

Challenges Allied to the Effectiveness of the Environmental Impact Assessment in the Construction Industry of Sri Lanka

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Abstract: Environmental Impact Assessment is a structured program for evaluating and inspecting environmental factors, in order to support and aid the decision-making or the planning stage of a development process. Basically, this information is used to observe the change that cause to the environment due to the development process and advice the most effective and reasonable methods to reduce the impact to the environment. Considering the last decade Sri Lanka has been positive towards development and towards the Construction industry. Nevertheless, there are numerous environmental concerns that should be addressed due to these developments. EIA procedure emphasizes the possible environmental impacts and methods to reduce these impacts. This study elaborates on the Challenges allied to the Effectiveness of the Environmental Impact Assessment in the Construction Industry of Sri Lanka. The impacts of five main challenges are discussed in this study and also study will provide an insight about the current EIA procedure implemented in Sri Lanka. Both quantitative and qualitative approaches are used to collect data, and these collected data were presented using both numerical formats by regression analysis and descriptive formats by content analysis. The findings in the study reveal that the challenges discussed in this cause have a significant impact towards the effectiveness of the EIA procedure. The paper concludes with recommendations or strategies to overcome these Challenges.

Keywords: Environmental Impact Assessment, Challenges, Strategies, Construction Industry

1. Introduction

The Construction industry of Sri Lanka is a prominent industry that assists the development of the country. It contributes 7% to the Gross National Income of the country. The construction industry plays a key role when it comes to employment by contributing a potential 6-10% to the country's total labour force. The report on Economic and Social Statistics in Sri Lanka 2019 prepared by the Central Bank of Sri Lanka identified 17 industries that directly contribute to the National Economy out of which the Construction Industry is Ranked 1 (Wijsekara, 2020). Since the elimination of terrorism from the country which lasted nearly 30 years, Sri Lanka has taken a huge leap forward when it comes to construction. For an Example Colombo Port City, Hambantota Harbour and The Southern Expressway are some of the major developments taken place during the past two decades. Even though these developments attract foreign investments, increase the living standard of people and link Sri Lanka to the modern world there are some negative impacts from these developments mainly to the Environment. These Environmental issues are caused due to Construction finally generate the interest and concept of sustainable Construction, Where new legislation and laws are introduced in order to influence Construction projects and reduce the impact on the Environment. Environmental Impact Assessment is a good example for such legislations.

Principle 17 of the Rio Declaration on

Environment and Development (1992) refers to EIA as a national instrument which “shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment”. EIA procedure was introduced by USA in 1969 and then it was extended and introduced throughout the world. EIA was introduced to Sri Lanka in 1988 through the National Environment Act and it acts as an effective tool that integrates Environmental consideration into different development projects in Sri Lanka. But Sri Lanka is faced with many constraints when instituting EIA arrangements. There are many factors that affect the effectiveness of the EIA procedure in developing countries and these challenges must be avoided in order to create and increase the Sustainability of a construction project. Therefore the main aim of this study is to identify the challenges that are allied to the effectiveness of Environmental Impact Assessment in the Construction Industry of Sri Lanka and to suggest strategies in order to design construction projects in harmony with the Environment.

2. Literature Review

A. Environmental Impact Assessment

According to United Nations Environment Programme publication on "Environmental Impact Assessment and Strategic Environmental Assessment: Towards an Integrated Approach" by Abaza, Bisset and Sadler (2004) states that Environmental Impact Assessment is a structured program for evaluating and inspecting environmental factors, in order to support and aid the decision making or the planning stage of a development process. The Review of Implementation of the Rio Principles (2011) defined Environmental Impact Assessments (EIA) as a decision-making process and assessment that provides a systematic, accountable evaluation of the potential environmental threats if the proposed development takes place.

B. Effective Environmental Impact Assessment

Most of the studies that are related to Effective Environment Impact Assessment propose components or pillars that an effective EIA should possess. according Leu, Williams and Bark (1996)) an Effective Environment Impact Assessment should contain "Environmental policies, Regulations & Guidelines, Environmental administrative framework, EIA procedure, Role of actors involved, Status of EIA reports, EIA compliance monitoring and enforcement, EIA implementation in Practice, Implementation of Strategic Environmental Assessment (SEA) and International interactions". Out of nine components seven are domestic components and two are international components. Mentioned pillars were the base of identifying the challenges discussed in this study.

C. Challenges to effective

Environmental Impact Assessment

Problems in ensuring adequate public participation According to Zubair (2001), the limited period on commenting about the development project is not sufficient. Because most of the complex projects need more time for public hearing. And most of the general society is not aware of Environment Impact Assessment. The second issue is about the language barrier because most of the EIA reports are printed in English. Therefore EIA report must interpret and printed in a convenient language.

D. Inadequate technical and managerial resources to implement EIA

The EIA process merely relies on the judgement of the EIA consultant. But the practitioners have few drawbacks when performing the EIA procedure. According to this study project proponent can influence the EIA consultant to create a report in favour of the development process. The unethical behaviour of EIA practitioners imposes a negative impact on the EIA procedure (Zubair, 2001) *Inefficient EIA implementing and monitoring techniques* Glasson, Therivel and Chadwick (2005) point out developing countries as less interest in EIA implementation,

Because of limited number of EIA institutions and technical capabilities. At a primary level, effective EIA implementation and monitoring depends on the influential level of political commitment, financial support, public trust and participation, convenient environmental policy framework, proper institutional arrangements.

E. Challenges in enforcing Laws for Environmental Impact Assessment

There is a need for legal enforceability but there are some loopholes by which project proponents circumvent EIA. Some developers bypass the EIA procedures and implementation using these loopholes (Zubair, 2001). Sosovele (2011) conduct a research on how the EIA process has become effective with a focus on accountability in the implementation of the law. This study has compared the differences and effectiveness of the EIA procedure after the EIA laws are implemented.

F. Less transparent Environment Impact Assessment procedure

Zubair (2001) this study on EIA procedure in Sri Lanka, accordingly transparency in the EIA process is vested on the prepared EIA report, but in order to prepare a transparent EIA, accessible Environmental data should be available. Lack of environmental data creates a short circuit process.

3. Methodology

The main aim of this research is to identify the Challenges allied to the effectiveness of Environmental Impact Assessment in the Construction Industry of Sri Lanka. To understand the main aim a mixed method of quantitative and qualitative methods are highly appreciated. As a Quantitative approach Regression Analysis has been conducted and as an qualitative approach Content Analysis has been used because it gives a comprehensive picture about this study.

A. Conceptual Framework

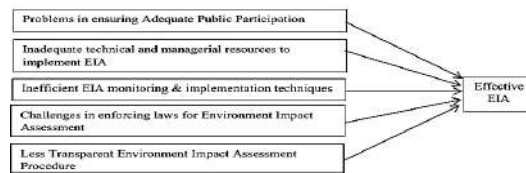


Figure 1: Conceptual Framework

Leu, Williams and Bark (1996) as mentioned 7 pillars that an effective EIA should possess based on those pillars, challenges for an effective EIA has been pick out for this study. The above conceptual frame work reflects it in a scientific manner

B. Data Collection Methods

A structured questionnaire is distributed among 50 Construction professionals and EIA consultants, and in order to gain an expert point of view about this study several open-end face to face interviews are conducted with 10 EIA consultants

C. Data Analysis Methods

Table 1: Data Analysis Methods

Objectives	Data Collection	Data Analysis Technique
To identify the impact of challenges that affect the Environmental Impact Assessment procedure, in the context of the Sri Lankan Construction Industry.	Questionnaire	Regression Analysis
To understand the effectiveness of the current EIA implementation mechanism in Sri Lanka.	Questionnaire Structured Interview	Content Analysis
To identify the strategies that should be taken in order to increase the effectiveness of the Environmental Impact Assessment.	Structured Interview	Content Analysis

4. Results and Discussion

This chapter addresses and analyses the findings of this study conducted under the topic "Challenges allied to the effectiveness of the Environmental Impact Assessment in the Construction Industry of Sri Lanka". Accordingly, a questionnaire was distributed among 50 EIA consultants and Construction professionals with significant knowledge about Challenges that affect the current EIA implementation mechanism and the questionnaire is used to analyse the main objective of this study. Based on the below pie chart 40% of the respondents are Engineers, 26% of the respondents are EIA consultants, 22% of the respondents are Quantity surveyors, 8% of the respondents

are Architects and finally 4% of the respondents are Project Managers

regression analysis are tested and elaborated below.

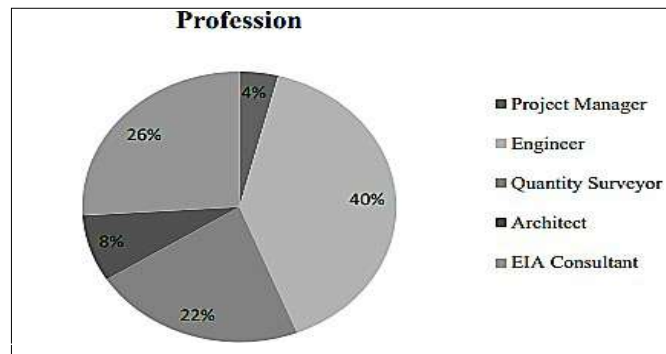


Figure 2: Profession Experience in the construction industry and building

A. Attainment of Main Objective

The main objective of this study is to identify the challenges that affect the Environmental Impact Assessment procedure, in the context of the Sri Lankan Construction Industry. In order to gain a general view about these challenges, a question was included in the questionnaire to identify the perception of respondents. Out of 50 respondents, 44% strongly agree and 42% agree that the fact that 'Problems in ensuring adequate public participation will affect the effectiveness of the EIA', 34% strongly agree and 44% agree that 'Inadequate technical and managerial resources to implement EIA will affect the effectiveness of the EIA', 24% strongly agree and 52% agree that 'Inefficient EIA implementing and monitoring techniques will affect the effectiveness of the EIA', 34% strongly agree and 30% agree that 'Challenges in enforcing laws for Environment Impact Assessment will affect the effectiveness of the EIA' and 30% strongly agree and 44% agree to the fact 'Less

transparent Environmental Impact Assessment procedure will affect the effectiveness of the EIA'. These percentages clearly signify that the above challenges will cause an impact on the EIA procedure. Therefore, in order to identify the level of impact, a correlation analysis and a

B. Correlation Analysis

Correlation is tested to emphasize the relationship between the independent variable and the dependent variable. The relationship between the dependent and independent variables is illustrated using the Significance value (p) which, $P < 0.05$ - the dependent variable has a relationship with the independent variable; $P > 0.05$ - the dependent variable has no relationship with the independent variable. The projects involved give an insight about the particular respondent. Based on the questionnaire, 30% of the respondents are with 15-20 years of experience followed.

Table 2: Correlations

Correlations							
		AVGA	AVGB	AVGC	AVGD	AVGE	AVGF
AVGA	Pearson Correlation	1	.589**	.548**	.478**	.502**	-.526**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000
	N	50	50	50	50	50	50
AVGB	Pearson Correlation	.589**	1	.550**	.438**	.493**	-.554**
	Sig. (2-tailed)	0.000		0.000	0.001	0.000	0.000
	N	50	50	50	50	50	50
AVGC	Pearson Correlation	.548**	.550**	1	.553**	.281*	-.365**
	Sig. (2-tailed)	0.000	0.000		0.000	0.048	0.009
	N	50	50	50	50	50	50
AVGD	Pearson Correlation	.478**	.438**	.553**	1	.621**	-.398**
	Sig. (2-tailed)	0.000	0.001	0.000		0.000	0.004
	N	50	50	50	50	50	50
AVGE	Pearson Correlation	.502**	.493**	.281*	.621**	1	-.578**
	Sig. (2-tailed)	0.000	0.000	0.048	0.000		0.000
	N	50	50	50	50	50	50
AVGF	Pearson Correlation	-.526**	-.554**	-.365**	-.398**	-.578**	1
	Sig. (2-tailed)	0.000	0.000	0.009	0.004	0.000	
	N	50	50	50	50	50	50

** . Correlation is significant at the 0.01 level (2-tailed).
 * . Correlation is significant at the 0.05 level (2-tailed).

Where;

AVGA- Average of independent variable "Problems in ensuring Adequate Public Participation"

AVGB- Average of independent variable "Inadequate technical and managerial resources to implement EIA"

AVGC- Average of independent variable "Inefficient EIA monitoring and implementation techniques"

AVGD- Average of independent variable "Challenges in enforcing laws for Environmental Impact Assessment"

AVGE- Average of independent variable "Less transparent Environment Impact Assessment Procedure"

AVGF- Average of dependent variable "Effectiveness of Environmental Impact Assessment"

The above table represents the relationship between the independent variables (Problems in ensuring adequate public participation, Inadequate technical and managerial resources to implement EIA, Inefficient EIA monitoring and implementation techniques, Challenges in enforcing laws for Environmental Impact Assessment and Less transparent Environment Impact Assessment procedure) and the dependent variable effectiveness of EIA. According to the above table, all the independent variables shows a negative and

moderately strong relationship and a significant values less than 0.05 which means the alternative hypothesis cannot be rejected. Therefore it confirms that there is a relationship between the dependent variable and the independent variable.

C. Regression Analysis

Regression Analysis is conducted to identify the impact of the Challenges that are allied to the effectiveness of Environmental Impact Assessment in the Construction Industry of Sri Lanka. This makes all the independent variables comparable & standardized.

Table 3: Regression Analysis

Coefficients ^a					
Model		Unstandardized Coefficients		Standardized Coefficients	Sig.
		B	Std. Error	Beta	
1	(Constant)	4.597	0.538		0.000
	AVGA	-0.183	0.151	-0.186	0.233
	AVGB	-0.230	0.139	-0.254	0.105
	AVGC	-0.033	0.095	-0.055	0.731
	AVGD	0.056	0.124	0.075	0.652
	AVGE	-0.278	0.114	-0.391	0.019

a. Dependent Variable: AVGF

Considering the above table regression model can be explained as follows.

$$Y = \alpha - \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + \beta_5x_5 + \text{Std. E}$$

$$E Y = 4.59 - (AVGA * -0.183 + AVGB * -0.230 + AVGC * -0.033 + AVGD * +0.56 + AVGE * -0.278) + \text{Std. E}$$

The table shows a negative impact when considering the

Beta value for the first independent variable Problems in ensuring Adequate Public Participation as -0.183. More elaborately it states that effective Environmental Impact

The Beta value of inadequate technical and managerial resources to implement EIA is -0.230. More elaborately it states that effective Environmental Impact Assessment can be achieved by reducing challenges regarding inadequate technical and managerial resources to implement EIA by 23%. And also it shows a negative relationship.

The Beta value of Inefficient EIA monitoring and implementation techniques is -0.033. More elaborately it states that effective Environmental Impact Assessment can be achieved by reducing challenges regarding Inefficient EIA monitoring and implementation techniques by 0.03%. And also it shows a negative relationship.

The Beta value of Challenges in enforcing laws for Environment Impact Assessment is 0.056. More elaborately it states that effective Environmental Impact Assessment can be achieved by reducing Challenges in enforcing laws for Environment Impact Assessment by 0.03%. And it shows a positive relationship.

The Beta value of a less transparent EIA procedure is -

0.278. More elaborately it states that effective Environmental Impact Assessment can be achieved by reducing challenges regarding less transparent EIA procedure by 27.8%. And also it shows a negative relationship.

Generally considering above mention Numerical values it is clear that these mentioned challenges will cause a significant impact on the effectiveness of the Environmental Impact Assessment.

Content Analysis is used to analysis the second and third sub-objective which was to understand the effectiveness of the current

EIA implementation mechanism in Sri Lanka and to identify the steps that should be taken in order to increase Effectiveness of the Environmental Impact Assessment.

D. Attainment of Sub-objective1.

The second sub-objective of this study is to understand the effectiveness of the current EIA implementation procedure in Sri Lanka. For that expert opinion from semi-structured interviews and some questions of the questionnaire were used to gather data. Before understanding the current effectiveness let's discuss about general overview on EIA implementation.

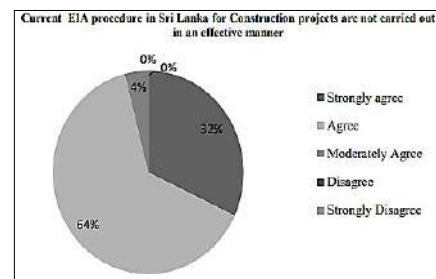


Figure 3: Respondents Perception

This is the perception of the respondents when it comes to the statement in the questionnaire "Current EIA procedure in Sri Lanka for Construction projects are not carried out in an effective manner". The chart signifies that 32% strongly agree and 64% agree to this statement, therefore it is clear that the current EIA mechanism is implemented with many shortcomings. In order to elaborate more on this several experts have discussed certain shortcoming of the current EIA implementation these shortcoming are discussed and analysis under the following section Policies and Acts related to EIA and the EIA process in Sri Lanka

1. Policies and Acts related to EIA

Fauna and Flora Act; According to the EIA experts interviewed for this study EIA process under Fauna and Flora protection ordinance is the most effective procedure of all three Acts

but it is implemented very rarely but the all the instances where the Environmental Impact Assessment is conducted under section 9A of Fauna and Flora protection ordinance is up to a Satisfactory level but it is conducted very rarely therefore the expected effectiveness cannot be achieved.

Coast Conservation Act; Considering the Experts' point of view most of them implies that the EIA procedure under Coast Conservation Act has several shortcomings. For example under provisions of section 16, the EIA process is not mandatory it is but it is 35 discretionary therefore it will directly affect the transparency of the project and it is not effective and not very satisfactory.

National Environmental Act; Most EIA experts interviewed during this particular study emphasize several shortcomings of this act such as if a given project is rejected then the project proponent can appeal against the decision, but if a project is approved and the people who made comments are not satisfied with the decision, they (people who made comments) have no right of appeal therefore it is lopsided procedure implemented under the National Environment Act. The next shortcoming or the deficiency in the EIA process is that when a project is approved and then it is change during the construction phase there is no quick mechanism to undo the wrongdoing and to take necessary action against the project proponent. The third shortcoming that most EIA experts stated is that even though there is an EIA process and IEE Process there is no clear demarcation for what projects should procedure with an IEE process and what project should procedure with EIA, therefore there is scope of manipulation in order to bypass the public participation procedure and get an unscrupulous approval.

2. EIA process in Sri Lanka

Screening; Most of the expertise responded that the screening process conducted in Sri Lanka is satisfactory

Environmental Scoping; According to most EIA experts are missing areas related to the

EIA which have not been identified and covered by the TOR (Terms of Reference). Even though the EIA consultant warns the client that certain aspects are not covered by the TOR, the client will suggest the EIA consultant to undergo the scoping process according to the TOR because by including more new items to the scoping process is an additional cost to the Client.

EIA Report Preparation; Most of the EIA Experts interviewed emphasize time duration allocated to prepare an EIA report is not sufficient. Basically the project proponents (client) will request to faster the report preparation process in order to get early approvals and start the construction phase this factor will also affect the standard of the EIA Report. Other than above mention shortcoming EIA experts interviewed mention several shortcomings such as Some EIA reports include irrelevant information confusing the reviewing bodies and the public and making it cumbersome, the translation to the Sinhala language from the English language is furthermore horrendous.

Public Participation & Evaluation of the Report; considering the responses to the questionnaire and the interviews the current public participation is an ignored component. There are several NGOs and Environment activists who speak up against Environmental destruction but most of them involve only in some interested projects because it helps to increase their fame and the attention towards them. Even some projects Project Proponents (client) advice EIA consultants to ignore the Public Participation because it will create chaos during the planning stage.

Decision Making; According to most EIA experts this is a controversial area, considering government projects there is a significant influence to the CEA and the Project Approving Agency to approve the particular project at any cost, because most of the projects are funded by using International loans therefore the government will influence to prepare

necessary approvals quickly by giving less priority to the environment.

Compliance Monitoring; considering the responses via Semi-Structured interviews, this stage is the most ineffective and less likely implemented. Mainly because there is no proper implementing and monitoring procedure to check whether allocated mitigation measures are implemented or not and the budget allocated for the monitoring process is not sufficient or the allocated budget is not used for the implementing or compliance monitoring.

A. Attainment of Sub-objective 2.

The next objective of this study is to identify the strategies that should be taken in order to increase the effectiveness of the Environmental Impact Assessment. These strategies are categorized under the following topics.

1. Ensuring Adequate Public Participation; to overcome these Difficulties interviewed experts mentioned several strategies such as Increase the accessibility of EIA reports to the public, Involve the public during EIA decision making, Reviewing and implementation and compliance monitoring.

2. Provision of adequate technical and managerial resources to implement EIA; upgrade human resources outside the government, introducing regular EIA training programs for responsible EIA actors will upgrade the knowledge about EIA.

3. Efficient EIA Implementing and Monitoring Techniques; Allocating a considerable amount of the construction budget in order to implement compliance monitoring, implementing a formal EIA compliance monitoring program carried out by the core environmental agency and competent authorities, formal EIA compliance implementing and monitoring program carried out by the core environmental agency and competent authorities must be included to the NEA because it increase the formality of the Monitoring process.

4. Enforcing laws for Environment Impact Assessment; The NEA and the Coast

Conservation Act must be amended to make it a more inclusive process and to make it a more efficient and effective process, there should be a clear demarcation between what projects needed an EIA and what projects needed an IEE, Then the Coast Conservation Act should be amalgamated with the National Environment Act but not to be mutually exclusive as it is in the present and Finally the right of appeal should be given to both parties.

5. Transparent Environment Impact Assessment Procedure; EIA experts suggest by decreasing the third party involvement will increase the effectiveness of the EIA process, increase publicity of EIA decisions and results will increase public participation and the next strategy is to the standardized time allocated for the EIA procedure.

5. Conclusion

The main objective of this study is to identify the impact of the challenges that affect the effectiveness of the EIA procedure in the construction industry of Sri Lanka, the results of the regression analysis confirms that by reducing the mentioned challenges (Problems in ensuring Adequate Public Participation by 18%, Inadequate technical and managerial resources to implement EIA by 23%, reducing challenges regarding to Inefficient EIA monitoring and implementation techniques by 0.03%, Challenges in enforcing laws for Environment Impact Assessment by 0.056% and reducing challenges regarding to less transparent EIA procedure by 27.8%) will increase

The next objective of this study is to identify the effectiveness of the current EIA implementation mechanism in Sri Lanka, this includes the Acts and Policies that enforce EIA in Sri Lanka and EIA process implemented in Sri Lanka, according to the experts there are several loopholes in some Acts and Polices which have been discussed. but yet these Acts and policies are sufficient to implement an effective EIA procedure. When it comes to the EIA process there are several shortcomings in each stage, therefore current EIA mechanism

implemented in Sri Lanka is questionable.

The final objective is to identify the strategies to overcome the five main challenges mentioned in this study, accordingly, some experts (EIA consultants) suggest certain strategies that should initiate in order to overcome these challenges. The data is gained through semi-structured interviews was analysed through content analysis.

6. Recommendation

The study covered five main challenges allied to the effectiveness of the Environmental Impact Assessment in the construction industry of Sri Lanka. Therefore the following recommendations will assist in enhancing the effectiveness of the EIA procedure. The first recommendation is to implement a Formal mechanism for appeals and dispute settlement related to EIA recommended to involve independent and competent review bodies in EIA programs and strategy will decentralize the power of the central Environmental Authority, the next recommendation is to Increase public participation throughout the EIA and also by increasing the awareness of the public to participate in the process at the initial stage. Regular EIA training Programs organized/coordinated by the main environmental establishments for responsible officials will increase the knowledge among EIA officials which will be effective during the monitoring and implementation process, by establishing an EIA tracking system and a central database for EIA reports will assist the monitoring stage. The next recommendation is to standardize the EIA procedure, by imposing a proper consultancy registration criteria and initiating annual excellence awards for good EIA practice by consultants and proponents will encourage the project proponents to implement an effective EIA. The considering the findings of this study the final and recommendation most important recommendation is to create a formal Implementation and monitoring mechanism by involving judicial agencies and EIA experts, because the monitoring mechanism is an important component of the EIA process which

proves the effectiveness of the whole EIA process. Therefore these are some of the Recommendations suggested to overcome challenges allied to the effectiveness of the Environmental Impact Assessment in the construction industry of Sri Lanka.

Finally study is limited to five main challenges therefore recommended to identify more challenges other than above mentioned five. Identification of strategies to overcome the mentioned challenges is a sub objective of this study therefore the experts recommend to conduct a research mainly focusing on these strategies how they will affect the effectiveness of the EIA procedure. SEA Strategic Environmental Assessment is implemented around the world and also in Sri Lanka especially for large-scale projects therefore it is recommended to conduct a study based on SEA implementation in Sri Lanka. Another recommendation is to consider a single development or an infrastructure project and evaluate the shortcomings of the EIA process implemented particular project using this study as a based article, which will assist to a deep evaluation about Environmental Impact Assessment.

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Acknowledgment

I would like to offer my sincere gratitude to my supervisor Lt Col (Rtd) TC Kathriarachchi for guiding me throughout the period of this study and the Faculty of Built Environment and Spatial Sciences of General Sir John Kotelawala Defence University for the inspiration and guidance to the betterment of this research.

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