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Comparison of environmental impact assessment of highways in Malaysia, South Africa, Thailand, and Denmark

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ABSTRACT The objectives of doing comparative analyses of EIA systems in Malaysia, South Africa, Thailand and Denmark are to inform policy makers with a view to improve EIA in the home countries, extend knowledge of methodological procedures and to increase international understanding of environmental problems. The EIA procedures are aiming to provide individual approvals of different projects and assess and mitigate the potential environmental impacts. Some procedures are written in the EIA legislation but EIA administration and procedures are also based on the national tradition. To overcome this an EIA on a highway was analysed in each of the four countries. In the paper we compare the EIA systems in the four countries across four different themes: Relation to standard EIA procedure, EIA system and surrounding environmental regulation, form of public participation, and scope of and methods in the analyses of environmental impacts. Important findings are; that a participation in international environmental conventions is reflected in the EIA issues, EIA will expand on issues where environmental legislation is considered insufficient, cultural determined issues will be enclosed in the EIA, and public access and public participation in the decision process are present in all four countries but in very different ways.

(EIA comparison, Malaysia, South Africa, Thailand and Denmark, highways)

INTRODUCTION

This article makes a critical comparison of the EIA systems in Thailand, South Africa, Malaysia and Denmark. The aim of the report is twofold. Firstly, the comparison across countries makes it easier to identify strengths and weaknesses in the different systems. Secondly, we hope that the description and analysis of the different systems can serve as a source of inspiration to how the EIA systems in the different countries could be further developed. In the report we compare the EIA systems in the four countries across four different themes: Relation to standard EIA procedure, EIA system and surrounding environmental regulation, form of public participation, and scope of and methods in the analyses of environmental impacts. We do that on the basis of an analysis of the general EIA system combined with the analysis of an EIA process on a road in each of the four countries.

ANALYTICAL FRAMEWORK

Relation to standard EIA procedure

There are many similarities between the EIA systems. Most EIA systems are comprised of – in one way or another – a screening, scoping, EIA report, public participation, decision and monitoring. But there are also many differences between the systems and the way they are used in practice in different countries. In order to avoid describing in length all the elements where EIA systems are similar, we compare the EIA systems to a standard EIA system and focus on the elements where the EIA system in each country deviates from the 'standard procedure'. The standard procedure we use is developed through discussion in the team and through literature review. Christopher Wood develops a framework consisting of 14 evaluation criteria, which he finds vital to the quality of an EIA system [1]. Our approach is different since we have chosen to describe deviations from a 'standard EIA system' and describe the problematic issues that emerged through the study process. As our standard process we have chosen to use a very

plain model. A standard EIA process contains the following four steps:

a. Decision of what type of project is this, and whether this type is subject to an EIA process?
b. Investigation of which environmental problems this specific project produces at this location.
c. Gathering of data that enables assessment of the extent of the environmental problems and make proposals for mitigating measures
d. Decision concerning conditions for project approval and control with implementation.

When it comes to specific activities concerning the highways we will also include national or international EIA guidelines for highways. A national guideline will indicate the specific natural, cultural and social problems that by experiences are relevant for a highway project.

EIA system and surrounding environmental regulation

All four countries had some sort of environmental regulations before the EIA systems were introduced. Some of them have a land use planning system with a long tradition, and all countries introduced environmental regulation during the 1970's and 1980's. In none of the countries was the intention that the EIA system should replace the existing environmental regulations. The EIA system should function with the existing environmental legislation. This relationship is important firstly because there are huge possibilities for unclear competences and overlap of competences, when more regulatory systems have to function jointly, which can destroy administrative efficiency. Secondly, the EIA systems capability to integrate all relevant elements of the surrounding regulatory systems is important for the potential effectiveness of the EIA systems.

Form of public participation

Public participation is a central element in EIA. How public participation is formally laid down in the system and how it is carried out in practice has, firstly, huge importance for how the EIA system actually works, and, secondly, is a useful indicator for the political culture in the country. On the basis of Lund's analyses of the concept of public participation [2] we distinguish between three forms: legitimatising participation, instrumental participation and democratic participation. *Legitimatising participation* is when the sole purpose of the participatory process is to legitimate the process, but it does not have any influence on the content. *Instrumental participation* is when the public is utilised as information providers to improve the quality of the EIA reports, but where the public's prioritisation of problems and benefits is disregarded. D*emocratic participation* is when the views and the priorities of the public are taken into account in the decision making process.

Scope of and methods in the analyses of environmental impacts

EIA is about the environment, and the basis of the entire process is that important environmental impacts are identified and investigated properly. Scope is the step of the EIA process where all possible environmental problems should be considered. Significant problems will be studied and mitigated. The environmental problems taken into consideration are important for assessing the validity of the assessments made in the reports. The issues treated in the final EIA report indicate environmental problems that are considered important in the country.

METHOD

The study is based on a review of EIA literature about the four countries, a review of the legislation and guidelines on EIA in the four countries, semi-structured interviews with university experts and professionals in the administrative system, and a case study of an EIA on a road in each of the four countries. National experts on EIA participated in the reviews of the national legislations, and the different findings have been discussed with experts in the national systems. In each country an EIA on a road project has been examined. In analysing the EIA reports, we especially focused on the environmental issues and adequacy of the used methods for investigation of the environmental consequences of the proposed project. Furthermore, it should be examined if the specific EIA operates with the national environmental objectives.

A single case study has been chosen from each country, and these are not in themselves conclusive, but they serve as illustrations of how

the systems work, and as point of entrance to get into discussion with the national experts. Apart from Denmark, the countries investigated have a federal structure, and in some of the countries, especially South Africa, the variation between the provinces can be substantial.

THE EIA SYSTEM IN MALAYSIA

Current layout and relation to surrounding legislation The core of the EIA system in Malaysia is section 34(A) in the Malaysian Environmental Quality Act and the 1987 EIA order Prescribed Activities [3]. The system includes most normal steps of EIA systems: screening, scoping, public participation, environmental reports, review, and decision. There are a number of special issues in the Malaysian EIA system.

1. Malaysia is a federal state, and the division of competence is put down in the ninth section in the constitution. According to this list many environmental important aspects are within the jurisdiction of the states, e.g. matters of land, water, rivers, freshwater fishing, forest and agriculture. The 1987 regulations are federal law, but the 1987 order on prescribed activities includes a number of activities that according to the constitution is under state jurisdiction.

2. Public Participation in the process is limited, and is mainly on the behest of the project developer. According to an EIA handbook [4], public participation is essential in the preliminary assessment process, but only in ways we would assess as instrumental public participation, and the form of the public participation is left to the project proponent. The terms of reference for the detailed EIA are required to be displayed for public comment. In the detailed EIA study, public participation is recommended for the same reasons as in the preliminary assessment and as in the preliminary assessment it is completely at the behest of the project proponent. When the review panel receives the detailed study, it puts up public notice as "it considers appropriate", stating the nature and location of the project, and where copies of the report can be obtained, and the cost of each copy. The public then has the possibility to forward comments in writing within 45 days.

3. EIA is meant to follow the integrated planning concept. But in projects both requiring land approval from the State Executive Committee and an EIA there seems to be two parallel processes. An application for land alienation or land conversion must be submitted to the Land Office, who refer them to the relevant agencies for comments. The Department of Environment (DOE) are usually asked for comments on environmental aspects. At the same time an EIA must be prepared in a process co-ordinated by DOE. The consequence is allegedly that the project is often approved by the state first, and that the "EIA report only were prepared after commitments have been made to the site, design and technologies. It is not surprising therefore, that owning to this lack of coordination and integration, an EIA is often regarded as a mere formality" [5]. Generally it seems that the EIA process is commenced when the planning process is almost complete [6] [7], or even after the bulldozers have started [8], although the EIA handbook states that the EIA procedure should be initiated early in the project planning [9].

4. Implementation of the conditions in the EIA approval seems to be the weakest link in the Malayan EIA system. The conditions in the approval given by the Department of Environment is to be implemented by the agency under which jurisdiction the condition falls, be it a state, a department responsible for the sewage system, or water supply or any other department. The coordination of all these authorities is extremely difficult [10].

EIA of the New Pantai Highway in Kuala Lumpur

The New Pantai Highway is a 19.6 km limited access highway intended to relive the pressure on other major roads in Kuala Lumpur. The main part of new highway is an extension of existing roads, but some kilometres of the road is new alignment of the road. The highway project is privatised. In December 1996, Maxtro Engineering issued the report from the preliminary EIA. The approval conditions are not accessible to the public.

The public participation in the preparation of the EIA report was through interviews using standard

questionnaires. The analysis was made on the basis of 185 questionnaires from 11 different localities in the vicinity of the project.

THE EIA SYSTEM IN SOUTH AFRICA

Current layout and relation to surrounding legislation

EIA is mandatory in South Africa. The requirements are laid down in Environmental Impact Assessment Regulations from September 1997 [11]. The system includes most normal steps of EIA – systems: screening, scoping, public participation, environmental reports, review, and decision. There are a number of issues specific to the South African EIA system.

1. Administratively, the Republic of South Africa has several levels: The national state, the province level and the municipality level. The national level is responsible for issuing the general regulation for EIA and the national guideline. The provinces are responsible for the bulk part of EIA's. But where the national environment is affected or national governmental authorities are the applicant the authority moves up to the national level. The authority can also be moved down to the local authorities.

2. The regulation leaves, in principle, no room for a screening process. According to the regulation all changes of for example land use is subject to an EIA – whatever limited scale – and a scoping report has to be prepared.

3. Public Participation is mandatory, but the regulation does not state where in the process it should take place, only that it must take place [12]. But the guideline document [13] states that public participation should take place during scoping and review of a full environmental report. Judged by the guideline document substantial weight is put on public participation. However, due to the imprecision of the law the degree of public participation varies from project to project [14].

4. The EIA process allegedly fulfils the task of integrating most of the complex environmental legislation in South Africa. Only in relation to the South African land use planning there seems to be risks of conflict and duplication of work.

5. Monitoring is not mentioned.

EIA of Extension of Cape Flats High Way

The "Cape Flats Freeway Extension" is an approximately 8 km extension of the Cape Flats Freeway, and is proposed as a limited access highway. It was proposed initially to construct it as a two or four lane main road, and on a later stage upgrade to highway standards. The project was proposed by Cape Metropolitan Council. In 1996 they commissioned a consortium of two private companies to investigate the feasibility of the route. The preparation of the EIA report was prepared by a member of the consortium, except for the public participation report, which was prepared by a different company. All concerned local and regional authorities were involved in the decision making process (Provincial Administration of the Western Cape, Cape Metropolitan Council, South Peninsula Municipality, Cape Town Municipality). In December 2001 no construction had so far commenced.

The public participation process included letter drops, public meetings, and workshops for special interest groups and representatives of authorities and individual consultations with farmers in the Philippi section. With the use a number of different methods: a questionnaire, advertisements, collective meetings and workshops the interested and affected parties were identified, and the consultant attempted to identify their interest and views. The views on the project in general were recorded, but emphasis was especially put on their requirements to mitigating measures. Assessing the public participation process it is clear that it is a democratic participation, in the sense that the publics views on necessary mitigating measures are feed into the decision making process.

THE EIA SYSTEM IN THAILAND

Current layout and relations to surrounding legislation

The National Environmental Quality Act from 1992 upgraded the status of the National Environmental Board (NEB) with the Prime Minister serving as Chair, and the Minister of Science Technology and Environment as one of the two Vice Chairs. Other Board members are

the ministers of key agencies such as finance, industry, and agriculture and Permanent Secretaries of related agencies. Up to eight positions were reserved for "members qualified in environmental matters" of whom "no less than half shall be representatives from the private sector". There are two separate tracks in the approval process, one for government agency or public sector, and the other for the private sector.

The EIA for the government agency or public sector project must be undertaken during the feasibility study. The report is filed with Office of Environmental Policy and Planning (OEPP) and reviewed by the Ad Hoc Experts Committee for Public Projects, and the Committee then passes the comment to The National Environmental Board (NEB). NEB may ask the opinion of the Office of Environmental Policy and Planning (OEPP) or other experts. The report (with comments) is then submitted to the Cabinet for decision. There is no time limit for the process. For the private sector projects, the EIA report is to be submitted to the Office of Environmental Policy and Planning (OEPP). The OEPP can only "comment" on the EIA report; the decision to approve or disapprove the report lies with the Ad Hoc Experts Committee. The OEPP has fifteen days to comment on the "correctness" of the EIA and another fifteen days to make a complete review. The Ad Hoc Experts Committee, which includes a representative of the licensing or permitting agency, must complete its review within forty-five days or the EIA report is considered approved. If it is rejected, the EIA report is to be revised and resubmitted to the Committee. An additional thirty days are allowed for this second review [15].

1. In Thailand the Terms of Reference for the EIA are decided on and prepared by the project proponent but approved by OEPP. Section 51 of The National Environmental Quality Act grants the minister the authority to require that licensed specialist prepare the EA report. An ad hoc committee has been set up to approve the registration of specialists or consulting firms [16].

2. Public participation in EIA is not institutionalised in the legislation. Some in the government argue that public interest is taken into consideration through the potential representation of NGOs on the National Environment Board, which reviews the EIA for public sector projects. NGO representatives may also be invited to the Ad Hoc Experts Committee that reviews the EA Report for private sector projects. Others consider that making the EIA report or its Executive Summary public is sufficient notification. The legislation does have some provisions that have implications for local communities and public interest groups with respect to development projects. Section 6 grants rights and duties to individuals "for the purposes of public participation in the enhancement and conservation of national environmental quality." These include the right to be informed and obtain information and data from the government on "matters concerning the enhancement and conservation of environmental quality, except where the information or data involves officially classified material, such as secret intelligence pertaining to national security, or secrets pertaining to rights to privacy, property rights, or the rights in trade or business which are duly protected by law". Under section 8, NGOs and non-profit organisations or juridical persons directly engaged in activities concerning environmental protection or conservation "without any objective to be involved in politics" may register with the Ministry of Science Technology and Environment. NGOs may also propose nominees to represent the private sector in the NEB. Registration of NGOs may be revoked if their activities cause "disturbances or (are) contrary to public order or unsuitable".

Finally, the EIA process as defined in the legislation assumes that NGOs or environmental professionals can articulate the interest of the public or effected communities. There appears to be a genuine lack of confidence on the part of government officials and environmental professionals in the ability of local groups to participate in an informed and meaningful way as part of the project planning. Even the participation of NGOs on the NEB or Ad Hoc Experts Committee would appear to come rather late in the process [17].

EIA of the Southern Outer Bangkok Ring Road Inter-city Motorway Project

The Southern Outer Bangkok Ring Road Inter-city Motorway Project, which is a part of the

Outer Bangkok Ring Road Project has a total distance of 35 kilometres. The road has six traffic lanes, and the shoulder is wide enough for future expansion to eight lanes.

To comply with Ministry of Science, Technology and Environment's regulations, it is imperative to study and assess environmental impacts of the project. The scope of environmental impact assessment complies with the guidelines of the Office of Environmental Policy and Planning (OEPP). Four factors have to be scrutinised, which are:

a. Physical Resources: The study includes topography, geology, meteorology, air quality, noise level, vibration, hydrology, soil removal, landfill and construction and water quality.
b. Ecological Resources: The study includes aquatic and terrestrial ecosystems.
c. Human Use Values: The study encompasses land use, transportation network and navigation, utility systems, flood control and drainage.
d. Quality of Life Values: The study is composed of socio-economic conditions, resettlements and way of life, public health, aesthetics, tourist attractions, historical buildings, places of interest, safety and proposing measures to arrange meetings for public hearings and public relations activities.

The study contains comparative study of alternative routes, among others the route crossing Chao Phraya River by a suspension bridge or a tunnel [18].

The study indicates that negative impacts will take place during construction. The extent of the impacts will be low to moderate. However, positive impacts on land use, transportation networks, socio-economic conditions, and safety will be realised when the road is open. The study details about meetings and public relations are provided by interviews made by private employed sociologists.

THE EIA SYSTEM IN DENMARK

EIA system and relation to surrounding legislation

EIA became compulsory in Denmark in 1989 implementing a directive from the European Union. The Danish EIA system has been adjusted several times in the 90ties.

The EIA system has been integrated into the planning system and environmental permit system, which have existed since the beginning of the 1970's in Denmark. Therefore, the EIA system in Denmark has two tracks: one integrated into the environmental permit system, and one integrated into the planning system. The Danish implementing principle was that the system existing beforehand should be changed as little as possible. But besides this the Danish EIA system is in many ways a standard EIA procedure [19].

1. The Danish EIA system is an implementation of an EU directive. The EU directive sets out the general aims and stipulates a number of requirements. As the EIA directive is a minimum directive it even allows the member states to go further than the requirements in the directive. Each member country decides for them how to implement the directive in their national legislation. The Danish Government, at all levels, is responsible for that actual implementation fulfils the requirements of the directive.

2. The EU directive prescribes in its Annex 1 which type of major projects should always be subject to an EIA. Annex 2 lists other type of projects that might have significant impact on the environment. Denmark has implemented the directive in such a way that all projects in Annex 2 must be screened for significant environmental impacts, using the criteria in Annex 3 to assess the impacts. But there is one general exemption from this: The directive will not be in force in cases where projects are approved through a specific act of national legislation. The article in the directive has been made on request of the Danish government because a directive that restricts the work of the Danish Parliament (Folketinget) is contradictory to the competence of the Danish Parliament. When a project is proposed through a specific act in the Parliament it is exempted

from the EIA procedure. On the other hand it is anticipated in the directive that the same assessments will be executed and the same information made available during the legal process. There are no rules regarding which type of projects can be approved by specific acts, but normally these acts deal with highways and other infrastructure projects.

3. The EIA competence is normally located at the regional council level. In most cases, the competence to issues other necessary permits is also at the regional council level. But not always, for example environmental permits for minor industries are located at the local council level. But the coordination between the regional councils and the local councils seems to be working rather smoothly. Further, it is not always the regional council that has the responsibility for the EIA process. For example the Ministry of Transport is responsible for projects on the sea, and in case of projects that requires a 'Country-Planning Directive' the responsibility is within the Ministry of Environment. The integration with the existing planning system and environmental permit system is secured by stipulating in the relevant statutory orders that for projects subject to an EIA the other permits may not be issued before the EIA permit is given.

4. Compared to the three other countries a special aspect of the Danish system is that it is the authorities that are responsible for preparing the EIA report. The authorities use information obtained from the project proponent, but writing the final report is the responsibility of the authorities.

5. The possibilities for public participation are legally secured in different steps of the EIA process. If a project is subject to an EIA a short hearing phase is mandatory in the scoping phase to allow the public to come with ideas and suggestions. After the draft EIA report has been prepared, it has to go through a public hearing phase of no less than eight weeks. After the public hearing phase, the raised objections have to be processed, and a final decision has to be taken by the regional council. The decision has to be made public with a motivation for the decision and a guideline for how to object on the decision. The timeframe for complaining is four weeks. Before the regional plan amendment is final approved by the politicians there shall be a public hearing about the project. After the regional council has approved a regional plan proposal it shall be published and comments to the plan have to be given within eight weeks.

EIA of the highway from Herning to Århus

In 1990, the Danish Parliament adopted a construction act regarding the establishment of three major roads in Denmark. One of the roads was a 75 km. high-class road Herning-Silkeborg-Århus. This road is problematic from an environmental point of view as the nature around Silkeborg is one the most beautiful areas in Denmark, and contains a number of legal protected areas, among others the valley of Denmark's biggest stream: the Gudenå. An EIA was prepared for the road and published in 1992 by the Directorate of Roads [20]. An analysis showed that the expected issues from general high way guidelines were covered by the report. The EIA recommended as a least destructive alternative that the road should cross the Gudenå valley North of Silkeborg. In January 1993, a proposal for a Construction Act (anlægslov) was sent to the Parliament, but later that month there was a change of Danish Government. The new coalition government wrote into its 'Statement of government' (regeringsgrundlag) that no roads would be built through legal protected areas. As a consequence the stretch around Silkeborg crossing the Gudenå Valley could not be built. But it was decided to build the rest of the road as a four-lane highway.

In 1996, the Directorate of Roads initiated an investigation of different alignments of the road through or around Silkeborg (but not the earlier Northern alignment). The report was completed in 1998, and in late 1998 and early 1999 and number of public meetings about the alignment was conducted. At the public meetings – especially a public meeting attended by the Minister of Transport is said to have been important [21] - it became clear that the citizens of Silkeborg were very much against a highway through the forests close to Silkeborg. They preferred the Northern alignment. In early 2000, it was decided to undertake a thorough EIA assessment of two alternatives: the Northern alignment and an alignment through Silkeborg following the trace of the existing ring road. The

EIA report was published in August 2002, and a number of public hearings were conducted [22]. The EIA reports consisted of a main report integrating all the findings, a report describing the environmental assessments, a report containing visualisations, and a CD with visualisations of each of the alternatives. This material has been handed out for free from town halls and public libraries in the area. Further, the reports can be downloaded from the website of the Directorate of Roads.

The reports describe the two main alternatives: a four-lane highway through Silkeborg and a four-lane highway North of Silkeborg and their environmental consequences. Within each of the main alternatives a number of sub-alternatives were investigated. The reports seem to be thorough and well-written documents. We have interviewed a number of the affected parties, including the Danish Association for Conservation of Nature, a NGO with high professional capacity, and everybody has praised the reports as very thorough and informative in relation to the issues dealt with.
What has been criticised, though, is the absence of a thorough analysis of a railroad from Århus to Silkeborg as an alternative solution.

Public participation: Throughout the process a number of public hearings have been conducted, and citizens have had possibilities to object. In the public hearing phase of the year 2002 EIA report, three public meetings with a total of 830 participants were conducted, and according to the Directorate of Roads (DOR) they have received around 100 written objections towards the project. As far as we can assess relevant objections from the public during the public hearing phase has influence on the final design of the road:

1. If a citizen during the public hearing phase proposes an alignment of the road that has not been considered earlier, and claim that this alignment has fewer problems than the other possibilities, DOR investigates the proposal, and prepares a short report on the alternative. DOR prefers to have considered all the alternatives in advance, as 'that is their job', but in some cases citizens have proposed alternatives not earlier considered [23], and DOR has investigated the proposal.
2. Many of the objections are related to very specific problems. For example, a lady during the public hearing process wrote to DOR and claimed that a small wetland area South of the village Voel, where the proposed alignment of the highway would cut through the Southern corner, was used for recreation and educational purposes. DOR had not been aware of the use of the wetland during the planning process. As a consequence of the new knowledge DOR will probably move the highway somewhat, so the highway does not cross the wetland [24]. During our interviews in the area we were told about a number of examples where DOR had made adjustments to the project, to meet the demands of one or a few households – changing the slope of an embankment to hide the highway from the views of a farm house, adding noise-barriers at a short stretch and so on.

All the stakeholders we interviewed found that the EIA process had been useful and that it had provided a lot of information.

DISCUSSION

Importance of political process

There seems to be a lot of evidence for the EIA procedure is implemented in a way consistent with the political culture in each country. For example, the requirements and possibilities for public participation during EIA processes in Thailand and Malaysia are quite limited, as are the possibilities for public participation in these countries in general. But it also seems that the EIA procedure can work as a vehicle for introducing more public participation in EIAs in the two countries, because there is some sort of pressure for living up to standard EIA procedure, where public participation is an important element. In South Africa, it seems that the amount of public participation changed when the majority government came into charge. The public participation in EIA's is also an indicator for possibilities for public participation in general.

Participation

The legal prescriptions for public participation in the four countries are quite different, and the way they are implemented even more different. In Malaysia, public participation is required in the EIA handbook as means to improve project

design, whereas the public have only limited possibilities for commenting on the project itself. Further, the conditions in the final decision are not accessible for the public. The case study showed that the affected people during the preliminary EIA were questioned about their conceptions of how the road would affect them. We will characterise the public participation process in this case as instrumental public participation. In South Africa, the legal prescriptions for public participation were quite imprecise, only stating that some form for public participation was required. But the actual public participation in the case study was very extensive, and used methods that allowed people without many resources to express their views. Furthermore, the views of the public seemed to have great influence on the final decision. That is, a public participation process, that we will characterise as democratic participation. In Denmark, the requirements for public participation in the EIA procedure is very precise, but they are implemented in a way so that it requires quite some resources to participate in the process: ability to read the formal documents and ability to express one's views at public hearings or formal letters to the authorities. But the case study showed that the public participation had been quite extensive, and had had quite some influence on the detailed design of the project.

Relation to surrounding legislation

Denmark has a complicated system, but it is consistent. South Africa has a dual system that isn't consistent. Malaysia and Thailand seems to have the EIA as the only integrative system.

Scope of EIA assessment

Analysis of the EIA reports has shown that they in a number of areas cover the same issues. For example, they all include a study of the loss of valuable ecosystems and of change of land use. But there are also a number of differences between the EIA reports, which are quite illustrative towards what is perceived as environmental problems in the four countries (see Table 1). The South African EIA includes an analysis of the impact on the road on 'security from intrudes', which is connected with the serious security problems in South Africa; but security from intruders is not included in any of the other countries, because this isn't considered a problem in these countries. The Danish EIA includes two issues not included in any of the others: increased emission of green house gases and the saving of time for traffic. Green house gases became an issue in Denmark already in the late 1980s, and national policy goals was adopted at that time, even though the international political discussions about binding targets for reduction of green house gas emissions was only just started at that time. So the inclusion of green house gas emissions in the Danish

EIA report was probably due to the national policy goals, which were adopted due to the linkages between an international scientific discussion about green house effect, and the Danish policy process. None of the other EIA studies include impact on green house gas emissions even though those studies were done some years later, and the international political discussion about green house gases had developed considerably in the meantime.

Table 1. Comparison among EIA reports of roads. The coverage of selected environmental issues in the case studies of Malaysia, South Africa, Thailand and Denmark.

Selected environmental issues	Malaysia 1996	South Africa 1998	Thailand 2002	Denmark 2002
Increased emission of greenhouse gases	No	No	No	Yes
Quality of surface water	Yes	No	No	Yes
Light Pollution	No	Yes	No	Yes
Saving of time for traffic	No	No	No	Yes
Security from intruders	No	Yes	No	No
Public transport as alternative to the road	No	Yes	No	No
Aesthetic considerations	No	Yes	Yes	Yes

The issues selected are the ones where there are differences between the four countries. Yes indicates that the environmental issue is dealt with in the EIA report; No indicates that it is not dealt with.

REFERENCES

1. Wood, C (1995). *Environmental Impact Assessment. A Comparative Review.* Longman Scientific & Technical. pp 337.
2. Lund, S. (1990). *Efficiency or Empowerment? A Meta-theoretical Analysis of the Concept of Participation.* In Signe Arnfred & Agnete Weis Bentzon (ed.): *The Language of Development Studies,* New Social Science Monographs/Nyt fra Samfundsvidenskaberne. København, pp 163-191.
3. Environmental Quality Act (1998) (Act 127) & subsidiary Legislations. Compiled by Legal Research Board. International Law Book Services. Kuala Lumpur.
4. Department of Environment (DOE) (2000). *A Handbook of Environmental Impact Assessment Guidelines.* Department of Environment, Ministry of Science, Technology and the Environment, Malaysia.
5. Institute of Advanced Studies: Planning for Environmentally Sound Development in Malaysia in Kanniah, R. (1999). *An analysis of the laws relating to environmental impact assessment in Malaysia with specific reference to federal-state jurisdiction.* A dissertation submitted to the University of Malaya in accordance with the requirements for the degree of LL.M in the Faculty of Law. 330 pages. Available at the Law Library, University of Malaysia.
6. Kanniah, R. (1999). *An analysis of the laws relating to environmental impact assessment in Malaysia with specific reference to federal-state jurisdiction.* A dissertation submitted to the University of Malaya in accordance with the requirements for the degree of LL.M in the Faculty of Law. 330 pages. Available at the Law Library, University of Malaysia.
7. Interview Fauzi M.J.M (2002), Executive Director, Prof. Dr., CEO of UKM, Pakarunding Sdn. Bhd. (Consultant Branch), Universiti Kebangsaan Malaysia.
8. Sahabat Alam Malaysia (2000). *Malaysian Environment –Alert 2001.* Sahabat Alam Malaysia, Malaysia.
9. Department of Environment (DOE) (2000). *A Handbook of Environmental Impact Assessment Guidelines.* Department of Environment, Ministry of Science, Technology and the Environment, Malaysia.
10. 10 Interview Fauzi M.J.M (2002), Executive Director, Prof. Dr., CEO of UKM, Pakarunding Sdn. Bhd. (Consultant Branch), Universiti Kebangsaan Malaysia.
11. Republic of South Africa (1997). *Environmental Impact Assessment Regulations (Environment Conservation Act 1989).* Nos.R 1182-1184. Government Gazette, 387, no 18621, 5 September 1997.
12. Republic of South Africa (1997). *Environmental Impact Assessment Regulations (Environment Conservation Act 1989).* Nos.R 1182-1184. Government Gazette, 387, no 18621, 5 September 199713. Department of Environmental Affairs and Tourism (DEAT) (1998). *Guideline Document. EIA regulations.* Implementation of section 21, 22 and 26 of the environment conservation act. 48 pp. South Africa.
13. Interview Mohamed, A. (2001). Environmental Officer, Environmental Impact Management Unit, Department of Environmental and Cultural Affairs and Sport, Western Cape Province, South Africa.
14. Yap, N.T. (1994). *Environmental Assessment: The process in Thailand and Canada.* In: Environmental assessment and development. Edited by Robert Goodland and Valerie Edmundson. The World Bank symposium.
15. Yap, N.T. (1994). *Environmental Assessment: The process in Thailand and Canada.* In: Environmental assessment and development. Edited by Robert Goodland and Valerie Edmundson. The World Bank symposium.
16. Department of Highways (1998). *Engineering and economic feasibility study, Final Report.* Phase I. 3 Volumes. Ministry of Transport and Communication, Kingdom of Thailand.
17. Miljø og Energiministeriet (2001). *VVM-vejledning – om visse offentlig og private anlægs indvirkning på miljøet.* Miljø og energiministeriet (EIA-guideline – on certain public and private projects effects on the environment).
18. Vejdirektoratet (1992). *Vejen og Miljøet.* Motorvej Herning - Århus. (The Road and the Environment. The Highway Herning-Århus).
19. Interview Würtz, J. (2002). Vice-major, former major, Silkeborg Municipality.

20. Vejdirektoratet (2002). Motorvej Herning – Århus ved Silkeborg. VVM-redegørelse. Hovedrapport (The Highway Herning Årus around Silkeborg. EIA report. Main report.).
21. Interview Munch, B. (2002). Project Leader, The Directorate of Roads. Denmark.
22. Interview Munch, B. (2002). Project Leader, The Directorate of Roads. Denmark.