ASSESSING THE ECOLOGICAL COMPONENTS IN THE FORESTRY RELATED NORMAL ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORTS IN SABAH

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DECLARATION

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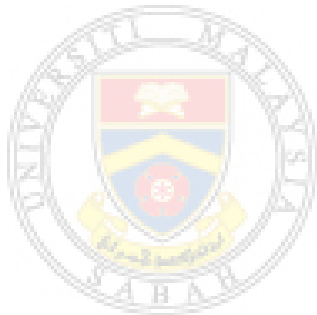
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ABSTRACT

Owing to an alarming commitment in environmental management, Environmental Impact Assessment (EIA) report has been used as a tool to identify, quantify and evaluate the potential impacts of defined actions towards the environment. As there exists data gap in the context of ecological components in the forestry related EIA reports in Sabah, this study intends to investigate the ecological component's inclusion and determine it's shortcomings in the selected EIA reports. Other than that, this study also aims to investigate whether three factors affect the quality of the ecological components in the forestry related Normal EIA, namely legth of EIA report; number of environmental consultants' EIA writing experience; and lastly the year of the report. A total of 40 normal EIA reports, ranging from the year 2006 to 2017, were reviewed in this study. Four main Review Areas were investigated using a modified Lee and Colley's Review Package: (1) description of the development, the local environment and the baseline conditions (2) identification and evaluation of key ecological impacts (3) alternatives and mitigation and (4) communication of results. The results of this study revealed that Review Area 4 showed the best mark among other Review Areas. Strengths to be emphasised in the Review Area include having unbiased information with appropriate emphasis and a clearly written non-technical summary of the main findings of the study. Meanwhile, Review Area 3 is the least performing Review Area solely due to reports lacking of alternatives of project activity. In terms of quality, literature reviews have shown that the alternatives of a project activity is an important element in an EIA report. However, the alternatives of a project activity is not required in the sense of compliance with the local EIA guidelines and handbook published by the Sabah Environmental Protection Department (EPD). It was also found that some factors such as the year of the EIA reports, EIA report length and the number of EIA report writing experience of environmental consultants did not have a significant correlation with the ecological inclusion of the assessed normal EIA reports. Throughout the assessment of the ecological inclusions in the normal EIA reports, some shortcomings identified include the absence of explanations on emission of greenhouse gases due to decomposition of biomass from land clearing; lacking of effort to monitor the existing environment during the operational phase of the project; and also lacks of indicator species survey. These issues require further advancement in the future for the embetterment of the management of forestry related activities, especially in the context of Sabah's EIA.

ABSTRAK

MENILAI KOMPONEN EKOLOGI DALAM LAPORAN IMPAK ALAM SEKITAR (EIA) NORMAL BERKAITAN PERHUTANAN DI SABAH

Disebabkan pengurusan alam sekitar telah mencapai tahap keperluan yang membimbangkan, laporan Penilaian Impak Alam Sekitar (EIA) telah digunakan sebagai alat untuk mengenalpasti, mengira dan mentafsir potensi impak aktiviti yang telah dikenalpasti, terhadap alam sekitar. Memandangkan terdapat jurang data dalam konteks EIA yang berkaitan perhutanan di Sabah, kajian ini berniat untuk mengkaji inklusi komponen ekologi dan juga kekurangan yang terdapat di dalam laporan EIA tersebut. Selain daripada itu, kajian ini juga bertujuan untuk mengkaji sama ada tiga faktor adalah mempengaruhi kualiti komponen ekologi di dalam laporan Penilaian Impak Alam Sekitar Normal, iaitu panjang laporan EIA dan tahun laporan EIA diterbitkan dan pengalaman Perunding Alam Sekitar dalam penulisan Laporan EIA namely legth of EIA report; number of environmental consultants' EIA writing experience; and lastly the year of the report. Sejumlah 40 Laporan EIA Normal, dari tahun 2006 hingga 2017, telah dikaji dalam kajian ini. Empat Bidang Kajian telah dikaji menggunakan Pakej Kajian Lee dan Colley yang telah diubahsuai: (1) huraian mengenai pembangunan, persekitaran tempatan dan keadaan asal (2) pengenalpastian and penilaian impak ekologi utama (3) alternatif dan mitigasi dan (4) penyampaian dapatan kajian. Dapatan kajian ini mendapati bahawa Bidang Kajian 4 menunjukkan markah yang terbaik di antara bidang-bidang kajian yang lain dengan mendapat markah penuh untuk dua Kategori Kajian. Kekuatan yang ditekankan dalam laporan EIA yang dikaji termasuklah mempunyai maklumat yang tidak berat sebelah dengan penekanan yang berpatutan dalam laporan dan juga penulisan ringkasan bukan teknikal yang jelas. Sementara itu, Bidang Kajian 3 adalah Bidang Kajian yang menunjukkan prestasi yang tercorot semata-mata kerana laporan-laporan terbabit tidak mempunyai alternatif untuk aktiviti projek. Dari segi kualiti, kajian literatur telah menunjukkan bahawa alternatif dalam aktiviti projek adalah tidak diperlukan dari sudut pematuhan dengan garis panduan tempatan dan buku panduan yang diterbitkan oleh Jabatan Perlindungan Alam Sekitar (JPAS). Kajian ini juga mendapati bahawa faktor-faktor seperti tahun laporan EIA diterbitkan, panjang laporan EIA dan pengalaman Perunding Alam Sekitar dalam penulisan Laporan EIA tidak mempunyai korelasi yang signifikan dengan inklusi ekologi dalam Laporan EIA. Sepanjang penilaian inklusi ekologi ini, beberapa kelemahan yang telah dikenalpasti termasuklah ketiadaan penjelasan mengenai pelepasan gas rumah hijau akibat pengurangan biomas daripada pembukaan tanah; kekurangan usaha untuk memantau persekitaran yang sedia ada dalam fasa operasi projek; dan juga kekurangan kaji selidik indikator spesies. Isu-isu ini memerlukan pembaikan lanjut di masa yang akan datang untuk kebaikan aktiviti pengurusan perhutanan, terutamanya dalam konteks EIA di Sabah.

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LIST OF ABBREVIATIONS

AEC	Agreement of Environmental Conditions
EcIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EPD	Environmental Protection Department
EU	European Union
DOE	Department of Environment
UK	United Kingdom
USA	United States of America

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CHAPTER 1

INTRODUCTION

1.1   Background of the research

Over the years, there has been increasing studies and efforts in harmonizing the environment, social and economics (Kaur, 2011; Paillé *et al*, 2013; Wagner *et al*., 2002). In continuity to this, an increasing focus has been drawn to the subject of environmental management (Abdul-Sattar, 2007). Among the most extensively used environmental management tool is the Environmental Impact Assessment (EIA) report. It serves as one of the assisting element needed for decision-making process (Barasa, 2014). Malaysia as a developing country is one of the implementing countries of EIA report.

Though EIA report has been continuously showing positive results in tackling the environmental issues in proposed developments, the ability of the theory and actual implementation to merge is still being argued. Some weakness points and critiques have been pointed out by some studies (Jha-Thakur and Fischer, 2016; Khera and Kumar, 2010; Atkinson *et al*., 2000; Kabir and Momtaz, 2010; Lee and Brown, 1992; Ahmed and Abdella Elturabi, 2011). In Malaysia alone, there have also been studies published to assess the quality of the EIA reports (Rahimah, 2014; Vun and Latiff, 1999; Maisarah and Zulhabri, 2014; Vun *et al*., 2003).

One of the subjects of interest for the EIA reports' assessments is the ecological components. According to Rahimah *et al*. (2010), the significance of ecological studies in EIA is to ensure the conservation of biological variation. This is one of the mitigation steps to stabilize and preserve the environment and economic development. The reason for ecology assessment is to determine whether the EIA reports have shown a sufficient level of quality and compliance (Vun and Latiff, 1999) towards the Malaysia environmental laws, legislations, guidelines or handbook.

As forest is rich in biodiversity, it is capable to conserve ecological components such as water and soil. It contains processes that respond to climate change as it holds a large store of carbon which depends on the primary production and ecosystem respiration (Wan *et al.*, 2018). Other than that, the resources from forests are also capable to provide livelihood of human population (Oli *et al.*, 2016).

Ecosystems easily respond to the changes in climate, nutrient loading, habitat fragmentation or biotic exploitation (Franklin Jr. and Pindyck, 2018). Deforestation, whether due to natural or anthropogenic phenomena, also generates potential environmental change which can affect the ecological balance (Santos and Almeida, 2018).

According to Bala *et al.* (2007), increased insolation and also additional increased land surface reflectance will follow after the loss forest because of the occurrence of decreased cloudiness. Other impacts upon the loss of forests include changed in aerosol emissions from contaminated continental atmosphere to the oceans with a subsequent modification of rainfall patterns, alteration of wind behaviour and atmospheric moisture and thus causes precipitation (Aleixandre-Benavent *et al.*, 2018).

In Sabah, it was reported that the loss and degradation of forests is a crisis that is brought up by the industrial logging industry (Bryan *et al.*, 2013). Gunggut *et al.* (2014) concluded three main explanations for the phenomenon of forest degradation in Sabah. The first explanation is the policy and practice of the North Borneo Charted Company (NBCC) and British colonial government on logging and agricultural plantation during post-colonial era. Secondly, it is caused by rapid exploitation of the forests due to global processes such as the interactions of water, air and soil with humans and biosphere. Lastly, is the local socio-political dynamics whereby politicians sought to maintain a patronage network to strengthen their political positions.

In light to the importance of forests and the degradation of forests issues, the specific field of development chosen for the assessment in this study is the forestry related activities. There is no doubt that there is still a large gap in

research or published studies, especially in Sabah, for the ecological component assessment of EIA reports. For this reason, this study is necessary to assess the quality and compliance of the ecological components of the EIA reports in Sabah.

In terms of quality of ecological components, the EIA reports will be assessed by a review package widely used by other researchers. For the compliance of the EIA reports, it will be compared with local guidelines and handbook published by the Environmental Protection Department (EPD).

1.2   Aim and Objective of the research

Considering the data gap that exists on the study of ecological component in EIA reports specifically in forestry activity in Sabah, the overall purpose of this research is to evaluate the quality of inclusion of ecology in the EIA reports in Sabah between the years 2006 to 2017. In order to achieve the foundation of this research, the following specific objectives were established:-

1. To investigate the inclusion of ecological components and examine the ecological components issues contained in the forestry related Normal EIA reports in Sabah.
2. To identify the ecological input shortcomings in the forestry related Normal EIA reports in Sabah.
3. To investigate whether the quality of the ecological component in EIA is correlated with the length of EIA report; number of environmental consultant's EIA writing experience; and lastly the year of the report.

1.3   Significance of the research

The findings of this study will fill in the data gap that exists whereby there has been unknown inclusion of ecological component in forestry related EIAs in Sabah. After knowing the deficiencies identified from the data analysis, this research will thereby fill in the room of improvement needed on the inclusion of ecological components in the forestry activity and the EIA report.

This study needs to be done to look at the ecological inclusion trend of the forestry related EIA reports. It is important to know how far the developers of Sabah have evolved in achieving the goal of taking care of the environment whilst compromising to the legal needs of development.

1.4   Scope of Study

In the assessed EIA reports, there are sub-titles specifically focusing on ecology which is about the living organism community in the proposed project area. However, this study follows the scope of ecology as defined by Barot *et al.* (2019) which is the interactions between organism and between organisms and their environment. Henceof, this study also emphasizes on the criteria which is interconnected with organism such as water, air and soil environment that is described in the assessed Normal EIA reports.

This study is composed of a Review Package contaning four Review Areas (Review Area 1, 2, 3 and 4). The focus of Review Area 1 is the ecological general description of the development. In this Review Area, the existing ecological data in the Normal EIA is assessed. It also covers the consequences and impacts of organisms towards the ecological component such as the number of workers in a proposed project which consequently will determine the approximate amount of trash in the proposed project area. The amount of trash is a relevant issue towards the ecological component due to its potential to pollute the ecological components.

The scope in Review Area 2 introduces the key ecological impact of the proposed project in the Normal EIA report. The assessment done in this Review Area is more in depth towards the magnitude and significance of the ecological components' impacts in the proposed project area. Other topics in this Review Area include some relevant risks from forestry activity which may harm the ecological components as written in the Handbook and Guidelines by EPD, such as greenhouse gases and soil erosion.

In Review Area 3, the alternatives, mitigations and monitorings of the ecological impacts which had been identified in Review Package 2 are being assessed. The scope of Review Area 3 is quite straighforward as the Normal EIA

reports have chapters which are specifically focused on the topics on mitigations and monitorings. The plans and commitments to monitor the ecological components of proposed project is also within the scope in this Review Area.

The last part in the Review Package is Review Area 4 which focuses on the communication of results of the ecological components. The layout, presentation, emphasis and non-technical summary which involves ecological components are assesed.

After the result of the Review Package is analysed, this study focuses on the three factors that has a possibility to affect the ecological components in the proposed project area. The factors include the length of the EIA report; the year of the report; and lastly the number of environmental consultants's EIA writing experience.

CHAPTER 2

LITERATURE REVIEW

2.1   Environmental Impact Assessment
2.1.1   Definition

The Environmental Impact Assessment (EIA) has no acceptable or explicit definition used worldwide. One of the earliest description of EIA was developed in the National Environmental Policy Act of 1969 (NEPA) in the United States which was not a directive piece of legislation but rather a procedural statute (Chazell, 2014). In NEPA, EIAs are similarly described with Environmental Assessment (EA) which meant as concise public document that briefly discusses the purpose and need for an action, and also alternatives to such actions in a development (Bjorkland, 2013). Nowadays, there are many definitions of EIA and some of them are seen in Figure 2.1.

Caldwell (1988)
An early and special phase of a new approach to policy development that incorporates several analytic techniques in a process sometimes called "comprehensive impact analysis."

Barker and Wood (1999)
EIA is a tool that seeks to ensure sustainable development through the evaluation of those impacts arising from a major activity (policy, plan, program, or project) that are likely to have significant environmental effects.

Jay *et al*. (2007)
EIA is the evaluation of the effects likely to arise from a major project (or other action) significantly affecting the environment. It is a systematic process for considering possible impacts prior to a decision being taken on whether or not a proposal should be given approval to proceed.

Drayson and Thompson (2013)
EIA is a process that allows the potential environmental impacts of a proposed development to be determined and appropriate measures to mitigate impacts proposed.

Rahimah (2014)
EIA is a tool that contains environmental concerns in the process of sustainable and management development.

Barasa (2014)
EIA is the most useful tool for understanding and managing the impacts of a particular project. It describes a procedure that must be followed for certain types of project before they can be given 'development consent'.

Figure 2.1: Some definitions of EIA

Figure 2.2: Some definitions of EIA (continued)

No matter how many EIA definitions there is, the common ground where all these definitions merge is that EIA is a kind of monitoring and assessment process that is done before an activity starts, followed with the observation of the impacts during the construction phases and requires a closure report after the activity ends (Elvan, 2018).

2.1.2 Origin and Evolution

Before EIA became a world-wide phenomenon, the first country to enact legislation on EIA was the United Stated of America (USA). This happened back in the year 1970, after the National Environmental Policy Act was established in 1969 (Barker and Wood, 1999). The chronology of EIA and its development in some other countries are seen in Table 2.1.

Table 2.1 Development of EIA

Time Period	Examples of Development
Pre-1970	Initial development • Efforts to protect the environment includes through check lists, guide books, and procedural manuals
Early / mid-1970	Methodological development • EIA introduced through NEPA in 1970 • Several other countries adopted NEPA-based approach such as Canada, Australia and New Zealand
Latter 1970s to early 1980s (Increasing scope of EIA)	Increasing scope of EIA • Use of EIA by developing countries (e.g. Brazil, Phillipines, China and Indonesia) • SIA (strategic Environmental Assessment) and risk analysis included in EIA processes • Greater emphasis on ecological modelling, prediction and evaluation methods • Informational (non-hearing) provisions for public involvement • Coordination of EIA with land use planning processes
Mid-1980s to end of decade	Process strengthening and policy integration • Development of follow-up mechanisms (e.g., compliances and effects monitoring) • World Bank and other international lending and aid agencies establish EIA requirements • Increasing number of developing countries carry out EIAs (e.g., Asia)

Table 2.1 Development of EIA (continued)

Time Period	Examples of Development
1990s	• Towards sustainability • EIA identified as implementing mechanism for UN conventions on climate change and biological diversity • SEA system established by increasing number of countries • Sustainability principles and global issues receive increased attention (some EIA guidance but still limited) • Increasing use of GIS and other information technologies
2000 onwards	• Principles of sustainability are now fully incorporated into any step or stage in the EIA system

Sources: Barker and Wood (1999); Caldwell (1988); Ortolano and Shepherd (1995)

Nowadays, EIA is implemented both in developed and developing countries (Kabir and Momtaz, 2013). On November 2011, a joint research by UNEP, FAO and IUCN indicated that 191 out of 193 member nations of the United Nations either have national legislation or have signed some form of international legal instrument that refers to the use of EIA (Morgan, 2012).

Morgan (2012) also stated that the two countries that did not practice any forms of EIA legislation or instrument were People's Republic of Korea and South Sudan. However, a paper written by Song (2004) had indicated that Korea adopted the EIA system in 1977 with the enactment of the Environmental Conservation Act and later introduced in full scale in 1981 when the "Regulations on Preparing the EIA Report" were legislated. In South Sudan, Elmuntasir and Ahmed (2008) reported in their study that EIA should be undertaken in accordance with the Environmental Policy Act of 2001 under section 9.

Although implemented, a hydropower case study in Pakistan, Norway and Sweden by Abdul-Sattar (2011) observed that Pakistan (represents developing country in this case) showed a shortcoming of efficiency in the application and review process; this is due to misconception about the EIA process, which initially receives intense attention but becomes weakened by the time of implementation. Rooms of improvements in EIA implementations are needed as Veronez and Montano (2015) stated that the concepts and approaches of EIA are in a constant state of evolution.

As one of the many developing countries, Malaysia was one of the second generations of Asian countries that enacted the Environmental Quality Act in 1974 (Memon, 2000). The responsible agency for EIA in Malaysia is the Department of Environment (DOE). Any EIA study must be conducted by consultant agencies that are registered with DOE under the EIA Consultant Scheme (Swangjang, 2018).

The decision of implementing EIA has been extended to the state of Sabah whereby the Environment Protection Department (EPD) and DOE jointly share the responsibility to administer the EIA system in Sabah (Moduying, 2007). The EPD and DOE are responsible to implement EIAs covered by the Environment Protection Order (Prescribed Activities) 2005 and Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015, respectively.

2.2 The Purpose of EIA

Being one of the oldest and most mature tools in environmental management, EIA serves as a merger for the environment and development (Abdul-Sattar, 2007). According to Jay *et al*. (2007), the purpose of EIA is to supply decision-makers on the environmental consequences from the actions of the developers.

Carroll and Turpin (2002) described EIA as a contributor to environmental risk assessment and identifying hazards at the design stage provided that the information supplied is in a transparent and systematic way. Therefore EIA plays a critical part to reduce or avoid the potential significant environmental impacts identified from projects, programs and legislative actions (Mareddy, 2017).

This encourages more environmental compatible actions in planning and decision making prior to, during and even after the project ends. According to Mareddy (2017), the types of environmental impacts which EIA wants to identify include some of the following:

- Beneficial or detrimental

- Naturally reversible or irreversible

- Repairable via management practices or irreplaceable

- Short term or long term

- Temporary or continuous

- Occurring during construction phase or operational phase

- Local, regional, national or global

- Accidental or planned (recognized before hand)

- Direct (primary) or indirect (secondary)

- Cumulative or single

It is important to note that the objective and aim of and EIA may vary according to situations and nature of a project. Some variables include social parameters, cultural parameters, and requirement and need of the proposed activity of development. Nonetheless, the book by Mareddy (2017) stated that there are three types of tools to solve EIA's purposes into an effective projection. The three tools are management-based tools, process-based tools and product-based tools (Table 2.2).

Table 2.2: Tools of preventive management

Management-based tools	Process-based tools	Product-based tools
Environment management system	Environmental technology assessment	Industrial ecology
Environment performance evaluation	Toxic use reduction	Extended producers responsibility
Environmental audits	Best operating practices	Eco-labelling
Environmental reporting and communication	Environmentally best practice	Design for environment
Total cost accounting	Best available technology	Life cycle assessment
Law and policy	Pollution prevention	
Trade and environment	Cleaner production	
Environmental economics	Clear technology	
	Eco-efficiency	

Source: Mareddy (2017)

From the purposes that had been highlighted by the studies mentioned, EIA is supposedly an impact reduction or avoidance mechanism to preserve the environment. However, the purposes mentioned are only relevant if the environmental preservation measures stated in the EIA is truly implemented in the project.