure cases. Even more problematic is that the narrowing of the ambitions continues when it comes to establishing the mitigation measures of the projects. In the end, the results of the EIA assessment are not that different from traditional regulations - it starts out with a broad analysis and assessment of impacts, but ends up as a more sector-oriented regulation of the project.

References

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ⁱⁱ The 12 cases of industry covers: two raw material extraction, one sewage treatment work, one system for sludge treatment, one deposit, one plant for incinerating hazardous waste, to plants for energy production, two retail centres and two industrial productions.

The 11 cases of infrastructure covers: five roads, three harbours, two natural gas works and one airport.

The 13 cases of livestock projects covers: 12 pig farm extensions and one cattle stock extension.

ⁱⁱⁱ Excepted are cases from the Directory for Roads and the Directory for the Coast. These Directories only produce a few types of EIAs, while the counties cover a much broader area – both in type and in number of EIA cases.

^{iv} The same is very much the same when it comes to livestock projects. Here the description counts the wide range of surrounding. But as soon as the assessment of what is significant and what is not, the presentation of the problem is narrowed down to the traditional problems regarding nitrogen in relation to groundwater, surface water and air pollution.