



Master thesis

LEARNING LOOPS IN EIA: Analyzing system-level learning and the contributions of the Netherlands Commission for Environmental Assessment

--The cases of Ghana and the Maldives--

Author: **De Jong, Amos A. MA**

Postal address: Apothekersdijk 34a, 2312 DD Leiden, the Netherlands.

E-mail: amosdejong@gmail.com

Personal phone: 00316 441 958 58

Student#: 3226565

Supervisors at the University: Dr. Runhaar, Hens A.C. and Prof. Dr. Driessen, Peter P.J.

Supervisors at the NCEA: Drs. Kolhoff, Arend J. and Mr. Verheem, Rob

Institution: Utrecht University

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**“LEARNING LOOPS IN EIA: Analyzing system-level learning and the contributions of the Netherlands
Commission for Environmental Assessment: The cases of Ghana and the Maldives”**

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and
the Netherlands Commission for Environmental Assessment

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Statements and conclusions in this report are based on semi-structured interviews with high officials, including government representatives, consultancies, research institutes, CSOs and NGOs in Ghana and the Maldives. A site visit to the Western Ghanaian coast (WAGP project) and a three day site visit to Vilufushi (Vilufushi project) including a public consultation was part of the research as well. This report was never possible without the great support of both the Ghanaian and the Maldivian EPAs. The latter even facilitated work space and provided helpful logistic support which aided the field work process to a great extent. Further support was offered by the Ministries of Environment and Energy (Ghana) and by the Ministries of Environment and Planning (Maldives) which was highly appreciated. Other institutions in both countries not mentioned specifically here were equally helpful and are hereby acknowledged for their support.

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Abbreviations and acronyms

AR	Advisory Review
CA	Competent Authority
CSO	Civil Society Organization
DFID	Department for International Development
DMC	Disaster Management Centre
EA	Environmental Assessment
ECEN	Environmental Compliance and Enforcement Network
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
ELS	Experiential Learning Spiral
EMP	Environmental Management Plan
ESMP	Environmental and Social Management Plan
EP	Environmental Permit
EPA	Environmental Protection Agency
GoG	Government of Ghana
GoM	Government of the Maldives
GPRS	Ghana Poverty Reduction Strategy
IP	Inspection Panel (World Bank)
NCEA	Netherlands Commission for Environmental Assessment
NGO	Non-Governmental Organization
NMFA	Netherlands Ministry of Foreign Affairs
M&E	Monitor and Evaluation
MEC	Ministry of Environment and Construction
MEEW	Ministry of Energy, Environment and Water
MHTE	Ministry of Housing, Transport and Environment
ODA	Overseas Development Administration
RAP	Resettlement Action Plan
PEA	Preliminary Environmental Assessment
SEA	Strategic Environmental Assessment
ToR	Terms of Reference
TRC	Technical Review Committee
WAGP	West African Gas Pipeline
WAPCo	West African Gas Pipeline Company

Summary

Environmental impact assessment (EIA) practices can render learning effects on both the project level –being the physical undertaking like the construction of an oil platform or the reclamation of land– and the system level –being the EIA’ rules, regulations and capacities of the key actors (i.e. the proponent, authorities, civil society agencies and knowledge communities). These learning effects can affect the project proceedings or the organisation at the system level. In low and middle-income countries (LMCs), where EIA systems are rather fragile, donor agencies can stimulate the learning effects directly via focused assistance at the project level or via capacity development programmes aimed at the EIA system. But what about the indirect learning effects leading from EIA projects towards the system? Do donor contributions at the project-level evoke system-level changes?

For an effective development of the EIA system all affecting influences should be clear, including the effects of donor interventions. Where effectiveness studies usually aim at the direct outcome and impacts, this research explores the existence of indirect outcomes in terms of system-level feedback loops. The Netherlands Commission for Environmental Assessment (NCEA) is the expert body central in this study. EIA projects in both Ghana and the Maldives were selected: these are all large-scale projects that were rather new to the local EIA authorities and subject to international attention, which scaffolded learning opportunities. The main research objective was to discover and analyse the cognitive and behavioural changes of key actors that stem from NCEA advisory assistance in these projects. The leading research question is: *To what extent does the NCEA contribute to system-level learning via their project-level EIA assistance in LMCs?*

A case-study design was chosen to allow for a qualitative analysis which seemed necessary at this explorative stage, where little is actually known about the link between project interventions and system-level developments. A time-series reflective control design together with a treatment-control design¹ further aided to open the black box veiling the changes at the system level and their relation with the specific contributions of the NCEA. Methods include field observations, semi-structured interviews, group discussions and document analyses. The research approach is cognitive, meaning that only interpretative data is gathered. Conclusions, consequently, are mainly based on perceptions of key actors that were interviewed or joined discussions during fieldwork.

In general, research results indicate that the relation between NCEA individual project advisory services and the development of the EIA systems in LMCs is fragile, and depends to a great extent on the institutional context which either hampered or enabled the learning loops in practice. More specific, results in Ghana indicate that key actors do not believe that they learned significantly from NCEA review comments, except for some lessons about project specific aspects related to the construction phase. Results in the Maldives indicate greater learning effects, especially about EIA processes, although many did not evolve due to an impeding context where post-tsunami political games and weak institutional arrangements for EIAs determined failures in practice. Differences in learning between both countries can be explained by the status of the EIA system at the time the EIAs were performed: In Ghana basic system elements –e.g. generic rules, regulations, or EIA institutions– were already in place and key actors did not believe far going adaptation was needed, while in the Maldives basic system elements were lacking and key actors acknowledged that there was a dire need for improvement. Susceptibility and an attitude to learn seemed pivotal: the NCEA comes with the status of an international, independent expert body. This augments the trust and confidence of the EIA authorities, but does not create a learning environment per se.

¹ Treatment cases included EIA projects with NCEA aid, control cases comprised EIA projects without NCEA aid.

1

THE BACKGROUND: INTRODUCTION AND DEFINITIONS

1.1 Introduction

The quality of environmental impact assessments (EIAs) in low and middle-income countries (LMCs) is often low (cf. Zubair et al. 2010; Kolhoff et al. 2009; Alshuwaikhat 2000; Appiah-Opoku 2001; Modak and Biswas 1999; Sankoh 1996), despite various attempts of international donors to aid with the development of an effective EIA system. The latter is defined as a set of rules, regulations and capacities of the proponent, authorities, civil society agencies and knowledge communities (from now on referred to as the EIA' key actors). Still, little research is performed that clarifies the manners donor contributions could be made more effective. This research attempts to partly fill this gap.

Donor assistance can be either or both aimed at the *project level* –e.g. advice on the content or quality of the EIA reports as part of a physical undertaking, like the construction of an oil platform or the reclamation of land– and/or on the *system level* –e.g. capacity development programmes focused on EIA' rules, regulations and capacities of the proponent, authorities, civil society agencies and knowledge communities (from now on referred to as the key actors). Direct outcomes and impacts on both levels are being studied (see for instance Lof 2009 or Sadler 2003). Little is known, however, about the indirect outcomes and impacts. Hypothetically, project-level donor assistance renders learning effects which subsequently generate changes at the system level, and vice versa. In this thesis a research about the link between project-level expert assistance and the development of the EIA system is presented and discussed. This link is conceptualized as a set of learning mechanisms which stem from donor interventions. The Netherlands Commission for Environmental Assessment (NCEA) is the expert body central in this study. Due to limited resources and manpower only one donor agency was selected; conclusions are based on the work of the NCEA and must be understood as such. EIA projects in both Ghana and the Maldives were selected: these are all large-scale projects that were rather new to the local EIA authorities and subject to international attention, which scaffolded learning opportunities. The main research objective was to discover and analyse the cognitive and behavioural changes of key actors that stem from NCEA advisory assistance in these projects. The leading research question is: *To what extent does the NCEA contribute to system-level learning via their project-level EIA assistance in LMCs?* Answers to this question presented in this thesis contribute to improved understanding in terms of ideographic theory building, i.e. a building block that facilitates full analytical comprehension or a nomothetic theory.

Below first the EA systems and its shortcomings in LMCs are described, before feedback loops and learning mechanisms are defined and discussed in section 1.3. The research questions are defined in the subsequent section, followed by a brief argument about the scientific and societal relevance of this study in section 1.5, and a reading guide for the whole thesis in section 1.6.

1.2 EA systems in LMCs

To date, one hundred and sixty nine countries have some sort of environmental assessment (EA) system running in their country (NCEA 2010b). An EA system exists of rules, regulations, and capacities of the EIA' key actors (Kolhoff et al. 2009), and determines the performances of EAs. Environmental assessments refer to “the evaluation of the effects likely to arise from a major project (or other action) significantly affecting the natural and man-made environment” (Wood 2003; 1). Effective EIAs can ensure that environmental and social considerations are taken into account in all

decisions about physical projects that potentially may harm the environment and members of the respective communities. It is a strong way to realize of sustainable development.

In general, four different EA stakeholder groups can be recognized. One of them is the project proponent, being either a governmental agency desiring to plan or commence with physical projects like road or house constructions or a business agency eager to perform such projects. Another actor is the competent authority (CA) responsible for the (political) validation of the EA study and the environmental license. A third group of actors are the epistemic communities who either advice EA authorities on process or substance matters (e.g. the NCEA) or perform the technical part of the EA (the actual gathering of environmental data). Last but not least is the civil society group which includes the public (participating via public hearings and information meetings) and the NGOs who most often attempt to represent socio-ecological interests that are not directly protected by the political and market actors. The power of the CA is most obvious given their control over the final EA decision. In practice, the advisory assistance of epistemic communities are often taken seriously, which enlarges their power as well.

Despite some promising developments and rather extensive efforts of both donor and recipient actors in the past two decades, current EA systems in many LMCs are rather weak (Alshuwaikhat 2000; Appiah-Opoku 2001; Modak and Biswas 1999; Sankoh 1996) and many face similar shortcomings (Kolhoff et al. 2009). Constraints recognized by different evaluators are: A lack of a proper regulative framework and capacity deficiencies, such as little human and organizational skills, means and access to information and other resources (Kolhoff et al 2009; Van Loon 2009), a lack of environmental awareness, public input, scientific data and local EA experts (Appiah-Opoku 2001), and a failing participation, diffusion of experience, donor policy, political will, and socio-economic state of the nations (Alshuwaikhat 2005; Sankoh 1996). The constraints, in short, can be found in the political, economical, ecological and socio-cultural dimensions of the societies.

Factors that directly (can) influence EA elements in these dimensions are: interventions of international donors and finance institutes, the institutional, legal framework and international EA conventions, the political and administrative system, the socio-economic system and the natural environment (Kolhoff et al. 2009). However, these context factors do not always explain EA system success or failure, for they “can –but do not necessarily– influence the development and performance of an EIA system” (*op cit.*: 278). Furthermore, apart from the contextual elements the EA-system generates its own functional capabilities as well, which I here will refer to as the intrinsic developments. Examples are cooperation between different EA authorities, inter-organizational linkages based on information sharing or formal and informal rule setting by local EIA authorities.² Together with the contextual factors the intrinsic developments (potentially) either stalemate or enhance EA performances. Stalemates eventually result in a poor consideration of payoffs between economic, social and ecological aspects of development projects, while enhancement implies “a balanced approach to development which takes into account environmental as well as social and economic considerations. [This]...would provide practitioners and policy makers with the implications of the potential negative environmental, as well as social, impacts to acceptable levels” (Abaza 2000; 272). Moreover, as a consequence of strengthening EA systems the intrinsic value of the system increases; i.e. the resilience of the regulatory framework and the EA capacities to external or internal stress, such as political opposition or pressure from (international) businesses.

² Although many of these actions will relate somehow to some contextual factors, the greatest efforts are executed by local EA actors only and are therefore classified as intrinsic developments of a local EA system.

1.3 Feedback loops and learning mechanisms

The project advisory contributions of the NCEA are focused upon in this research. The Netherlands Commission can provide an advice in three moments of the project –on the terms of reference (ToR), on the final EIS (advisory review; AR) and on monitor and evaluation processes (M&E)– with the prime aim to enhance the particular individual project. These advisory comments, though, are but one of the five strategies³ the NCEA performs with the ultimate overall aim to enhance the national EA system, i.e. the national rules, regulations and capacities that determine the effectiveness of EA performances. Effectiveness is thereby determined by three indicating levels: *output*, which comprises EIA reports, awareness, attitudes towards the project and voluntary changes in project design, *outcome*, indicating a more forced change of project designs together with a change in attitude towards the project and more informed decision-making processes, and *impact*, encompassing the physical changes in environment, in socio-economic conditions like poverty and in existing governance structures (Kolhoff et al. 2009; Schijf 2009; NCEA 2009). These ultimate objectives of the NCEA imply that the distal goal of the individual project comments is to contribute to the enhancement of the national EA system in terms of output, outcome and impact as well. Evaluation studies (see for instance Lof 2010) attempt to grasp the various effects of NCEA activities in general on the three indicating levels. In addition, the commission itself recently developed an evaluation and monitor tool to audit the different effects on the three levels (see Schijf 2009). Little attention, however, is paid to the feedback mechanisms from an individual project advice towards the EA system, i.e. the effects of learning from project comments on the national regulatory framework and the EA capacities of the different actors. As mentioned above, these feedback mechanisms are apparent in EA performances (cf. Kolhoff 2010) but remain to date rather vague and ill defined. Therefore, this research explores these feedback mechanisms and analyses their actual form and effects. Learning is the central concept, for the advisory comments directly aim at learning effects on the project level, and indirectly on the system level as well.

The ignorance about the significance of feedback loops coming from an expert advice during EA project performances is striking. Obviously, an EA system becomes more resilient when feedback mechanisms ensure the integration of lessons learned; this is a form of experiential learning (cf. Joy and Kolb 2009). Moreover, EA is an exercise of sustainable development and engaging in sustainable development requires the learning of shared goals and appropriate strategies for achieving these goals (Henry 2009). In addition, problems of sustainability typically arise from complex interactions between social, economic and ecological systems, and information necessary to understand the manner these systems will react to any particular policy choice is often lacking. This information must somehow be learned (*ibid*). Learning, thus, is vital for the enhancement of EA system developments and performances.

Definitions

The concept of learning is here defined as a full experience, i.e. knowledge acquisition and subsequent change in behaviour (cf. Joy and Kolb 2009; Jha-Thakur et al. 2009; Kolb and Kolb 2008; Kolb 2005; Mainemalis et al. 2002; Kolb 1976). Cognitive change is thus not enough; full learning results in both cognitive and behavioural changes.

Hypothetically, if the NCEA' individual project advisory assistance triggers changes in cognition and behaviour towards the EIA system, the system will change accordingly. Changes, if

³The other strategies are: Assistance for legislation, capacity development activities, awareness raising and training for actors outside EIA system, and creating a knowledge and learning platform (see Kolhoff 2009).

present, can be either about rules and regulations, or about the EA capacities. The former are about all formal (e.g. laws) and informal rules (e.g. rules of thumb) and regulations guiding EA performances in practice. EA legislation, the structure of key governmental EA organizations and EA procedures differentiate the concept further (cf. Kolhoff et al. 2009). EA capacities, the second indicator of EA system change, are plural. Moreover, they are results of both historical and current events and often intertwined in practice (Van Loon et al. 2009). In general we can recognize capacities of EA authorities –such as leadership, structure of the agency, human resources, financial resources and inter-organizational linkages– capacities of the proponent –such as its attitude and willingness to pay for EA– capacities of the epistemic communities –such as skills, access to information and knowledge infrastructure– and finally the capacities of the civil society –such as leadership, autonomy, skills and financial means (Kolhoff et al. 2009). In short, the EA rules, regulations and capacities are the main indicators of change. Again, the learning effects are measured in terms of both a cognitive and behavioural change towards these indicators.

General mechanisms for learning in EIA are yet unclear (see for instance Runhaar et al. 2010; Fischer et al. 2009; Jha-Thakur et al. 2009; Henry 2009; Sinclair et al. 2008; Chávez and Bernal 2008; Fitzpatrick 2006; Fitzpatrick and Sinclair 2003; Saarikosky 2000). Manners of learning and their supporting conditions are more clear and researched extensively by different social scientists, though. However, most of these learning characteristics are explained in terms valid for most High Income Countries (HICs); learning in LMCs is never extensively analysed. In this research learning outcomes and their driving forces in LMCs are at the heart of the analysis.

1.4 Research objective and main questions

Hypothetically, one of the factors that influence the EIA systems in LMCs via learning mechanisms are the activities of the NCEA. As mentioned above, here we focus on one activity –project advisory review comments– and analyse whether or not this activity actually does affect the development of the EA systems, and what can be done to increase this effect. Perceptions of key actors are thereby key. In this research we attempt to discover and analyse the effects of the NCEA' individual project advisory review comments on the perceptions on and (subsequent) adjustments of elements of the national EA-system by local key-actors, i.e. key actors' cognitive and behavioural changes. Key-actors are the representatives of the Ministries, the EPA, the TRCs, the proponent and the civil society organizations (CSOs, including NGOs) that were involved in the selected EIAs.

The leading research question, as defined in section 1.1, is: *To what extent does the NCEA contribute to system-level learning via their project-level EIA assistance in LMCs?* The following sub-questions were defined to aid the data collection and analysis:

1. *What are the system-level learning outcomes in the selected EIAs?*
2. *To what extent does the NCEA contribute to system-level learning?*
3. *What are the options of the NCEA for improvement?*

1.5 Scientific and societal relevance of the study

This research includes different aspects of local societies –EIAs are projects executed within and partly by the society– and of environmental governance. It is therefore highly appropriated to be executed within the section of environmental and societal sciences of the University of Utrecht. In

addition, from a societal point of view, this research is relevant for it will conclude on current learning mechanisms with the main objective to formulate recommendations *for policy*: To help the NCEA to define approaches that result in increased learning effects within EIAs that enhance EIA system developments. Obviously, enhanced EIA systems will affect physical project developments in the countries, where the chance for more forms of actual sustainable development is significantly increased; hence the societal relevance of this study.

From a scientific point of view, this research is rather interesting as well for its simultaneous focus on the character *of policy*. The learning perspective is relevant here, for it will reveal the manners actors deal with sustainability issues and how they learn from their experiences (cf. Henry 2009). In addition, despite the fact that learning in EIA is becoming a central topic within the scholarly debates, a strong base of empirical evidence on this matter is strikingly lacking (Runhaar et al. 2010; Fischer et al. 2009; Jha-Thakur et al. 2009; Henry 2009; Sinclair et al. 2008; Chávez and Bernal 2008; Fitzpatrick 2006; Fitzpatrick and Sinclair 2003; Saarikosky 2000). This research will make a contribution to such an evidence base, to provide scholarly discussions with more substantive information.

1.5 Reading guide

The thesis continues with a brief outline of the analytical and methodological research frameworks in chapter two. Here the research philosophy and approach are described together with the technical research design. In the subsequent two chapters the case studies are described: first the case of Ghana is analysed in chapter three, before the case of the Maldives which is described in chapter four. Both chapters open with a brief introduction and background information about the country, the environmental issues and the project descriptions, before the learning outcomes and are listed in a table and subsequently described further in detail. Each chapter ends with a discussion and a summary where all system-level learning result, that were triggered by experiences in projects both with and without NCEA assistance, are listed in a table where value-scores are added, ranging from -- to ++. Chapter five ends with the final conclusions where outcomes of both countries are compared. The chapter includes a brief discussion about the methodological challenges, and final recommendations for the NCEA for improvement. Appendices are added as a separate document and include a full report on the consultative hearing on the island of Vilufushi in the Maldives.

2

ANALYTICAL AND METHODOLOGICAL RESEARCH FRAMEWORK

In this chapter both the analytical framework (section 1.1) and methodological research framework (section 1.2) are described and visualised in two separate figures.

2.1 Analytical framework

The analytical framework of this research is about the effects of the individual project advisory services of the NCEA on key actors' perceptions of and behaviour towards the development of the national EIA system. Effects of NCEA comments are to date evaluated on the project level; information about their more distal effects (i.e. system level) is strikingly lacking and forms the knowledge gap this research attempts to fill. Actors central in this research are both individuals and organizations who endure system-level learning experiences. Elements of change are about either EA rules and regulations or about the EA capacities in the particular LMC. As described in the former chapter, the EIA system endures various inputs which all either stalemate or enhance its development. The system performances are the EIAs (or SEAs) which all have an output, outcome and impact which were explained in chapter one. The philosophy behind this framework is about the feedback loops running from system outputs back to the system again: moments of learning that affect the development of the system.

The analytical framework is visualized in figure 1 below. Note that the difference between learning on the project level and learning on the system level is made pure for analytical reasons. This research focuses on lessons that are triggered on the project level but deal with system elements, i.e. regulations and capacities. In practice, both types of learning are often intertwined: learning about manners to improve elements on the project level simultaneously causes system improvements due to increased knowledge and experience. In that case project level learning equals system level learning. However, this research is about the system level effects only. Therefore we need this analytical separation to understand the links between projects, capacities and the rules of the game.

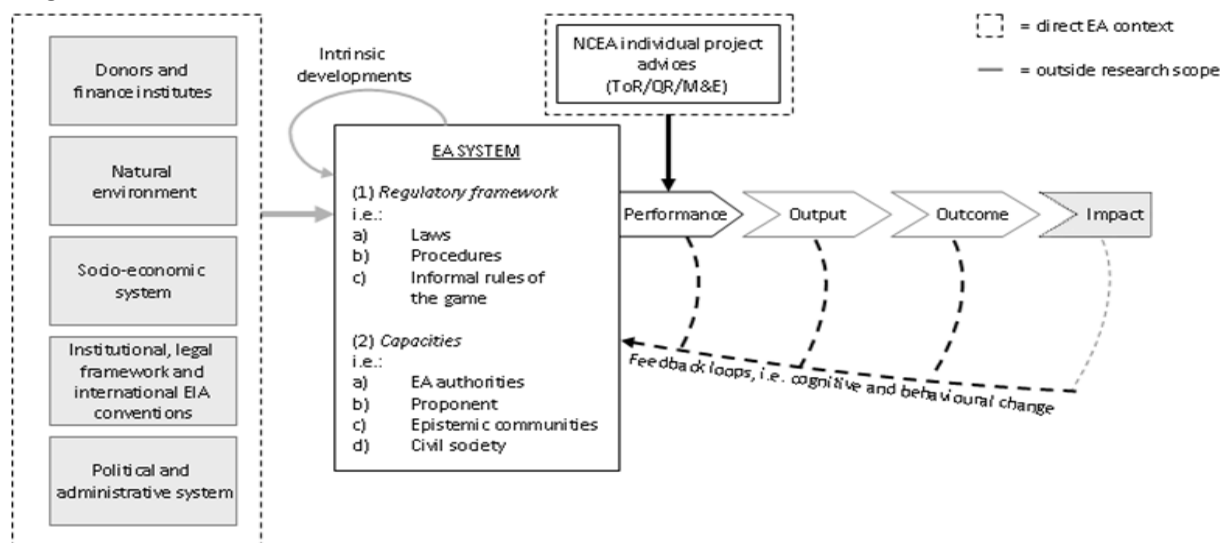


Figure 1: Analytical framework (Source: partly based on Kolhoff et al. 2009)
Please note: grey boxes and arrows fall out of the research scope

Explanatory factors

All explanatory factors defined below are listed in the summarising tables of chapter three (Ghana) and four (the Maldives), where scores are added to clarify their meaning and power in practice. Below the variables are briefly described.

The meaning of system-level learning mechanisms in practice depend on different factors. These factors vary in power between different EIA projects. Based on a literature review⁴ and experiences during fieldwork the following variables that explain the existence and power of system-level learning mechanisms for EIAs in practice were identified:

- Availability of information
- Dissemination of information
- Ability for abstract thought
- Discussions between key stakeholders about lessons learned
- Capacity authorities to translate lessons into practice
- Enabling (political and institutional) context
- Time to learn and implement lessons
- Moments of reflection on lessons learned

Furthermore, the characteristics of learning determine the existence and power of system-level learning mechanisms as well. Characteristics of learning are: (1) topic of learning, (2) level of learning, i.e. individual and/or organisational learning, extent of learning, i.e. from knowledge accumulation to behavioural changes, and type of learning mechanisms, i.e. experiencing, reflecting, thinking and acting. These are all defined by the researcher and based on insights gained during a literature study and the experiences on the work floor of the NCEA.

2.2 Methodological framework

Three main issues are investigated to find an answer to the question about the effects of NCEA project advisory comments on EA system developments. First, the EIAs in general, and the NCEA activities in particular (independent variables). Second, the learning outcomes resulting from these activities (dependent variables). And third, the changes (cognitive and behavioural) in EA system elements (also dependent variables). Below the methodological operationalization of the research on these three issues is presented. Figure 2 presents the research technical framework.

Opening the black box

Although the system impact of project advisory services is central in this research, it is not an impact assessment pur sang for the attribution gap is large⁵ and information additional to oral statements is hard to acquire. Instead, a cognitive approach is used to explore the current strengths and weaknesses of the NCEA project contributions with regard to the development of EA systems.

Via a case study approach the black box obscuring the project dynamics and their links to developments on the system level was opened. Learning is thereby the 'crow bar' that opens the

⁴ See for instance Jha Thakur et al. (2009) or Sinclair et al. (2008).

⁵ Ghana experienced several donor (e.g. World Bank, UNESCO, NREG) contributions to environmental management issues like capacity development programmes, international EA conferences or sector-based expert guidance. Projects in the Maldives comprised several international agencies that all aided in different manners with the reconstruction and redevelopment after the tsunami disaster. Unravelling cause-effect relations in this complex context is hard and most of the times impossible due to a lack of data and information available.

black box. Focusing on learning helped us to understand the links between NCEA advisory comments on the project level and changes on the system level in terms of the local practitioners themselves. Thus, although an attempt was made to define the manner and extent NCEA project assistance affects system dynamics, it was not the primary aim to assess the exact impact of the Commission's comments, but to qualitatively explore their current contribution and opportunities for improvement.

Project-oriented case study

Links between changes in the two system categories –the regulatory framework and capacities– and preceding NCEA assistance in particular EIA projects in the similar country were explored via a *project-oriented case study*. Three EIA projects in Ghana and two EIA projects in the Maldives were selected as the treatment cases for this research. These projects were all performed between 2000 and 2009. Selection of the particular EIA treatment projects in the two LMCs were based on the following:

- Large scale projects –system level learning effects are expected to be more apparent here which facilitated the research that needed to be performed within certain time limits.
- Project characteristics were rather new to the local EIA key actors; no or little experience with such projects widened the chance for learning.
- Projects encompass ToR, EIS and M&E phases, or at least the first two (NCEA advice moments)
- Treatment cases include NCEA advice on ToR, EIS and/or M&E plan and execution.
- Projects were performed no more than one decade ago (for the sake of memory and data availability)
- Request for NCEA advice came from recipient country (sign of involvement and will to learn)

Furthermore, at least two cases (one per country) were required for this research in order to compare the differences across borders/cultural contexts. The objective was to compile similarities in learning effects and future challenges in the final conclusions. Differences determine the nuances.

Via the case study approach effects of project advisory assistance on perceptions and actions towards the EIA system in the selected country were examined. The time-series approach defined the momentum of the EIA project in relation to possible system developments (the particular EIA project must precede system changes to play a potential significant role). Subsequently, the interactions between NCEA staff and key-actors in the EIA project were studied via semi-structured interviews and a review of project-related records. The formal NCEA advice was analysed as well and key-actors were asked about their perceptions towards the substance of this advice plus the procedures that resulted in its submission.

Finally, a score list per case was used that differentiated between the learning characteristics (i.e. topic, extent and mechanisms) and the conditions for learning for both projects with and without NCEA interferences. Scores vary based on a Likert scale and range from 'no learning effects' (--) to 'evident learning effects' (++) and are presented in the summaries of chapter three and four. A reflective control design together with a treatment control design was used in both countries. These designs are described in detail below.

Reflexive control design

To illuminate the differences in EIA system developments before and after NCEA intervention a *time-series, reflexive control design* was used. If, hypothetically, NCEA project advisory assistance eventually

lead to changes in EA system developments, and perceptions on these developments, then such changes must be observable at least in documents and most likely in participants' minds. A time-series reflexive control evaluation based on a document analysis with pre-intervention and post-intervention records of EIA system elements, together with interviews with actors who were involved in EA system developments before and after NCEA intervention, clarified if and what changes occurred during and after NCEA presence. EIA learning outcomes and NCEA contributions were compared to the system changes that were noted via this technique. Research conclusions are based on outcomes of this comparison.

Control-treatment design

The distinction between learning from NCEA advisory assistance and learning from other drivers of change remained a methodological challenge and could not be clarified by the time-series method or the project case-study only. Measuring and extrapolating the historical accounts of other external driving forces, such as national socio-economic developments or political movements, to determine their significance for learning was one way to face the challenge though not possible with regard to the resources available for this study. Instead, a *control-treatment group design* was applied to determine the significance of NCEA advisory assistance as an attribute of learning effects. The treatment group case consisted of EIAs with NCEA interference, the control group case consisted of EIAs without NCEA advisory assistance. Both cases needed to have followed comparable EIA sequences (i.e. screening, ToR, EIS, etc.) and had to be performed in the same country and before the observed EIA system changes. To make the conclusions more reliable outcomes of a control-treatment design should be disaggregated (Rossi et al. 2004), therefore the roles and activities of both individuals and organizations in the EIAs were taken into account (controlling for subsequently individual and organizational learning).

For the treatment group the relation between the EIA project stages (scoping, reviewing, monitoring) and the NCEA activities is examined. For the control group similar EIA stages were analysed: Here no relation with NCEA activities are measured, obviously.

Biases in the research approach

During extensive face to face interviews the key agents were questioned about their experiences in both cases with and without NCEA presence. Moreover, during a presentation of the preliminary research results to the EPA in Ghana, to the Maldivian research team (EPA members plus former project manager) and to the NCEA in Utrecht reflection on the statements resulted in valuable data about the quality of the research conclusions. Observations and a project document review added further certainty about the particular meaning of NCEA advisory assistance as a trigger for learning.

This methodological approach implies that mainly actors who have experiences in both control and treatment cases were questioned. Moreover, most control cases were either defined and described by the respondents upon request, or were based upon hypothetical constructions –“What if the NCEA was not present?” The limited resources for this study left the researcher with no other choice. This does bring forth a selection bias. However, the extensive experience of these actors in both cases enabled them to critically reflect upon the differences and on the influence of the NCEA; the selection bias worked out rather positive in this case. Another apparent problem is that the restricted selection of cases and actors does entail that the research results in *ideographic theory* only. This is hardly a problem though, given the current significant lack of knowledge about learning mechanisms in EIA in LMCs. We are in an infant stage where different building blocks are needed to build the tower of full analytical understanding where nomothetic theories can rule. This research is one of those blocks and hence serves the purpose of ideographic theory construction about learning from expert advisory assistance in

EIA.

The approach of this research is cognitive. Ideas and attitudes of actors towards the EA system elements are measured, and in the case of the treatment group towards NCEA advisory interventions as well. A cognitive approach is thereby required to acquire insights in the frames of the key actors and the manners these frames might change due to learning. In fact, clarification of the ideas and values of the recipient actors are central in this study, hence a cognitive approach is useful. This means that mainly interpretative data was gathered and form the basis of the research conclusions. The later must be read accordingly. As a consequence, evident limitations are that this study only can conclude about cognitive aspects; actual behaviour change can only be made plausible, not proved. Extensive empirical validation requires resources not available for this study. However, research conclusions are relevant for they are based on first-hand data from practitioners in the field. They illuminate the perceptions and attitudes of key actors which are pivotal for learning (cf. Runhaar et al. 2009; Joy and Kolb 2009; Jha-Thakur et al. 2009; Swann 2007; Kim 1993). Moreover, this research focuses on the influence of NCEA advisory review comments and these comments are inherent cognitive: they aim at a change in the minds of recipients in such a manner that recipients themselves change the organization in practice. To study changes in recipient' perceptions a cognitive approach is relevant. An account on individual learning characteristics together with a detailed analysis of the EIA systems thereby lard the conclusions about system-level learning effects with significant leads about potential behavioural change resulting from changes in perception. This makes the final definition of learning mechanisms more plausible as well.

In sum

In sum, this research uses a cognitive approach to conclude on the feedback mechanisms from the project to the system level, i.e. the potential of recipient actors in LMCs to learn from NCEA project advisory assistance about the manners to enhance EIA' rules, regulations and capacities. Research conclusions only make definitions of learning mechanisms plausible; given the limited resources for this study no extensive empirical validation is possible. Notwithstanding, the research results are relevant because they illuminate what key actors think, how changes in perceptions occur and what recipients perceive as needed to realize changes in practice. This is also important for the NCEA to realize actual learning effects.

Project case studies were used to clarify the learning mechanisms in practice. Key reports were studied and key actors were questioned about their experiences during and after the EIA projects. In the end, the cumulative score per learning indicator illuminates the extent of learning effects. Changes in EIA system developments were further measured via a time-series, reflexive design. Changes are about either the regulatory framework or the EA capacities. Last but not least, in an attempt to close the attribution gap key actors were asked for their experiences in EIA projects without NCEA interferences as well. This control-treatment design aided to prove the correlation between NCEA advisory assistance and EIA system changes. Ideographic theory is the final result but highly relevant given the current need for empirical input in the debate about EIA system developments in LMCs. Below the technical research design is visualized in figure 2.

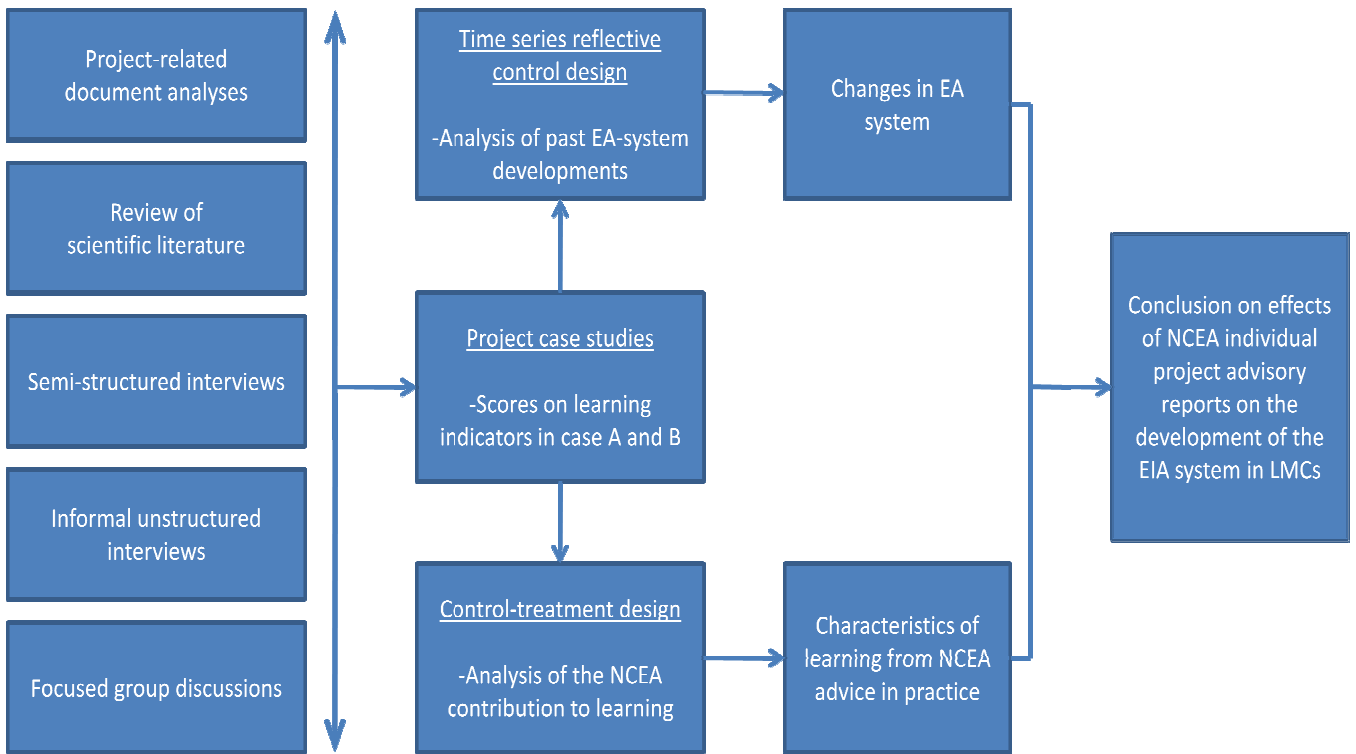


Figure 2: Technical research design

3

THE CASE OF GHANA

"You in the West belief in the system, we here in Ghana belief in the people"

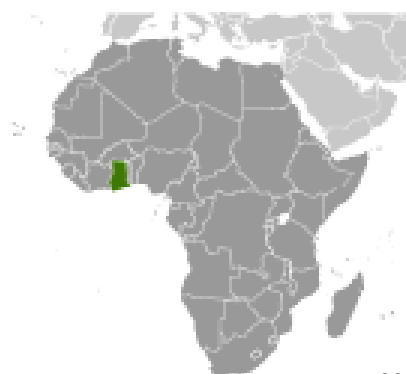
(Ghanaian head of EA division within the EPA)

3.1 Introduction

The republic of Ghana is a west-African country and borders with Côte d'Ivoire (Ivory Coast) to the west, Burkina Faso to the north, Togo to the east and the Gulf of Guinea to the south. During pre-colonial times different Akan Kingdoms –including the Ashanti Empire– inhabited the land, which all changed during the first contacts with the Portuguese in the fifteen century, and the British in eighteen seventy four, who established the Gold Coast Crown colony. Independence was achieved by the Gold Coast in ninety fifty seven. Ghana was the first sub-Saharan African country to do so. The name Ghana was chosen to reflect the ancient Empire of Ghana, which once extended throughout much of west Africa. The population is estimated at more than twenty one million, with about sixty percent of people between the age of fifteen and sixty four, and a growth rate of about 1.25%.

Ghana has a total surface area of 239,460 sq km. About 8,520 is water. The coastline is about 539 km. Lake Volta in Ghana is the world's largest artificial lake (geography.about.com). Main natural resources are gold, timber, industrial diamonds, bauxite, manganese, fish, rubber, petroleum, silver, salt and limestone. Natural hazards are mostly created by droughts, and the dry and dusty north-eastern harmattan winds that occur from January to March. Current other environmental issues are: recurrent droughts it the north which severely affects the agricultural activities, deforestation, overgrazing, soil erosion, poaching and habitat destruction which threatens wildlife populations, water pollution and inadequate supplies of potable water. The country is party to the following environmental agreements: Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Ozone Layer Protection, Ship Pollution, Tropical Timber '83, Tropical Timber '94 and Wetlands (geography.about.com).The GoG signed but not ratified the Marin Life Conservation.

Ghana, now a constitutional democracy, endured a long series of coops before Lt. Jerry Rawlings took power in ninety eighty one and banned political parties. After approving a new constitution and restoring multiparty politics in nineteen hundred ninety two he won the presidential elections of that year and the ones on nineteen hundred and ninety six, but was constitutionally prevented from running for a third term in two thousand. John Kufuor succeeded him and was reelected in two thousand and four. John Atta Mills took over as head of state in two thousand and nine. The unicameral Parliament includes two hundred and thirty seats. Members are selected by direct popular vote to serve for four-year terms.



Map 1: Ghana

Source of figures: CIA World Fact Book



Reading guide

In this chapter the case of Ghana is illuminated and discussed. Three projects determine the focus: the Ankobra Petrochemical Plant project of 2000, the West African Gas Pipeline of 2004 and the Jubilee Field (oil) project of 2009. These projects are described first in section 3.2. The specific role of the NCEA is described in this section as well. The learning outcomes are then described in section 3.3. First the project level performances that scaffold learning effects on the system level are illuminated (3.3.1), before the actual system-level learning outcomes are listed in a table and further described in detail (3.3.2). In section 3.4 the results are compared to projects without NCEA assistance. An analysis follows in section 3.5, where learning outcomes are explained and future challenges defined, before a summary is presented in section 3.6 where a table includes all valued scores per learning indicator as defined in chapter two.

3.2 The oil and gas projects

For the Ghana case, three case studies were selected: The Ankobra Petrochemical Plant (APP) EIA, the West African Gas Pipeline (WAGP) EIA and the Jubilee Field EIA. These cases were performed in three different moments in the last decade (subsequently 2000, 2004 and 2009) and signalled three different approaches of the NCEA: In 2000 two Ghanaian resource persons joined the work group in the Netherlands during the review of the APP preliminary EIS, in 2004 a NCEA work group visited Ghana and joined an extensive EPA technical review committee (TRC) during the review of the WAGP preliminary EIS, and in 2009 solely the NCEA technical secretary⁶ wrote an advice concerning the Jubilee preliminary EIS, without a preceding field visit. An analysis based on statements of key actors about their experiences in these projects resulted in the definition of learning mechanisms and the clarification of the strengths and weaknesses of NCEA project advisory services to influence system developments.

Ankobra Petrochemical Plant (2000-2001); stopped by EIA

A consortium of American and UK-based enterprises initiated together with the Ghanaian government the Ankobra Petrochemical Plant project; a planned construction of a 140,000 barrels per day crude oil refining and petrochemical unit in the Sekondi Export Processing Zone in Ghana. The project was meant to meet the domestic and international needs for crude oil. However, before construction could commence an EIA study was obliged by law. This study turned out to be fatal for the project plans: Environmental and social consideration were poorly taken into account, as was proven by the review comments on the preliminary EIS, and the project proponents withdrew their contributions most likely because short term revenues would not outrun mitigation and compensation measures, and acquiring an environmental permit would take too much time, effort and financial means.

The plans for a large petrochemical plant in Ghana were strongly supported by the government of Ghana (GoG), and the Ministry of Energy (MoE) in particular, for its promising contributions to the Ghanaian economy –the Ankobra project promised to install the biggest refinery of the country. The EPA, by law the responsible agent for the sound execution of EAs, found itself in a challenging position: initially they did not have sufficient power to withstand the pushing support for the plant' construction. Trust between the agency and the proponents, consequently, was strikingly lacking and signified the importance of the project mainly in terms of power. The EPA had its doubts

⁶ In consultation with some experts.

about the credibility of the proponent but did not feel secure enough to put such issues on the table: *“It was a big project and we needed to show that we took it seriously. But I doubted about the credibility of the proponent: their point of departure was the USA system, not ours. They just wanted an EIA approval as a means to acquire funding for the project. Right there you could see they did not want to adhere to our national procedures”* (EPA member). As a consequence, assistance of the NCEA was requested not only for technical support but also for its symbolic function. The interference of an international third party is regarded as a boost of power and confidence: *“It is like going to a fight knowing that your big brother is behind you”* (EPA member). This was the case in the Ankobra project as well: *“The NCEA really helped us with the problems of power and trust. With their comments we could be more stringent, we just had more power. Without that I can imagine that the proponent would have succeeded to win the GoG (especially the MoE) on their side and compel the EPA hierarchy to follow their will”* (EPA member).

After the review letter of the EPA to the project proponents, the UK-American consortium decided to discontinue with the construction of the petrochemical plant. The EPA send a letter of gratitude to the NCEA to thank them for their essential contributions. The agency was not satisfied with the entire process, however, for they would have preferred the proponent to take up the review comments and continue with the project installation. The increased power position during the Ankobra Petrochemical Plant project did not structurally affected the power of the EPA within the Ghanaian EA context; although the agency gained an important experience, their authority to enforce compliance to EA regulations and permit conditions depends too much on the state of resources available to perform the required tasks. This is their greatest challenge, for to date they lack sufficient and qualified personnel, material and financial means necessary to deliver state of the art performances and continuously (re-)affirm the leadership position within their country.

West African Gas Pipeline (2004-2005); extensive EIA

The West African Gas Pipeline Company Ltd. (WAPCo), a consortium of Chevron Texaco Ltd, Nigerian National Petroleum Corporation, Shell Overseas Holding Ltd, and the Volta River Authority, was formed in May 2003 to manage the Ghanaian part of the offshore and onshore gas pipeline transmission system that was planned to deliver natural gas from Nigeria to commercially viable markets in Benin, Togo and Ghana. WAPCo was the initiator of the EIA study that was required by law in Ghana.

For the WAGP compliance to license conditions was monitored, by the EPA and by World Bank, but no extensive records or other information sources are available at the EPA. WAPCo published an environmental and social management plan (ESMP) that is available in their website. The EPA does have a file on the WAGP but many documents, including the permit conditions, cannot be found by the different EPA members who state that their filing system is weak; although several documents are present, none are systematically archived or stored on accessible places. The library has the Draft EIS and the Resettlement Plan Document, but no other documents are available there.

Currently the agency does not request formal monitor and evaluation reports or a final EMP, for *“the gas is not running yet”*, despite the completion of the installation of the project. Unfortunately, several problems were witnessed during the implementation of the gas pipelines that only were resolved after complaints of communities and NGOs (see box 1 for an exemplifying illustration). In addition to the call for better monitor and evaluation activities, including measures to ensure compliance to license conditions, these accidents exemplify the relationships between the various stakeholders. Apparently, the CSOs have clear and close relationships with the project

proponent and to a far lesser extent with the EPA, who is still regarded as a far away agency. Be that as it may, enhanced monitoring and compliance enforcement could have helped to prevent these issues and contribute to a closer relationship between the EPA and the public. NGOs add that the execution of EA processes themselves could be enhanced as well, to overcome problems of compliance after the EIS is finalized. Here the role for the NCEA seems most valid: EPA and TRC members are rather ignorant about the post-EIS stages and do neither have the knowledge nor the resources to effectively act as a controlling agency. Although all stakeholders in the WAGP project state that compliance of WAPCo is in general satisfying up to date, more assistance in terms of practical suggestions and concrete guidelines are more than welcome and could be incorporated in the NCEA project advisory reports.

WAPCo now fully complies to the license requirements according to the EPA members, and according to a monitor report that was published by the NGO Green Ad.

Finally, after the permit was granted WAPCo commenced the construction of the pipelines, which are installed offshore and onshore to date. Problems (see box 1) occurred but were solved according to the satisfaction of communities, NGOs and the EPA. The gas is not running yet, but the pipelines are ready for operation. No significant environmental and social impacts are noted, except for the ones mentioned above, although the EPA did not monitor extensively yet for they await the operation phase.

Jubilee Field (2009); EIA for Phase I

A proposal for the development of hydrocarbon resources within the Jubilee Field, an oil and gas reserve located off shore Ghana (Western Region), was submitted to the Ghanaian EPA by the Jubilee Joint Venture which consists of Tullow Ghana Limited and its joint venture partners Kosmos Ghana HC (Kosmos), Anadarko WCTP Company, Sabre Oil and Gas, the EO Group, and the Ghana National Petroleum Corporation (GNPC). The Jubilee Field is located approximately 60 km from the nearest coast and lies in deep water (1,100 to 1,700m), straddling two oil concession blocks. It covers an area of 110 km².

Development of the Jubilee Field was planned to be performed in phases with potential future phases depending on the success of Phase 1.⁷ Phase 1 consists of subsea oil and gas production wells connected to a Floating Production Storage and Offloading vessel (FPSO) permanently moored in the Jubilee Field. The processed crude oil would be stored in the FPSO storage tanks and offloaded to oil tanker vessels for delivery to international markets approximately every 7 to 10 days. Well completions and installation of subsea equipment and FPSO was planned for late 2009 through to mid 2010 and initial oil production was targeted for late 2010. Field operations are projected to last for 20 years (until 2031) although future appraisal and development of the reserve may extend this period significantly.

The EIA had been carried out by ERM of South Africa on behalf of Tullow Ghana Ltd and was restricted to Phase I of the Plan of Development. The EIA process was mainly concerned with:

- the installation of production facilities at sea in the form of a Floating Production, Storage and Offloading (FPSO) vessel and
- subsea well heads, production manifolds and rigid and flexible pipelines

⁷ This development is in accordance with the 2006 2nd edition medium-term national development strategy known as the Growth and Poverty Reduction Strategy (GPRS II) 2006 to 2009. The strategy places emphasis on economic growth as a means of reducing poverty. Two priority areas will benefit, i.e. infrastructure development and private sector development. Income will be generated through sale of the State's share of the oil, taxes and royalties (NCEA 2009).

- the subsequent operation of the field involving the production of oil and gas,
- the processing of these products,
- the cleaning and discharge of the associated production water and
- re-injection of the gas, production- and seawater in the original reservoir to boost oil production
- the offloading of the oil in export tankers once every 5-7 days and
- the possible future transport of gas to shore by pipelines.

The development drilling programme has already been covered by three separate EIS (covering amongst others the discharge to sea of the ditch cuttings) and have been approved by the Ghanaian authorities. Drilling is currently underway and expected to be completed by mid 2011. In total, 17 wells will be drilled of which 9 are producing wells, 5 water injectors and 3 gas injectors. First oil is expected by October 2010. The lifetime of the field is expected to be at least 20 years after which the installations will be decommissioned.

The Ghanaian EPA granted an environmental licence on the basis of the EIA for Phase 1. An Environmental Management Plan and monitor and evaluation data are currently not available for the oil is not drilled yet. Tullow Oil acknowledges that oil production for Ghana is a rather new undertaking and provides full cooperation for sound environmental management. The EPA requested an extra step in the EIA process that was not obligatory by law –in addition to an license for operation a license for installation of the project material was obliged– but Tullow Oil did comply to this request.

The role of the NCEA

The EPA of Ghana was the competent authority during all selected EIAs. In the Ankobra case however, the agency lacked experience and knowledge about the oil refinery projects. Therefore the NCEA was requested to assist in the review phase of the EIS. Before a review report was submitted, the NCEA invited two EPA resource persons at their office in Utrecht to join the group of Dutch experts that were analyzing the project characteristics and the preliminary EIS report. These resource persons were asked to complement the discussions with contextual and local data. The expert group together with the Ghanaian resource persons and a NCEA technical secretary and chairman visited several petrochemical sites in the Netherlands to acquire more insight in the practices of such large projects. A final review advice was submitted on 16 February 2001, comprising many detailed comments, mainly about substantive, technical issues.

The WAGP project again confronted the EPA with a rather new type of project. The EPA acknowledged that they lacked sufficient capacity and knowledge about gas pipeline constructions and its requirements for sound EIAs; Ghana never executed a gas pipeline project before. Therefore the NCEA was requested to assist with the review of the preliminary EIS. The character of the project –an international, large and complex project with various learning opportunities for its unique character in Ghana– signified an opportunity for the NCEA to realize capacity development together with the project related advisory review comments. Therefore, a joined review group was set-up with 16 EPA technical review committeemen (TRC) and the NCEA expert work group including the technical secretary and a chairman. This entire group visited the two sites in Ghana where the pipeline was meant to enter the land and met several times with other stakeholders (including CSOs)

to discuss the most important issues of the EA.⁸ On April 29th 2004 the NCEA issued their final review advice, where different comments signified the need for an addendum. The EPA requested an addendum from WAPCo which was delivered and again reviewed by both the EPA and the NCEA. A permit was granted based on the information available in the EIS and its addendum. The permit conditions were checked by the NCEA as well. Thus, the NCEA provided advice on three different documents: The preliminary EIS, the addendum and the permit conditions.

By e-mail communication on 22 September 2009, the EPA-Ghana indicated that it had received the Environmental Impact Statement on the Jubilee Oil Field Phase 1 Development and that it was in the process of organizing the review of the statement. The EPA Executive Director requested the NCEA to review the report and provide EPA with necessary technical support and advice. The same request had been done to the Norwegian Ministry of Environment. One of the technical secretaries of the NCEA issued an advice report, which was integrally included in the final technical review letter of the EPA towards the proponent Tullow Oil.

3.3 EIA learning outcomes

In this section the learning outcomes of the three EIAs are described and compared with projects without NCEA assistance. First the project level performances that scaffold system level learning loops are illuminated in sub-section 3.3.1. System level learning outcomes are subsequently described in sub-section 3.3.2, before a comparison is presented.

3.3.1 Project level performances

For all projects a full EIA was performed. The NCEA advisory services differed from ToR advice to AR (see table 1). In most cases more than ninety percent of the NCEA review comments are copied into the final EPA review letter that is sent to the proponent. The review report for the Jubilee project proponent Tullow Oil included the NCEA review comments integral in appendix 4, for the WAGP project the review comments are processed in a self produced text⁹ and for the Ankobra Petrochemical Plant all comments are said to be included in the review.¹⁰ Sometimes comments are omitted or more specifically defined to fit local characteristics. Reasons for omission are clear: the EPA already included that comment itself, or does not regard the comment as relevant. The latter is hardly ever the case.

According to EPA members, the NCEA advice helps to signify which issues are more significant than others. In the case of the Jubilee Field project it helped the EPA to prioritize particular comments of the local people over others. In all cases the NCEA comments enhance the confidence of the EPA. The interference of an international third party functions as a boost for EPA review committeemen and helps to overcome problems of distrust in cases where the relation with the proponent is somewhat fragile –as was the case in the Ankobra Petrochemical Plant project.

Strengths and weaknesses in EIA performances

EIA performances facilitate or impede system-level learning opportunities. Here we will briefly illuminate the strengths and weaknesses in the EIA performances to clarify the context of learning in addition to the descriptions above.

⁸ Four thematic groups were formed, each consisting of four TRC members.

⁹ The EAP review comments to Ankobra Ltd could not be found in the EPA office and are probably lost.

¹⁰ The review letter could not be found by the EPA; statement is based on oral information.

The different stakeholders perceive the EIA practices differently. In general, formal agencies, including ministries, regard the EIAs as rather satisfactory although all mentioned that there are improvements that should determine the focus for future operations. NGOs are most critical and state that there are several pitfalls that impeded sound EIA performances in practice.

In general, the work of the EPA is regarded as qualitatively high in all three projects. The Ministry of Energy (MoE), for instance, regarded the EPA comments as rather useful and influential: *“Project designs can forcefully be changed because of EPA comments. For instance in the WAGP project the depth and the route of the pipelines were adjusted according to EPA comments.”* Furthermore, during the EIA the relationship between the proponent and the CSOs was rather positive. CSO actors, including fishermen chiefs and a representative of the Western District, stated that they a close contact with the proponent contributed to a feeling of participation and trust. The proponent promised to help the community by building schools, a community centre and drainage systems and kept this promise. Moreover, during the accident with the gas pipeline, when a leakage allowed chemicals from the pipeline mend to clean it to enter the ocean and affect the fish, the water and the air along the coastline –causing health problems for many community members who were treated in the local hospital– the proponent rapidly resolved the problem by fixing the pipeline and compensating the community by paying for hospital fees and for their loss in income.¹¹ Given these investments of the proponent in the habitat of the local communities, the community representatives perceive the coming of the projects (WAGP and Jubilee Field) as a blessing and treasure their relationship with the investors.

A clear weak performance was about the EIA reports: different stakeholders had problems with the length and language of the EIA reports. The MoE is convinced of the fact that there are ample opportunities to make the review more simple: *“Language should be far more simple to help other stakeholders understand what it is all about. During hearings some aspects are hard to understand, even for my people”* (MoE member). CSOs recognize this problem: The EIA reports are far too extensive, difficult to find (the EPA library stores a copy, but Accra is too far away, both in terms of time and costs) and far too complicated for the community members. Full understanding of all issues is therefore lacking, causing a concern about future effects: *“You do not know what will happen tomorrow. Maybe something changes, an accident occurs again or fish just disappears. We are concerned about these items for we rely heavily on the ocean for our livelihood and do not know what the potential effects of the project are in the future”* (chief fishermen). A closer contact with the EPA could overcome this issue. Now the EPA is rather invisible for members of the local community. In contrast to the contact with the proponent, no direct contact or resource persons are known by the representatives and the tasks and roles of the EPA remain rather unclear. The NGOs recognize the criticism from the CSOs about the EISs as well. They also regarded the length as too extensive and the language as too technical. According to them, this results in ignorance and/or misunderstanding. Time available for public evaluation is not helpful here. Twenty one days are scheduled by law for the public to prepare a reaction to the report. However, *“before the actual report is published and distributed to the regional offices a week has passed, leaving fourteen days for the public to understand a report too extensive and difficult to grasp”* (NGO member). Even the NGOs struggle with the reports and cannot explain every issue to the public within the given time, with their current knowledge and capacity. As a consequence, consultation meetings are less significant: *“People do not fully understand the problems at hand. Because of the technical language people cannot relate to it.*

¹¹ The community, in an attempt to divide this money in a honest manner, used the money to built a community centre for all its members.

Here we need stronger recommendations [for instance of the NCEA] about more use of local vernacular. Otherwise it weakens the relationship people have with the EIA; the power play against people will be stronger” (NGO member).

Compliance in practice

In order to understand the project performances and their effects in practice, which all potentially offer learning opportunities about manners to enhance the EIA system, post-EIS stages need to be analysed as well. Compliance is the most pivotal issue here, for lessons about compliance rates in practice illuminate the strengths and weaknesses in the current EIA system to ensure that environmental and social conditions are properly, and effectively, taken into account in final project decisions, and all EIA agreements are abided to.

The Jubilee Field Project (2009) is not in operation yet and therefore no compliance records are published. The EPA did request additional reports (not required by law) during the installation phase and Tullow Oil delivered them despite the extra costs and time. Recognizing the explorative stage of Ghana and oil exploitation, Tullow Oil cooperated to take into account more strict environmental measures, at least according to their own statement. For the WAGP project (2004) compliance was monitored, by the EPA and by World Bank, but no extensive records or other information sources are available at the EPA. Currently the agency does not request formal monitor and evaluation reports or a final EMP, for “the gas is not running yet”, despite the completion of the installation of the project. Unfortunately, several problems were witnessed during the implementation of the gas pipelines that only were resolved after complaints of communities and NGOs (see box 1 below for an exemplifying illustration). Enhanced monitoring and compliance enforcement could have helped to prevent these issues. Compliance was no issue for the Ankobra Petrochemical Plant project (2000), for the project never saw daylight after the withdraw of the American proponent.

No striking differences in terms of compliance between projects with and without NCEA interferences are experienced by the key actors. However, compliance monitoring is believed to be more strict in projects where the NCEA provided an advice, resulting in a closer adherence to the permit conditions. According to EPA members, in the projects where the NCEA provided a review advice compliance is more easily enforced because of the international status of the review report. For instance in the WAGP project the NCEA included comments on the shore crossing of the pipelines on the Ghanaian coast. This aided to empower the EPA position in their frequent discussions with WAPCo about monitoring compliance to permit conditions in practice. WAPCo now fully complies to the requirements according to the EPA members, and according to a monitor report that was published by the NGO Green Ad. Still, NGOs state that although most companies comply on paper compliance in practice is still hard to determine, both for projects with and without NCEA interferences. The EPA is perceived to more strictly control the projects with NCEA contributions, though; more compliance evaluations and (surprise) field visits are executed. This, however, is not so much regarded as an effect of the NCEA review comments but of the nature of the project: Large and complex investments like oil platforms or gas pipelines with promising economic benefits and potential social and environmental risks find priority within the EPA audit division. The small and medium scale projects, where the EPA does not feel the need to call in for NCEA assistance, are less or not at all monitored for compliance due to lack of resources and organizational capacity.

3.3.2 Learning outcomes on the system level

The Ghanaian EPA requests assistance from the NCEA when they lack the capability to adequately review all project issues themselves. In practice advice is requested for large projects where complex issues are raised which the EPA did not encounter in former projects. The confidence to review the EIA outcomes themselves and advocate socio-environmental interests in such projects is low, especially when large multinational companies are the project proponents, and the NCEA is regarded as a boost to that confidence: *“It is like going to a fight with the knowledge that your big brother is behind you”* one EPA member acknowledged. The fact that the NCEA is an international independent expert body is thereby decisive; in times of dispute between the EPA and the proponent the cooperation with such an external neutral party helps to empower the position of the EPA: *“The NCEA is our referee who can support or back our decisions”* (EPA member). In addition to the added value for their power position they gain in knowledge as well. Below all system level learning outcomes are summarised in table 1 and further explained in more detail below. First learning in projects with NCEA assistance is described, before a comparison is made with projects lacking such advisory assistance.

Projects with NCEA advisory assistance

Learning outcomes are listed together with the outputs of the EIAs and the NCEA activities in table 1, and further described in detail below.

	<i>Ankobra Petrochemical Plant</i>	<i>West African Gas Pipeline</i>	<i>Jubilee Field Project</i>
<u>Output EIAs</u>	<ol style="list-style-type: none"> 1. PEA 2. ToR 3. EIS 	<ol style="list-style-type: none"> 1. PEA 2. ToR 3. EIS 4. Addendum 	<ol style="list-style-type: none"> 1. PEA 2. ToR 3. EIS
<u>Output NCEA</u> (for details see appendix X and X)	<ol style="list-style-type: none"> 1. AR of preliminary EIS 	<ol style="list-style-type: none"> 1. AR of preliminary EIS 2. Advice on addendum 3. Advice on permit conditions 	<ol style="list-style-type: none"> 1. Secretariat advice on EIS
<u>System learning outcomes in practice</u>	<ol style="list-style-type: none"> 1. New knowledge about project-related technical issues 2. Moderately enhanced insight in necessary EIA processes 3. Awareness and attention for SEA and decentralization 4. Confidence and knowledge TRCs 5. Attention and awareness about participation and information dissemination 6. Little and weak reflection 7. No behaviour changes 		

Table 1: System level learning outcomes in Ghana

3.3.2.1 New knowledge about project-related technical issues

During the interviews almost all EPA members agreed that they gained several new insights on substantive matters related to the project, which were presented in the NCEA advisory comments. They acknowledged that several technical aspects that the NCEA included in their advice were new for them. It helped them to understand what relevant project issues should be included in the EIS of similar projects before license could be granted. For instance, comments about the pipeline debts or shore crossing methods that were part of the WAGP review are still remembered by most review committeemen.

“Without the review comments of the NCEA we might have overlooked some important issues that up to then were not in the draft EIS. We copied these comments in our final

BOX 1Problems that arose during and after installation of the West African Gas Pipelines

(1) A leakage in one of the pipelines caused chemicals meant for cleaning the pipelines to flow into the ocean. The leakage was caused by an anchor of one of the many fishing boats that work in the areas nearby the pipeline routes –a risk that was emphasized by the NCEA in her EIS review comments. As a consequence, the marine environment including the fish and air along the coast where polluted. Members of the coastal communities experienced health problems –coughing and a soar throat– and a loss of income due to a reduction in fish catches suitable to sell. WAPCo, the project proponent, noticed a reduced pressure within the pipelines and discovered the leakage. The EPA was notified but WAPCo took the lead by repairing the pipeline and compensating the community by paying the hospital fees and donating money to cover the loss in income people suffered from reduced fish catches. *“We were really happy about the way WAPCo resolved this problem and compensated us for our suffering. To divide the money equally, for the whole community to benefit, we proposed to build a community centre. It is built as we speak”*, a fisherman chief declared during an interview. Strikingly, despite NCEA comments, EPA monitoring of the pipeline installation was not capable to timely detect this risk and prevent the accident. The risk was noted in the official review comments; compliance in practice failed nonetheless.

(2) WAPCo changed the installation methods for the shore crossing of the pipelines after completion of the EA. Consequently, the new method was not adequately assessed for its impact and possible alternatives. Problems arose during its operationalization: The beams of steel that were used along the hole for the pipeline –to reduce the wave actions and facilitate the digging– had unexpected environmental consequences. On the West side (towards the beam) fast erosion of coast materials was noticed, on the east side (away from the beam) a lot of sand deposition was detected. As one EPA member stated: *“It really changed the area; children are now playing on the new sand grounds that formerly did not exist in that place.”* The EPA requested a monitoring report that eventually was drawn by the NGO Green Advocacy Ghana, the first of its kind made by this rather new NGO. This report, which was not disclosed for the public, covered a shore line rate-change detection analysis (Tema/Takoradi Shore Crossing Sites) and was rather moderate in its statements. The following conclusions were noted:

“It is obvious that constructional activities have altered the cliff edge/vegetation line, but have not had significant negative effects (in terms of erosion) on the wet-dry shoreline...The pipeline constructed at Aboadze (Takoradi) had not had any significant negative erosion effect in the coastline.(...) Natural transport of sediments along the beaches may be affected by the pipelines’ shore crossing site leading to changes in beach morphology. But the study of WAPCo determined that changes were temporary and that the beaches would be restored once the beams were removed” (Centre for Environmental and Health Research and training (environmental consulting); no date).

The EPA granted approval for the decommissioning of the beams in line with the recommendations of this study, in 2008, with the additional requirement for WAPCo to monitor the beaches for physical changes (erosion/accretion) over two years after the decommissioning. Quarter reports were requested by the regional EPA office; they only received one and did not receive any other report even after several requests. The power of EPA to enforce compliance seems weak, although the regional office disagrees: *“The EPA has every power, we asked for 4 reports per year but it seems nothing has happened and the headquarters of the EPA does not enforce penalties. Maybe they do not believe the problem is that significant”* (EPA member). Many respondent, NGOs, proponents and EPA members, acknowledge that weaknesses in compliance monitoring and enforcement lie in post-EA procedures and capacities: *“After the project implementation the eyes of everybody are less strict and open. That is where we have a problem. This is a learning area for us: What to do after project implementation? This is an area we are not at our best”* (EPA member).

review letter to the proponent. For future projects we now know better what issues are important and will include it ourselves in the review of such projects” (EPA member).

However, not all review committeemen do remember the specific content of the NCEA comments and some state that they did not learn anything new for they were already familiar with most of the issues. In the latter case respondents stated that NCEA comments showed overlap with their own review comments and where they added new ones no significant learning effects occurred. In addition, some members of the TRCs of the projects are not working anymore as a review committee member or are passed away, which signifies a loss of knowledge, especially in the organizations where organizational memory mechanisms are lacking. The NCEA review comments are thereby not read by the committeemen who are not working for the EPA. The EPA does not forward the comments to the other TRC members but their own personnel, who also in many cases not vividly remember the content of the NCEA advice.

3.3.2.2 *Moderately enhanced insight in necessary EIA processes*

Many of the respondents, both authorities and CSOs, believed that awareness and knowledge about EIA design and procedures in Ghana is rather advanced. Still some EPA members state that lessons about EIA processes were learned, but only to a moderate extent and only about the refinement of the existing processes. Others did not receive any lessons from NCEA review comments or the EIA experiences in general about the design of the assessment: *“We already have a strong EA system in Ghana and know about the required processes”* (EPA member).¹² An exception was made for SEA processes. Here they acknowledge that they still learn from the NCEA because the actual implementation of such an assessment is rather new in Ghana –SEA gained attention in Ghana since the last five years. The NCEA comments on the Jubilee project, for instance, included a section on the need for SEA to be performed for the oil and gas sector as a whole in Ghana, to account for the cumulative impacts of the Jubilee and other projects. This is to date even more important because of the recent successful oil field explorations in Ghana. The NCEA comment triggered the EPA to set up an SEA for the oil and gas sector and develop their capacities for SEA operations. NCEA comments that were provided for the Jubilee project helped them to improve their understanding of this process. Awareness of the need and relevance for extensive consultation meetings were also triggered by the NCEA project comments in the WAGP project and the Jubilee Field project.

3.3.2.3 *Awareness and attention for SEA and decentralization*

On the one hand respondents state that the current EA system is the strongest one in Africa and not in dire need for structural changes. However, on the other hand there are signs of structural changes caused by NCEA project contributions that did not appear in projects without a NCEA advice (we will discuss the differences in learning between projects with an without NCEA assistance at the end of this chapter). For instance in the Jubilee Field EIA the NCEA suggested to start an SEA for the entire oil and gas sector to account for cumulative impacts caused by activities in this –booming– sector in Ghana. This accelerated an intensive and focused development of SEA capacity (for the oil and gas sector) within the country; an EA system change that was recognized by all respondents and allocated in the period during and after the Jubilee Field project. Furthermore, the WAGP project

¹² This statement does not hold when we conclude that the EA practitioners in Ghana still need to learn a lot about post-EIS processes like compliance enforcement, annual report reviews and the organization of field inspections. This is no problem typical for LMCs though; many high income countries face similar post-EIS challenges despite a (more) mature regulatory framework.

provided a boost to the importance of sound reviewing, by the temporary ‘training on the job’ activities during the NCEA review period. The final review comments of the NCEA also comprise comments on the review process and the EPA review team. This caused, as was proven by statements in the interviews, more awareness of the importance and possibilities of reviewing. Subsequently, a decentralization of the EPA administration commenced to include district review and audit bodies as well. This development was suggested in and supported by the NCEA project advice, which accelerated this development. Thus, we can state that based on these project-level experiences lessons on the system level about underlying policies and strategies were learned on two major issues –institutionalization of SEA for the oil and gas sector and decentralization of review responsibilities. However, these developments already knew their spinoff before the EPA received the review comments of the Netherlands commission. Therefore the double-loop learning mechanisms on the system level are restricted to acceleration of existing (strategic) practices; no revised policy approaches are generated.

3.3.2.4 *Confidence and knowledge TRCs*

Extensive collaboration with the NCEA staff did result in learning effects about review procedures on the side of the Ghanaian TRC members, and generated confidence about their work. However, outcomes are moderate: many forgot most of the lessons learned and state that they did not significantly changed their behaviour in other projects,

Some respondents stated that the EIA experiences in general, and the interactions with the NCEA personnel and their final advice in particular, helped them to perform their tasks more effectively. Selecting and focusing upon the most significant project aspects, also relevant for post-EIS monitoring, was more easy compared to other projects where no NCEA assistance is provided. Others stated that their capacity of problem analysis increased due to the knowledge they gained from NCEA review comments. Again others stated that the increased insight in the importance and execution of hearings as a result of NCEA suggestions helped them to realize what was lacking or should be improved in other projects.

However, the leading perception is that the changes in behaviour are rather moderate and that *“not all lessons are translated into practice due to a lack of resources, capacities or just ignorance about the way to do it”* (EPA member). Still, the other side of the coin is that the TRC members felt more confident to forward their critics and recommendations and that the experiences also boosted –to limited extents– their confidence to operate in other projects: *“Their comments did not really change the way work, but it did boost our confidence: what we already did was approved to be right!”* (former EPA member).

3.3.2.5 *Attention and awareness about participation and information dissemination*

The EIAs including the NCEA advisory contributions evoked awareness and attention for the execution and quality of participation performances in EIA, and for the (importance of) dissemination of information. Awareness rose about the importance of enhanced participation also after the EIS finalization.

For the projects with an NCEA review advice more consultation meetings were executed – although this may be attributed to the size of the projects next to NCEA interference as well. Opinions about the current practices of consultative meetings do differ significantly. EPA members are more or less satisfied and even perceive some meetings as *“a little too much; no new ideas are mentioned and it does not seem to match our effort”* (EPA member). NGOs are far more critical in

particular about the content of the meetings –they accuse the proponent of manipulating discussions by focusing attention on promising compensation measures for the communities instead on the actual socio-environmental project consequences, leading to monologues instead of dialogues– and state that information was either insufficient, or too extensive, too technical and not translated into local knowledge. The World Bank’ Inspection Panel (IP) has had comparable experiences. This Panel received complaints about the disclosure allegations about the WAGP project: “The list of disclosure-related allegations was extensive. According to the complainants, “although West African Gas Pipeline Company (WAPCo) periodically consulted landowners, other ‘stakeholders’ were wrongly excluded and the overwhelming majority of our people were not consulted during the preparation of the Environmental Impact Assessment.” The requesters said...that it would have been helpful if relevant proportions of the large documents [including the EIA and the Resettlement Action Plan (RAP)] had been reproduced in Yoruba and distributed to impacted communities” (Bank Information Centre 2009). In addition, Friends of the Earth-Ghana claimed that the promised economic and financial analysis of the project was never disclosed. The annual report of the IP (2007-2008) stated that the Management disagreed with the inadequacy of consultation meetings, though several steps covered by an Action Plan were determined to overcome the issues of information dissemination, accountability and transparency. The IP acknowledges thereby that disclosure should be supplemented with translations of summaries of the RAP and ESMP in the local language, Yoruba.

The EIAs and NCEA advisory notes generated attention for information dissemination as well. Especially NGOs state that they learned from these projects about the importance of information sharing for sound EIA performances. To date, the EPA does not share all information. NGOs declare that they would like to receive, or have access to permits, permit conditions and the EIA review comments more easy and on a regular and structural basis. They add that the execution of EIA processes themselves could be enhanced to overcome problems of compliance after finalizing the EIS as well by an improved information dissemination. Baseline information and quantification of mitigation and compensation measures should be present and specified in the final report to greater extents. In the Jubilee Field Project, for instance, a fishery liaison officer was appointed as part of the proposed mitigation measures that were approved by the EPA. However, no task description was provided leading to misunderstandings and a failing practice to solve the problems at hand. This triggered the learning effects as described above.

3.3.2.6 *Little and weak reflection*

Most of the times interactions with the NCEA were about complex issues related to the projects that were new to the Ghanaian actors. Almost all respondents, consequently, stated that they encountered new experiences and felt that these new experiences contributed to their understanding and trust to deal with complex EA matters. However, not all new experiences lead to moments of reflection. The majority of the respondents acknowledge that reflection is important, although only some of them can actually indicate how new experiences made them think about their personal strengths and weaknesses and the ones of their organization. Experiences with the NCEA staff unveiled their current capabilities and knowledge base, but these were all insights on the individual level only. No real reflection on the organizational level seems to occur at the EPA. However, for the MoE this is different. Reflection is said to be a priority: “*Our main concern is to protect the image of the Ministry and to find out how the participation in EAs affect my/our work. When I know that, it makes it a lot easier to define the right ways to act. But it is very important to reflect and to get to know how other think about us, so we know if we need to do something different*

or better” (MoE member). The MoE uses the EPA review comments on EISs strategically as a moment of reflection, but does not specifically refer to the NCEA comments here for they are not read or received.

Although NCEA comments are believed to pinpoint the current weaknesses in the organization of the EPA, no respondent really believes that the NCEA comments evoke reflection that leads to profound thinking about impediments and necessary improvements on the system level.

3.3.2.7 *No behaviour changes*

According to the EPA and other TRC members experiences on the project level with the NCEA and their review comments do not lead to apparent changes in their behaviour or personal capacities to perform their tasks in EIAs. This means no behaviour changes on the system level. Despite the fact that learning does occur to a little extent in projects with NCEA assistance, compared to its absence in projects without NCEA interferences, no mechanisms that trigger the recipients to change the way they organise reviews, communicate with stakeholders or issue a license are recognized. The outcome of NCEA efforts is thus limited to the inclusion of their advisory notes in the final review letter of the EPA; no lessons force a significant change in organization or approach in future EA projects. Even for the WAGP project, where a joined review process was meant to train TRC members ‘on the job’, committeemen do only little recall lessons of that exercise and cannot really pinpoint how these lessons changed the way they work.

3.4 Comparison with experiences in projects without NCEA review comments

Learning in terms of substantive issues, and to a lesser or no extent in terms of process matters and skill development, mainly occurred in projects with NCEA assistance. For other projects where no NCEA review comments were issued EPA member state that they did learn about the practical value of the lessons learned from the NCEA in earlier projects, i.e. how to apply it in practice. However, new insights on the relevant EA matters were acquired to a far lesser extent. As a consequence confidence is lower when complex issues are faced, for the referee *“does not tell us whether we do a good job or not.”* Still, the quality of the review reports is not regarded as strikingly different in all cases. Sometimes, like in the WAGP and to a lesser extent in the Jubilee project, the NCEA comments eventually helped to improve the final EIS according to the respondents. The lack of international expertise in other cases is admitted to lower the weight of the final EPA judgment in the eyes of the other stakeholders –and hence the perceived quality of the review outcome– but the overall quality is not regarded as dangerously low. The EPA members state that they are most of the times sufficiently confident about the quality of their own achievements. They do wish to continue cooperation with the NCEA in future complex projects, though, for aid in disputes with project proponents (the potential empowerment of the EPA position) and some new lessons about substantive matters always come to hand.

With regard to double-loop learning there are differences as well, especially for SEA development. In projects without the NCEA assistance the lessons on the system level in terms of SEA development were not significant and many EPA members think that without NCEA project contributions these developments would have taken more time. However, the decentralization issues –i.e. the need for more region-based review capacity– were also raised in projects without a NCEA advice. Especially in the mining and power plant projects where tensions between local

communities, project proponents and the EPA were apparent, more commitment to the local context and more extensive review processes were desired that could not be handled by the head quarters only due to restricted capacities and resources. This generated a call for more decentralized review capacity. The contribution of NCEA project comments to system changes in terms of the decentralization development is thus more moderate.

The main challenges about the establishment of organizational mechanisms to ensure structural learning independent of individuals remain also for projects without NCEA interferences. Respondents do not recognize any striking differences between projects with or without NCEA advisory comments. Organizational learning is poor in both types of projects, although it must be noted that the projects with NCEA presence, which are large, often new and complex projects, gain more attention of a broader range of actors and often have more public hearings. This means that experiences within the whole sector and the subsequent range of the actors' network increases. This might help to safeguard organizational memory to some extent, for organizational memory is believed to be a product of *people*, and not the system: *"You in the West believe a system safeguards future successes, while here we believe in the people. When it is necessary, we can call upon each other to ask about former experiences and lessons learned. That will work, we do not need a system for that"* (EPA member).

Disputes in projects without NCEA interferences, in particular in the mining and power plant projects, lead to a more conscious behaviour of EPA members towards specific project issues and manners to communicate with the project proponents. However, the individual learning outcomes are little and behaviour change based on these lessons, consequently, is said to be moderate as well. Thus, no striking differences are noticed between projects with and without NCEA advice in terms of behaviour change.

EPA and other TRC members do encounter new experiences in projects without NCEA interferences as well. However, because these projects are most of the times small in scale and deal with issues that were faced earlier in past project several times the experiences are unique but not really new in character. According to the respondents experiences on the project level are of a more repetitive kind with less surprising elements. Reflection is quite low in projects without NCEA interference. Because not many new issues are encountered the EPA and other TRC members focus more on the execution of predefined tasks instead of using project experiences as a lens to find organizational strengths and weaknesses. Where NCEA comments evoke reflection to some extent, it is said to be more or less absent in projects without outside interference. Partly as a consequence, thinking about system pitfalls and initiatives for other actions based on project experiences are also not believed to be significant.

3.5 Analysis

In general we can state that for EPA and other TRC members learning on the system level –i.e. lessons about the state of current capacities, and necessary improvements– based on project experiences including the NCEA contributions is rather moderate and mainly restricted to the enhancement of technical, sector specific knowledge. Most of the specific project-related *issues* and their value for the particular organizations tend to be forgotten several years after the NCEA send out its final report. Lessons about EA *processes* are learned in projects with NCEA interferences only, but to a very limited extent; most of the times process issues are already clear to the EPA and other TRC members before the NCEA interferes. Only in the case where the Commission consciously aimed

in its advice to suggest improvements for the a process, like the review process or the public hearings, respondents state that they learned something about the content and procedural steps of that process. No other real significant new lessons in terms of process issues are mentioned. *Skill* development is most poor: both for projects with and without NCEA assistance no lessons are learned although a need and opportunities, especially for post-EIS activities, are recognized. Lessons about (policy) *strategies* also depend on specific NCEA hints. In general, it seems that double-loop learning mechanisms can be found in two out of the three projects where the NCEA interfered and only to lesser extent, and only focused on one issue (decentralization), in projects without NCEA advisory reports. Thus, the NCEA project advisory reports do render lessons on the system level about structural and strategic issues which affect the EA system, although much depends on the state of this system –SEA was not fully developed yet and decentralized TRC capacity was emerging: a momentum was thus already created for the project comments to connect to– and the extend the NCEA interacts with the recipient actors.

Failing organizational learning mechanisms partly the stalemate

In addition to the state of the EIA system, the absence of mechanisms that foster organisational learning explain the weak learning effects in practice as well.

Individuals do learn about substantive issues and to a lesser or no extent in terms of processes, skills and strategies. Together with the experiences they gain by working together with the NCEA it may be concluded that individual learning does take place to a moderate extent. Organizational learning falls behind, though. EPA' organizational learning mechanisms are rather poor and often not functioning. This is stated as a major struggle for the EPA: "*These things are very difficult to institutionalize*" (EPA member). The EA processes do involve different people from various departments but individual learning outcomes are not regularly shared among the EPA workforce. Once every three years members meet to exchange ideas about the state of the organizational capacity, its strengths, weaknesses and main challenges, despite the fact that different EPA members acknowledge that there is a need to do it more frequent. Experiences are integrated in organizational policies "just as time goes by" but at a slow pace, only via particular key persons within the organization and much of it is not formalized. Documents and reports are not structural archived and the location where project evidences and communications are stored –except for the draft and some final EIA reports, EISs and PERs which can be found in the library– are unknown to many members. Evaluative reports with lessons learned are often missing or not written at all. Consequently newly recruited members cannot rapidly take-up the lessons learned in the history of the EPA except from some training and discussions offered by the vested EPA members in place. The relation with the NCEA is institutionalized, though, which is perceived as a safeguard for quality ("we can always call on help") in times EPA would need more assistance than to date, e.g. when key persons leave the EPA and capacity decreases. The NCEA itself ensures a higher level of organizational learning within the EPA only when they organize joint review processes where extensive possibilities are offered to exchange ideas and opinions. The Ankobra and the Jubilee project lacked such processes and hence the EPA as an organization did not learn. For the WAGP project this was different due to the extensive cooperation between the NCEA and an EPA review team. Here more EPA members learned about review performances, although organizational learning was restricted to 21 review committeemen, several of them already left the EPA and halve of them worked for other institutions (e.g. Ministry of Health, Ministry of Food and Agriculture, Energy Commission, etc.). Organizational learning for this project was thus better than in the other two projects, but still moderate. In fact,

many review committeemen did not even received and read the NCEA comments, and did not know the NCEA included comments on the review process.

More extensive assistance helps

The learning effects that were apparent in the Ghanaian EIAs were caused mainly by a more extensive form of assistance of the NCEA. A comparison between the projects with NCEA advisory reports shows that the projects that triggered double loop learning on the system level are the projects where the NCEA offered more extensive assistance: The WAGP project included extensive cooperation and training of the EPA review staff while the Jubilee Field signified the start of an extensive NCEA contribution to SEA development for the oil and gas sector after the project was finalized. This implies that either intensive interactions during the project, or intensive follow-up during the post EIS-stage based on double loop comments in the review report increases the chances for double loop learning on the system level. However, without organizational learning mechanisms in place such efforts might be of a temporary impact only.

Other explanatory factors

The explanatory factors that were defined in chapter two only moderately supported or generated the learning outcomes in Ghana. Information was available at the EPA in Accra, and the main EIA reports were disseminated to the local EPA offices. However, information was often incomplete –no decision notes, minutes from meetings and hearings or monitor reports were provided publicly– and many stakeholders like CSOs did not receive any documentation. The EPA library stores the EISs (not the one of the Ankobra project) but other documents are often hard to find or even missing. Ability for abstract thought was more present in the projects with NCEA assistance due to the extensive collaboration with the international experts who could aid with the explanation of complex issues. Further, the TRC members join research institutes or have expert knowledge in particular fields. Discussions about learning effects were strikingly missing, both in projects with and without NCEA support. Reflection and interactions based on lessons learned only are performed informally; no formal mechanisms or even habits ascertain mutual exchange of newly acquired knowledge. Still, communications between key stakeholders about other matters were rather extensive, especially in the WAGP project. These interactions are more about the project procedures and state of affairs. Communication with CSOs including NGOs was rather weak, however, in both types of projects. Capacity to translate lessons into practice was weak due to the lacking discussions about the matter, due to a restricted resource base and due to the fact that most lessons were not understood profoundly, forgotten or valued as irrelevant. The large scale projects with NCEA assistance signified (unprecedented) investments that were important for the Ghanaian economic development. Political pressure to continue with the projects was apparent, though the EPA had sufficient power to advocate for environmental interest, as became most evident in the Ankobra case where the project stopped after withdrawal of the initiator who did not want to abide to the environmental regulations. International assistance with the EIAs increased the confidence of the EPA and empowered the voice for environmental considerations even further. The formal recognition of the EPA and the environmental regulations also created a context that enabled sound EIA performances. In projects without NCEA assistance this international “back-up” is missing, hence the context, especially for the mining projects, forms a more (political) hard environment to fully safeguard environmental interests to the fullest possible extent. Time to learn and implement the lessons was available. However, no moments were accounted for in the process to reflect and change the EIA

processes accordingly. All projects with NCEA assistance were initiated by large international investors who desired to continue at a rather rapid rate. Due to the economic interests, the GOG at particular points in the processes “*rushed things for the sake of the project to be realized within the time that was stated in the contracts*” (respondent).

Current status and the future challenges

Altogether, EA awareness in Ghana is growing and EA application are increasing significantly. EA practices are characterized by mixed opinions about the quality of the performances, especially the public hearings and the organization of post-EIS activities. The latter seems to be the greatest challenges in the current EA Ghanaian EIA system. These and others are listed in table 2 below.

-
1. Capacity and confidence for large and complex projects, especially for EIA authorities
 2. Structural archiving information
 3. Dissemination of information and knowledge
 4. Organizational memory
 5. Monitor and Evaluation processes
 6. Inspecting and enforcing compliance
 7. Cooperation with NGOs
 8. Integrating EA in other ministerial divisions
 9. Availability and accessibility of information (website)
 10. Motivation and skills personnel
 11. Resource limitations
-

Table 2: Current EIA system challenges in Ghana

These challenges remain because learning mechanisms from the project level towards the system level did not result in sustainable enhancements of the EIA system on these terrains. For the future these challenges could form points of attention, i.e. lessons that need to be learned. Especially the post-EIS performances, including the issues with ensuring satisfying compliance rates, are in apparent need for improvement. NCEA interference on the project level did not seem to make a striking difference on this terrain: Compliance in practice is not really different in projects with NCEA advice compared to projects without such an advice, at least according to the officials from agencies and NGOs that were interviewed for this research. According to one EPA member compliance does not depend too much on the review advice: “*Yes, NCEA project advisory reports do help to improve the final EA reports, but compliance in practice is about operationalization and other issues come to the table then. Compliance is beyond review.*” Suggestions are made for improvement (see also chapter six). The EPA members think that the NCEA could offer more assistance in this area. In their project advisory reports they could include a matrix with definitions of compliance and enforcement issues, together with descriptions of methods for compliance verification. Here the capacity of the EPA is limited despite the fact that on paper they have an inspection department. The estimated compliance in practice is currently forty percent. “*Working together with the NCEA is a big option for us! We could team-up in post-review activities that follow their project advisory reporting contributions.*” The Jubilee project is again a nice example here. Follow-up was provided by the NCEA on SEA development for the whole sector; as a consequence the capacity of EPA members to perform SEAs and EIAs for oil and gas projects increased due to improved understanding of necessary substantive issues, and to lesser extend about process issues. To date this aids to ensure compliance of Tullow Oil in practice as well, though more specific focus on the project requirements to ensure compliance in practice still is regarded as highly useful.

3.6 Summary

A summary of the learning results is presented in table 3 below. All learning indicators are about system-level feedback loops. In other words, the indicators comprise the elements that are present on the EIA project level and, when learned, can enforce changes at the system level. Scores indicate the extent learning on the project level took place. Scores are based on a Likert scale and differ from very weak (--) to very strong (++). These scores are partly derived from statements of respondents during discussions, and partly based on direct indication of respondents during interviews. Strong learning effects on the project level signify a significant change at the system level. Apparent learning about substantive issues on the project level, for instance, means that actors gained knowledge which they can use in future EIA projects. Capacity to individually (i.e. without outside expert assistance) deal with the EIA in similar projects has grown in that case.

LEARNIING CHARACTERISTIC	SCORE FOR PROJECTS WITH NCEA ADVICE (--, -, -/+, +, ++)	SCORE FOR PROJECTS WITHOUT NCEA ADVICE (--, -, -/+, +, ++)
-Topic of learning:		
1. Substantive issues	++	-/+
2. Process issues	-/+	-
3. Skills	-	-
4. Compliance issues	+	+
5. Compliance enforcement	-	-
6. Double loop learning	-/+	--
-Levels of learning:		
1. Individual learning	+	-/+
2. Organizational learning	-	-
-Extent of learning:		
1. Acquire new knowledge about EA	+	-/+
2. Change of mind	-/+	-
3. Behavioural change	-	-
-Learning mechanisms/stages:		
1. experiencing (new experiences)	+	+
2. reflecting	-/+	-/+
3. thinking	-/+	-/+
4. acting (based on new insights)	-	-
-Conditions for learning		
1. Availability of information	-/+	-/+
2. Dissemination of information	-/+	-/+
3. Ability for abstract thought	+	-/+
4. Discussions between key stakeholders about lessons learned	-/+	-
5. Capacity authorities to translate lessons into practice	-/+	-/+
6. Enabling (political) context	-/+	-
7. Time to learn and implement lessons	-/+	-/+
8. Moments of reflection on lessons learned	-	--

Table 3: Summary and valuation of system-level learning results for Ghana

4

THE CASE OF THE MALDIVES

“Legally the authorities for the environment have enough power, but all animals are equal in the animal farm”
(Maldivian authority for environment)

4.1 Introduction

“The Maldives is at the crossroads of three major transitions: the widespread movement in support of a full-fledged democracy, the economic emergence of the country as a middle-income nation and the natural phenomena of global warming and rising sea levels. Managing the convergence of these transitions is at the heart of the development reality of Maldives” (CSSR 2010; 1).

The Maldives is a Sunni Muslim country of low lying islands in the Indian Ocean, approximately seven hundred kilometres to the south-west of India/Sri Lanka (see figure 4.1 below). Local Maldivians tend to say that “the Maldives consists of ninety nine percent of water and one percent of land”, which is not too far out. A total of eleven hundred and ninety coral islands are grouped into twenty six atolls, approximately two hundred are inhabited and eighty function as tourist resorts. Current population rate is estimated at three hundred ninety five thousand six hundred and fifty, with a growth rate of 0,178 percent (CIA 2010). Thirty eight percent of the population lives in the city, with an 5.3 percent annual rate of change. The rest live on the islands many of which are inhabited by fewer than two hundred residents (UNSSC 2010). Literacy is high: everybody above fifteen years of age can read and write. Maldives is a republic, with Mohamed “Anni” Nasheed as the chief of state and head of government since November 11th 2008. The legal system is based on Islamic law with a mixture of English common law primarily for commercial matters. The administrative division divides the ninety atolls and the capital Male, with Atoll chiefs¹³ as the principle administrative authorities.

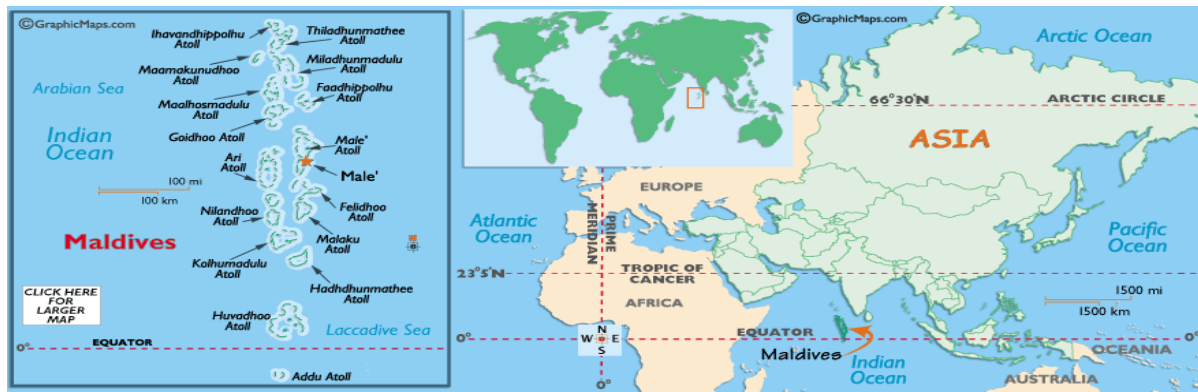
The islands are on average one and a half meter above mean sea level; the lowest point is zero meter and the highest point is 2.7 meter above mean sea level. Eighty percent of the Maldivian lands lie just one meter above sea level (CIA 2010), making the country rather vulnerable for sea level rising. Tourism is the largest economic activity, which accounts for twenty eight percent of the GDP and for more than sixty percent of all foreign exchange receipts. Over ninety percent of government tax revenue comes from import duties and tourism-related taxes. Fishing is the second leading sector. Agriculture and manufacturing continue to play a lesser role in the economy, constrained by the limited availability of cultivable land and the shortage of domestic labour. More staple foods must be imported.

Most striking environmental issues to date in the Maldives are: depletion of freshwater aquifers which threatens water supplies. Global warming and sea level rise and coral reef bleaching. The Maldives are party of the following international agreements: Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Hazardous Waste, Law of the Sea, Ozone Layer Protection and Ship Pollution.

Political context

The Maldives has a presidential system of government with a separation of powers between the executive, the legislative and the judiciary, guaranteed under a Constitution that was enacted in 2008. The president and the vice president are elected directly by the people in a popular vote. Last

¹³ Being: Alifu, Baa, Dhaalu, Faafu, Gaafu Alifu, Gaafu Dhaalu, Gnaviyani, Haa Alifu, Haa Dhaalu, Kaafu, Laamu, Lhaviyani, Maale (with national capital island Male), Meemu, Noonu Raa, Seenu, Shaciyano, Thaa, Vaavu.



Map 2: Geographical map of the Maldives

Source: WorldAtlas.com

elections were in 2008, to be held again in 2013. The Majlis, or parliament, has 77 directly elected members. The new parliament was sworn into office in May 2009 (MIADHU 2010).

Due to political reform in 2008 powers shifted: The environmental protection agency (EPA) was assigned with more powers to authorize and execute environmental management in general, and EIA in particular. Allocation of particular powers and responsibility resulted in accountability problems during EIA performances, which are described below. At time of writing the current cabinet resigned as a protest to the non-cooperative attitude of parliament, that earlier submitted no-confidence notes to several ministries and threatened to submit more. Democracy is developing gradually in the Maldives to date.

Before 2008, the Ministry of Environment and Construction (MEC) and later the Ministry of Energy, Environment and Water (MEEW) were the prime authorities for environmental management in the Maldives, including the approval of EIAs. The tsunami of 2004 triggered a sensitive political climate; allocation of donor funds lead to fierce discussions and political games. Focus of interests were mainly on socio-economic issues; the environment got a low priority and weak political support.

Post tsunami context; safe island strategy

On the twenty sixth of November 2004 an earthquake resulted in a tsunami in the Indian Ocean. Apart from the tragic costs of lives, the tsunami wiped out thousands of kilometres of coastal areas, including human settlements. The Maldives was one of the most affected countries in per capita economic terms. The financial impact was equivalent to sixty two percent of the GDP, or three hundred and seventy five million euro (EC 2007). The tsunami was the worst natural disaster experienced by the Maldives in recent history. Of the two hundred inhabited islands, thirteen were totally destroyed, fifty six suffered major damage and one hundred and twenty one experienced moderate damage (EIA report Vilufushi).

In 2007 already considerable progress was made in the economic recovery of the Maldives: the vast majority of tourist resorts were open again for business, most of the homes were being rebuilt and livelihoods restarted. Main challenges that remained were mainly about sea level rise and the dispersion of population across the archipelago –which raises the costs of delivering social services to the population. A long term strategy was drafted by the Ministry of Planning and National Development to address these two problems, already before the tsunami stroke. This “Safe Island Program” or “Focused Island Program” (currently “Resilient Island Program”) is meant to attract the population to preselected islands, in each of the twenty atolls, that can function as so-called *safe islands*. Risks of future natural and other disasters are mitigated on these islands by several environmental measures like land reclamation, sea walls, the construction of environmental

protection zones (vegetation enclosure surrounding the island) and drains to clear away floods in high tide times (EIA Vilufushi). Furthermore, economies of scale are attempted to be realized to provide public and private services in the selected island (EC 2007). The two EIAs under study in this report both consider a land reclamation project with above mentioned safety measures: Vilufushi and Viligili are safe islands as defined in the safe island strategy plan of the Maldivian government.

Geophysical features of Vilufushi and Villigili

For the islands the monsoon seasons are important for the current flow changes accordingly. The South-West monsoon continues for approximately 8 months while the North-East monsoon takes up the other 4 months.

-*Vilufushi* is an island 186.8 km from the Maldivian capital island Male, in the north-east corner of the roughly circular shaped Thaa atoll. This atoll has an average diameter of 45 km. with the deepest point inside the atoll of 88 meters depth in the centre. The Dhaalu and Meemu atolls are the northern neighbours that are separated by approximately 17 and 28 wide channels with a depth of about 500 meters. Vilufushi faces the island Kolhufushi on the Meemu atoll across the narrowest part of the channel between Thaa and Meemu. The island is bounded on the east by a coral reef located roughly 1 km offshore. Before the tsunami stroke and subsequent reclamation and reconstruction works commenced the island was flat with elevation of maximum 1 meter, barely 1 km long and up to 300 meters wide; providing a total of 13,5 hectares of land (cf. La Mer Group 2006). After the reclamation project the new land area is sixty one hectares (0.61km²), and the entire island has been leveled to +1.4m above MSL (cf. NDMC 2010).

-*Viligili* is the capital island in the eastern rim the Gaafu Alifu Atoll, the Upper South Province of the Maldives, and lies about 380 km from the national capital island Male. Gaafu Alifu Atoll is an administrative division of the Maldives created on February 8, 1962 when Huvadhu Atoll was divided into two districts. Gaafu Alifu corresponds to the north-eastern section of this large natural atoll, north of the line extending between the channels of Footukandu and Vaarulu Kandu. Total reclaimed land on Villigili is 15.0 Ha. Density is 36,0 per/Ha (Maldivian Government 2010).

Reading guide

Chapter four discusses the EA practices in the Maldives and the EIAs of the land reclamation projects on the Vilufushi and Viligili islands. Below section 4.2 starts with a brief description of land reclamation and reconstruction projects. Section 4.3 discusses the learning outcomes, starting with the performances on the project level, which scaffold the learning effects on the system level. The latter are described in sub-section 4.3.2. Section 4.4 presents a comparison with projects that did not receive NCEA advisory assistance. In section 4.5 the learning results are analysed; learning outcomes are explained and future challenges defined. This chapter ends with a summary in section 4.6, where a table with scores based on a Likert scale is presented.

4.2 The land reclamation and reconstruction projects

In 2005 and 2006 land reclamation projects on two tsunami stricken Maldivian islands –Vilufushi on the Thaa Atoll and Villigili on the Gaafu Alifi Atoll– were initiated by the Maldivian Ministry of Finance and the Ministry of Planning and Development. The proposed projects aimed at enlargement of existing land, partial levelling and the construction of a bund wall (revetment)¹⁴ for protection against sea level rise and high waves. The construction works were performed under the heading of a “safe island strategy” (now: “resilient island programme”), a pre-tsunami policy framework planned to create resilient islands that could function as safe locations for Atoll residents in times of hard weather –e.g. storms or tsunamis–, and central places capable to cater for large populations. The Netherlands bank for development (FMO) granted financial support for the projects on a fifty percent loan and fifty percent donation basis. A Dutch dredger company was selected for the dredging works. Both projects required an EIA according to the Maldivian Environmental Protection Act (4/93) which were performed by a Dutch consultancy firm upon request of the contractor. Subsequently, FMO requested the NCEA to assess the quality of several EIA outputs (see table X) and provide recommendations for follow up, as a safeguard for their financial assistance. For the Vilufushi project the Ministry of Environment and Construction granted approval after a satisfying completion of the EIA study, for Villigili the decision statement was issued by Ministry of Energy, Environment and Water (now: Ministry of Housing, Transport and Environment).

Vilufushi project

Before dredging and reconstruction activities commenced most of the inhabitants of Vilufushi moved out to the neighbouring island Buruni, and some went to the capital Male. Consultation with the representative of the public, including the island chief and his administration, lead to the agreement that the Vilufushi island required reconstruction from scratch. The plan was to create a safer and larger island for the residents as well as for the population of some other smaller nearby islands. The project involved an increase of the level of a part of the original island and the reclamation of a part of the surrounding shallow reef flats, to provide extra land for residential purpose and an more extensive social infrastructure that could cater for a population size up to five thousand residents. According to the Maldivian authorities the project was executed according to plan. The island has been rebuilt, including extensive land reclamation, topographic levelling, coastal protection, new housing and new public infrastructure. All existing structures on the original island have been removed and new land has been reclaimed to make Vilufushi four times its original size (cf. NDMC 2010). In addition, two thousand meters of revetment around the island was constructed, as well as a new fishing harbour. The harbour includes three hundred fifty meters of breakwater and fifty meters of quay wall. The required amount of sand for reclamation is estimated at about 1.1 million m³ (NCEA 2005). In the EIS the required equipment was described as a medium sized cutter suction dredger, a pipeline system and various bulldozers and wheel loaders. In practice, however, the contractor used one of his largest sized cutter suction dredgers for logistic reasons.

Villigili project

Due to relatively less tsunami caused damages on Villigili, residents could remain in the island whilst land reclamation and reconstruction activities were performed. According to several project co-operators this made working on the island harder compared to Vilufushi works for the constant

¹⁴ The revetment consists of fine coral rock, a layer of geo-textile and large rocks on top. Small coral rocks lay along the coastline at the foot of the revetment. This construction prevents erosion and absorbs the energy from the hitting waves.

mingling of residents with the work in progress. The project involved similar activities as the Vilufushi project: land reclamation, levelling, social infrastructure extension and reconstruction of facilities destroyed by the tsunami. On this island the plan was executed as well but is not finished up to moment of writing. Some residents still live in shelters and several elements of the social infrastructure are not fully constructed and in operation. Land is reclaimed though and coastal protection measures are implemented along the shoreline of the newly reclaimed area.

4.3 EIA learning outcomes

Here we discuss the learning outcomes in practice. First the EIA project performances are described, including their outcomes on the project level, before the learning results on the system level are presented and discussed in the light of the EIA performances.

4.3.1 EIA project level performances

For both projects an EIA study was performed by a Dutch consultancy firm at the request of the contractor. Upon FMO request, the NCEA delivered various advisory comments in different reports: a review of the IEE of Vilufushi, an advice on ToR for Vilufushi, an advisory review of the preliminary EIS of both projects, an assessment of the SIA for Vilufushi and an assessment of the Monitor Plan for Villigili. Copies of the NCEA comments were also sent to the relevant ministries in the Maldives. Based on the NCEA reports the FMO guided their formal approvals for assistance with particular conditions. The Maldivian authorities based their decision statements and project approvals partly on the EIA reports, which incorporated the review comments of the NCEA. Together with the consultants they regard both EIA studies as rather successful and of a good quality. However, the general conviction is that the EIA processes for the Villigili project are more enhanced and the EIA report is of better quality. Still to date the EIA reports and NCEA advisory notes¹⁵ are used as examples for the development of generic guidelines and best practice reference points. Baseline data in the EIAs have been copied for several other development projects in the Maldives. The National Disaster Management Centre (NDMC) now uses the EIAs as a reference for their disaster risk mitigation programme.¹⁶

For both projects an Initial Environmental Evaluation (IEE) was performed. The IEE for Vilufushi was reviewed by the NCEA. Comments of the Netherland Commission that were submitted to FMO included recommendations to perform a SEA and forward the IEE to the Ministry of Environment and Construction (currently two separate ministries) and the license agency for decision on the need for a full EIA. The latter was done and the Maldivian authorities together with the international donor agency (FMO) requested an full EIA study from the contractor, who hired a Dutch owned private consultancy firm for the job. An SEA was never performed but is currently an issue that is discussed by the MHTE and the EPA, yet without any concrete measures for application. The latter is explained as a lack of know how: "We lack direction and know how about the operationalization of SEA" (MHTE). Terms of reference (ToRs) were drafted for both projects by the consultancy firm and approved by the Ministry of Environment and Construction (Vilufushi) and the Ministry of Energy, Environment and Water (Villigili). Again, the NCEA provided advisory comments for the Vilufushi scoping document. The comments were largely taken into account as the outline of

¹⁵ This specific link is partly due to recommendation of the researcher during field work, and partly due to an internet searches of the EPA.

¹⁶ Need and relevance of EIA studies are explicitly mentioned in their latest report (see NDMC 2009).

the EIS proves. Moreover, the ToR for Villigili resemble the NCEA quite specifically proving a learning effect for both the consultant and the Maldivian authorities.

The public of both islands were heard on several occasions and (small) comments are said to be taken into account. However, neither the documents nor the key actors can prove that actual public consultation was effectively performed, and many state the reverse was true. Rather, project specifications were *presented* to island residents and only specific details were discussed. For Vilufushi most important issue for the public was the size of the new plots, which could not be discussed with the only agent in charge of public consultation (British Red Cross) for they regarded it as a government issue; government actors never showed up to confront of the people though. NGOs state that consultation was primarily done with officials of the island; community level consultation did not take place. Furthermore, due to a striking lack of technical knowledge and a poor information dissemination by the Government officials, the public did not have many opportunities to choose between alternatives: “Without information you have no option to choose from. People did not know better. Public consultations can be really disastrous in that cases as well: The construction of the harbour was done according to the high pressure public demand. Now people have to deal with the problems in the harbour (e.g. sedimentation, erosion and more shallow area) they face to date” (NGO member).

The contractor prepared several interim monitor reports and one final report that was published in Tera et Aqua (2007), a quarterly publication of the International Association of Dredging Companies. This report was not disseminated to Maldivian authorities, who up to date have no knowledge what so ever about the existence of monitor reports except the reports written by the CDE consultant and the UNDP about risk assessment and mitigation (changes on the Vilufushi and Villigili islands are described here, to some extent). Capacity for own monitoring programmes at the ministries and the EPA is strikingly lacking, as is the capacity and legal backing for compliance enforcement. Regulations for the latter are under construction at time of writing this report.

EIA follow-up seems to be problematic for both projects. A lacking inspection and monitoring system in the Maldives causes gaps in knowledge about levels of compliance. No agency performed specific monitoring of compliance issues for the Vilufushi and Villigili project progressions. The existence of monitor reports of the contractor (dredger) was unknown by current key actors, including the MHTE, EPA and the consultancies working for the NDMC. Only one EPA member found the report after internet searches. Lacking insights in biophysical developments on and around the islands renders many questions by the main authorities and consultancy researchers. Most important ones are:

- What are the changes in the currents along the islands, and their effects on the long term?
- What are the exact levels of erosion (now only photographic material as rough indication) and what levels can be predicted due to a lacking enclosure on both sides of the harbour (Vilufushi) of on the non-reclaimed side of the island (Villigili)?
- What are the exact levels and effects of the noticed sedimentation and waste in the harbour and on the southern shore line of the island?
- What is the recovery time for the (yet salty) groundwater?
- Does the borehole attracts erosion, and what are the consequences?
- What about the drainage systems: a lacking drainage canal between the original and reclaimed land possibly causes flooding in the lower hand-reclaimed parts on the original land (Villigili), or flooding in the centre (Vilufushi).

- What are the socio-economic consequences of a harbour that is developing more shallow and how can the harbour be designed and reconstructed to make it more usable on the long term (effectiveness and efficiency)?
- What are the long term effects of increased wave power on the shore line (issue of coastal protection)?
- What measures can be taken for a proper waste disposal and management that is currently affecting the nature on and along the island?
- What are the possibilities for more economic activities and job creation for island community that is a current dire need?
- How can the agriculture on the island be improved?

The EIAs outlined the mitigation measures that were used by the Maldivian authorities during the decision making process. Compliance to the conditions noted in the decision statement, and adherence to these mitigation measures, was satisfactory: all measures defined in the decision note were taken according to the Ministry of Planning. Sedimentation was largely prevented due to the construction of a bund before dredging commenced, which was one of the main concerns. The monitor reports of the contractor conclude that no adverse effects on the environment were measured. Problems described in the Monitoring Report that did occur were:

- The maximum allowed value for sedimentation was exceeded (relatively little) in week 4, location 3 (see Boskalis 2007)
- More suspended solids left reclamation area in week 24
- Suspended solids and sediments sounded the “alarm” by the end of week 25 (work virtually completed)
- “The limit values for sedimentation were exceeded during the project at some locations (near the outlet of the reclamation area), this occurred during a very short period only, up to maximum one week” (Boskalis 2007).

However, all other values remained within the predefined limits. The Maldivian Ministerial authorities did not receive complaints of the island inhabitants and regard the social habitat, including fishing possibilities, as satisfactory restored.

Social Impact Assessment

A Social Impact Assessment (SIA) was performed as was recommended in the NCEA advisory review of the EIS for Vilufushi. However it was meant as a socio-economic addendum to the EIS which did not become clear in the SIA report. Furthermore, consultations with the public were held but only via focused group discussions were different stakeholder groups joined simultaneously; separate interviews could have specified official points of view concerning the negative impact of the reconstruction plan, and thus give it greater importance in efforts to address these (see NCEA advice on SIA 2007).

No reference was made to the SIA or the NCEA comments on the SIA report in the 2009 Detailed Island Risk Assessment, Volume 3; Detailed Island Reports¹⁷, which presented a socio-economic assessment of Th. Vilufushi (Th. Vilufushi part 2). The SIA study is not mentioned, and even the EIA is neither referred to nor mentioned. The former project manager of the Red Cross, responsible for public consultations and the reconstruction of the houses, do recollect to have seen the report but did not use the content or outcomes.

¹⁷ The publication is a draft version compiled by DIRAM, the research team of the Housing and Infrastructure Redevelopment Unit (HIRU) that falls under the Recovery and Reconstruction branch of the NDMC.

4.3.2 Learning outcomes on the system level

Projects with NCEA advisory assistance

Below table 4 presents the learning outcomes on the system level for the two projects that received NCEA assistance. Indicators are further explained in the subsequent sub-sections. A comparison with projects without NCEA interferences is presented in a following section below.

	<u>Vilufushi</u>	<u>Villigili</u>
<u>Output EIAs</u>	<ol style="list-style-type: none"> 4. IEE 5. ToR 6. EIS 7. SIA 	<ol style="list-style-type: none"> 1. IEE 2. ToR 3. EIS
<u>Output NCEA</u> (for details see appendix X and X)	<ol style="list-style-type: none"> 1. Review of IEE 2. Advice on ToR 3. AR of preliminary EIS 4. Advice on SIA 	<ol style="list-style-type: none"> 1. AR on preliminary EIS 2. Advice on EMP
<u>System learning outcomes in practice</u>	<ol style="list-style-type: none"> 1. Enhanced awareness and capacity for EIA 2. Awareness and attention for EA integration in planning (SEA) 3. Identification of system bottlenecks 4. Development of regulatory framework for EIA 5. Awareness and attention for SIA 6. Increased attention for and knowledge about public consultations 7. Awareness of environmental problems in general 8. Empowerment of local governance 9. Empowerment EPA and EIA 10. Enhanced institutional organization 11. Attention for and knowledge about monitoring 	

Table 4: System-level learning outcomes in the Maldives

4.3.2.1 Enhanced awareness and capacity for EIA

The EIAs of the Vilufushi and the Villigili project triggered more attention for the relevance of sound EIA procedures. Due to the international attention based on donor finances both assessments were taken serious by the Maldivian authorities. To date the EIAs are regarded as examples of international best practices (“We can’t ignore this”) and occasionally referred to in other similar projects to safeguard long term interests¹⁸, and even for the construction of a generic, legal EIA framework. “The EIAs of Vilufushi and Villigili raised the bar and set a standard. They are a point of reference now” (EIA authority). Increased awareness lead to more attention for EIA execution in practice, which resulted in more EA applications annually (no exact numbers available) and an increased attention for the outcomes in practice: “EIA offers options for environmental protection that were otherwise never even considered” (EIA authority). Now all projects need a formal EIA – before mainly projects within the marine areas did– and the EPA attempts to make sure all proposals do abide by this rule, including the proposals coming from governmental agencies.¹⁹ Financial aspects still stalemate full execution in practice, though. Due to the lacking capacity of most proponents outside experts (consultancies) need to be hired which is a costly and often reluctantly accepted manner to proceed.

The awareness and attention was triggered by above mentioned EIAs, but also gained strength

¹⁸ Often mentioned examples are: Coping with, and mitigating effects of Climate change, seal level rise, natural hazards, vegetation preservation and ways to streamline the water currents.

¹⁹ Before 2007/8 most governmental initiatives were more or less immune for EIA regulations.

due to the tsunami strike in 2004 which raised insights in the vulnerability of Maldivian islands and the need to safeguard residential areas for similar future disasters. The EPA and other authorities still lack the capacity to safeguard compliance and monitor post-EIA activities. However, there is more knowledge and subsequent attention for the problems that (may) arise and several discussions are actively held about ways to improve the EIA performances, even on the highest political levels.

The Vilufushi and Villigili EIAs, once perceived as setting examples, defined a proper standard for the design and content of the assessment, including the scope, procedures, foci and minimum requirements also for large scale (reclamation, island development) projects. Timely execution is now perceived as pivotal; EIAs in an early project stage are more effective. The ToR are thereby regarded as crucial: *“Failures in practice we notice to date are not always due to the EIA as such, or a limited compliance, but to weak terms of reference that should have been more extensively defined already in the beginning”* (Expert in the field).

4.3.2.2 Awareness and attention for EA integration in planning (SEA)

Most negative changes in practice (see table 4 above) can be explained by an ill integration of EIA results in the planning and design of the islands after reclamation works were finished. Actors responsible for the planning and design of both islands acknowledge that they did not or solely screened the EIA report(s) and that the outcomes were not consciously taken into account. Current discussions about the achievements and future challenges on the islands do draw attention to the EIA in general, and to environmental and socio-economic considerations in particular, though. During field work SEA was repeatedly mentioned as a necessary instrument for future developments in the Maldives and to effectively implement the learning effects of both Vilufushi and Villigili. *“We know now that our plans need to consider environmental and socio-economic aspects better. SEA is important but we need more knowledge about that”* (EA authority). Capacity and knowledge are strikingly lacking, still, but the GoM ordered the EPA to initiate a generic framework for SEA which might be an important first step.

The NCEA repeatedly argued in their different advisory reports about the need and relevance for SEA in the Maldives, especially for the development of the safe island strategy. The post-tsunami, political context could not facilitate such an attempt though. Neither a clear defined regulatory framework nor political will and power could account for a follow-up to the recommendations concerning SEA. Learning effects awaited a facilitating context which seems to be merging to date. However, not the NCEA comments but the project outcomes and subsequent discussion, including the discussions during the field work with the author of this report, triggered the learning effects on the system level. Now, forceful steps also within the regulatory framework are needed to realize an effective integration of environmental and socio-economic considerations in the planning and design of (large-scale) projects in the Maldives. Some still doubt about the capacity base and intentions of key actors: *“SEA is now the right thing to do, but the government is not ready yet”* (key actor in planning).

4.3.2.3 Identification of system bottlenecks

Experiences with the environmental and socio-economic consequences of the reclamation and reconstruction projects on Vilufushi and Villigili raised awareness about the current EIA system bottlenecks. In a reaction to statements about the EIA outcomes in practice, most respondents themselves listed several issues that explained the problems noticed on the islands. Most of these issues were about the lacking elements of the EIA system which, once enhanced, could safeguard

more delicate outcomes in the future. Examples are: more legally based rules and regulations to force more extensive EIA performances including scope meetings and public participation, enhanced information dissemination to inform all stakeholders better and provide opportunities for reactions, increased EPA monitoring and compliance enforcement to safeguard positive impacts and environmental protection better, and structural archiving of data to facilitate evaluation, inspection and the availability of project related information. System bottlenecks are discussed in more detail in section 4.4.

4.3.2.4 Development of regulatory framework for EIA

The emerging awareness for and execution of environmental management in general and EIA in particular, triggered by the post-tsunami reconstruction projects including Vilufushi and Villigili, clarified the main weaknesses in the regulatory framework for EIAs. In a reaction formal guidelines were defined in 2007, including the manner of approval (decision statement, where conditions can be defined) but did not hold in court due to absence of translation into local vernacular, an obligation accounted for in the national constitution. The translation is finished at time of writing this report. To date the EPA and the Ministry of Housing and Environment are working on an extended set of rules and regulations for EIA, including more specific guidelines and generic frameworks for EIA elements such as ToRs or EISs. The EIAs and the NCEA comments are used by EPA members as examples and a control measure for best practices.

Before the legally-based EIA guidelines of 2007 many projects were performed without an EIA study or formal approval. Still to date several projects are initiated and executed without an environmental permit. EPA is lacking manpower and capacity to fully guide and authorize EIAs according to the need in the country. From the approximately two hundred and eighty EIA applications per year, only two are disapproved. Others are approved under specific conditions, though their compliance is hardly ever monitored or enforced due to the lacking institutional capacity. Compliance inspections, monitoring and enforcement are the most apparent weaknesses of the EPA to date, and the regulatory framework is not sufficiently strong to overcome these inadequacies in practice.

Recent developments are promising, though. Political decentralization is planned to be translated into the EIA regulations as well, and is partly already achieved, and environmental considerations within development projects are mandatory by the rule of thumb. For instance, approval of the island office is a formal requirement now and development projects are expected to take green spaces (vegetation) into account. The parental Environmental Protection Act (93/4) is being redefined as well, paying more extensive attention to EIA. Further, drafts awaiting extension and approval are the ones for fines for environmental damages and for legal monitor requirements. Some actors are still critical about these developments, accusing the authorities of solely paying lip services without really drawing lessons from past project for the development of a stronger and more extensive EIA regulatory framework.

4.3.2.5 Awareness and attention for SIA

The advisory comments of the NCEA for Vilufushi –where the need for a socio-economic addendum was forwarded (see appendices)– and the actual execution of the SIA triggered awareness about the importance to assess social consequences of a proposed initiative as well. Awareness lead to more attention for SIAs in other major projects and are now (partly) regarded as an important element in the national planning processes, including EIAs/SEAs. EPA members still remember the fact that the

SIA was performed and acknowledge that the learned to take social issues during reviewing into account as well.

4.3.2.6 *Increased attention for and knowledge about public consultations*

There is more awareness with Maldivian authorities, in particular on the island Vilufushi, about the need and possibilities for public consultation during different stages of an EA. One outcome of the public consultation on Vilufushi during field work was exemplifying. A sentence under the heading *lessons learned* stated: “*Environmental Impact Studies done for reclamation and shore protection should be carried out with public consultation*” (translation from local vernacular). NGOs are still critical about the manner public consultations are performed. They state that the public is barely heard and that initiatives are more presented instead of discussed with local residents: “*Because the project characteristics are too technical the public, lacking sufficient knowledge, has no option to choose from. Simply because they do not know better*” (NGO representative). However, the Vilufushi and Villigili projects accelerated attention for public consultations. Emerging capacity and regulations now need to enhance current performances.

4.3.2.7 *Awareness of environmental problems in general*

Here we discuss a side effect that does not directly signify a change on the EIA system level, but facilitates a supporting context for EIA and awareness about the EIA system challenges.

Due to the EIA report and the environmental concerns that played an apparent role during the land reclamation and reconstruction projects on Vilufushi and Villigili awareness was created about environmental problems in general and the need for sound environmental management in particular. For instance, (still) island inhabitants tend to demolish parts of the Atoll house reef to use the material for building purposes. New created openings in the reef empower the currents which leads to an increase of wave strength that hit the island coasts and cause coastal destruction. Another example is about the natural sand flow of the island; season based sand movement around the island is impeded in its natural flow of accretion and erosion due to man-built structures like harbours. Eroded sand now hits the current and is deposited somewhere else on the beach rock²⁰ of the Atoll. Awareness about the importance to pay attention to the development of corals, currents, sand movements and island forming processes (via monitoring) was accelerated by the EIAs for the Vilufushi and Villigili projects, and by the performances and consequences of the reclamation and reconstruction projects.

On Vilufushi more attention is paid to waste management (also to fight breeding spaces of mosquitoes) and the maintenance of the environmental protection zone, the revetment and the harbour area. Attention for environmental management was triggered by the manner mitigation measures were implemented during the dredging works, measures that were accounted for in the EIAs. The Vilufushi project was clearly a setting example for the importance and possibilities to take environmental issues into account during the policy making process. New plans for the island that are being developed to date –like the harbour expansion, recreation area on the newly sandy area north of the island, extension of fish market, creation of commercial port and distribution centre (all plans are still in draft phase)– are all accompanied with environmental considerations. The need for an environmental re-assessment, when entering the actual planning phase, is already stated by the former project manager.

²⁰ Black beach rock is the layer of material underneath the coral banks. It withholds the sediments (that is how island are formed) and is thus the skeleton of the islands.

Project briefings up to the president now include comments on the state of the environment and the manner environmental issues are dealt with. The life cycle or holistic perspective was described by several respondents during the interviews. Timely attention for the environment, meaning already early in the planning stages, was regarded important by various respondents as well. The disaster management include environmental considerations as well, often referring to the developments on the Vilufushi and Villigili islands. Furthermore, learning effects can be witnessed in four other land reclamation projects that are performed to date. Especially the performances to mitigate environmental damages –e.g. start with a bund wall before reclamation, perform coral studies and dredge only in the deep sea areas– are taken into account because of the learning effects from the former projects. NCEA comments now can be recognized in the ToRs and in EPA review comments.

In short, understanding about environmental management in general was enhanced due to experiences with the reclamation projects and the measures defined in the EIAs: “The environment previously was only a concept to us; now it is more” (expert in the field).

4.3.2.8 Empowerment of local governance

The EIA and the reclamation and reconstruction projects on Vilufushi and Villigili did empower local governance on the islands, including CSOs and NGOs, to some extent. Although no full recognition is achieved yet, the voices and opinions now are regarded as important and consultation has become a more prominent issue in the planning of development projects. Voices are better heard but even more so awareness about options for participation has increased significantly. People are now more aware what EIA is and what their chances for influence are. Given the recent decentralization and democratization of governance in the Maldives, actual implementation of lessons learned about local governance seems promising.

4.3.2.9 Empowerment EPA and EIA

After political reorganization in 2008 the EPA was rewarded with more power to act as the leading authority for EIA. The weaknesses in the EIA system were illuminated by, among others, the Vilufushi and Villigili projects and their consequences in practice. Lacking EPA authority, lacking possibilities for sound follow-up including compliance enforcement and improper EIA performances all became apparent due to the international attention during the reclamation and reconstruction projects where EIA was a strong condition and assessed by the NCEA. Awareness rose for the importance of prevention of environmental and socio-economic problems encountered on the islands to date. All positive effects on both islands, moreover, empowered the idea that sound environmental management could enhance project outcomes and impacts. The awareness and attention lead to a recognition that EPA and the EIA system as such needed more strength.

4.3.2.10 Enhanced institutional organization and awareness for further improvement

Together with the empowered EPA the institutional organization of EIA gained in strength, partly due to the experiences on Vilufushi and Villigili. Formerly EIA matters were authorized by the Ministry of Environment, a task of the EPA to date. It is now more clear which organization is responsible for what issue. The post-tsunami safe island projects were headed by a special committee where different ministries took a seat. The projects, in short, triggered the authorities to organize themselves better to safeguard sound project management, including the management of the environment. The enhanced institutional organization provokes attention for current flaws as well. Several respondent acknowledged during interviews that the institutional organization has improved,

but still lacks particular elements. For instance, EIA executors depend too much on the contractor, which makes them dependent and influences the quality of their work. In addition, the EPA is yet a part of the MHE and needs to be more independent to be able to critically comment on government projects as well. Last but not least, the context of EIA could be taken into account more delicately. Consultation and cooperation with Atoll and Island representatives should be common practice and institutionalized. These are all challenges recognized by different key actors. In short, the projects on Vilufushi and Villigili, partly due to the international attention and partly due to their post-tsunami character, evoked attention for the state of the institutional organization and triggered changes in authority and accountability that could be further enhanced to date.

4.3.2.11 *Attention for and knowledge about monitoring*

The Vilufushi and Villigili projects evoked attention for the importance of monitoring. Representatives of the MHE did read the monitor report of the contractor of Vilufushi via their publication in *Tera et Aqua* and learned about the ingredients and processes that are part of such an effort. Moreover, the NCEA stressed a sound monitor programme in their comments on the EISs of both islands which raised awareness about the needs and importance of follow-up activities. Complaints and problems in practice also triggered attention for monitor reports, which are often lacking in many EISs in the Maldives. Attention and awareness for monitoring lead to the formulation of the EMP as a legal requirement. At time of writing this report the EPA was asked by the MHE to make a list with all current projects that did not report on M&E.

4.4 Comparison with projects without NCEA assistance

During interviews respondents were asked to compare their experiences of the Vilufushi and Villigili projects with other projects where the NCEA was not involved. First striking differences noted was the international attention for the project. For Vilufushi and Villigili the funder, contractor and consultants all were international (Dutch) parties and brought their experience which was regarded as best practice in the Maldives who themselves acknowledge to lack both the capacity and knowledge to perform similar projects on a similar level. As a consequence projects with NCEA assistance are described as projects with a higher standard where more important details are taken into account. Furthermore, projects without NCEA assistance are confined to a more limited scope, less effective mitigation measures and a less efficient and extensive execution of the EIA. Respondents stated moreover that the attention for follow-up (more awareness) is significant higher, which leads to a better compliance in practice –*“EIA is there the baseline for compliance; in other projects contractors tend to forget to monitor”*– and more abidance to the regulations: *“There are also good EIAs in projects without NCEA aid, but often contractors don’t abide by our regulations to the fullest extent”* (EIA authority). According to another authority the presence of the NCEA safeguards an actual execution of the EIA: *“ In projects without international attention or NCEA advisory comments contractors behave differently. They would not leave any stone unturned to avoid an EA. They do their utmost best to argue why the project doesn’t need an EIA, instead of just performing one.”*

Examples of ill performed EIAs are mentioned for the Hulumale and Duwafuru islands. On the former various complaints were submitted to the Ministry by the public about increased sedimentation on the diving spots. The EIA of the development of Hulumale is judged as bad in quality and set-up. On the later houses that were built rather close to the shore were flooded due to

ill mitigation and protective measures. These problems were not noted on the Vilufushi and Villigili islands.

In sum, the projects with NCEA assistance seem to be performed with more environmental care based on an EIA of higher quality and detail. Mitigation and monitoring received more elaborate attention. The presence of international actors, including the NCEA, resulted in a kind of “*watch-dog policy*” that determined sound environmental behaviour of the contractor to a great extent: “*Without such NCEA comments the contractor would not care that much. He knows somebody is looking over his shoulder and needs to behave conform international standards or at least the agreements that were made based on the EIA*” (EA expert).

4.5 Analysis

Both the Vilufushi and the Villigili project rendered learning outcomes on the system level. Learning was triggered by (a) the EIA performances and (b) experiences with the project outcomes in practice. The latter is mainly about the problems both islands face to date. Learning was mainly about the design and contents of the regulatory framework, the capacity base of the key actors, the institutional organization for EIA, including governance for EIAs, and the generic EIA design and performance. Here we will briefly discuss these outcomes and attempt to define explanations.

International attention pivot for learning

For the Vilufushi project the ToR drafted by the NCEA were leading, while for the Villigili project the ToR drawn by the MEEW was leading. The latter was almost an exact copy of the ToR for the Vilufushi project, though. The EISs of both projects resemble to great extent the prescribed ToRs; the NCEA thus influenced the focus of the EIAs to a great extent. Together with their advice on the quality of the EISs of both projects, which was regarded important by both FMO and MEEW who partly based their decisions on the comments of the Commission, the NCEA influenced the decision of both projects in terms of scope and priority-based attention for environmental and socio-economic issues. Given the political turbulent and post-tsunami traumatized context, where environmental issues were rather neglected in most project cases, the contribution of the NCEA may be describes as essential for the sustainability profile of both projects, which is currently of a fair quality. Projects without comparable international attention, and without NCEA advisory assistance, perform lower in terms of environmental care and in many cases deliver poor quality EIAs according to the EPA, due to limited interests, (financial) resources and knowledge of contractors.

Other explanatory factors

The explanatory factors as defined in chapter two were present to a moderate extend in the Maldives. Information was available but only to a limited extent and due to ill storing and the absence of structural archiving after the political reorganization (EPA became main authority) many documents got lost. Information was only disseminated among the main authorities. Representatives of NGOs and CSOs did not get a hand on the reports. The monitor report of the contractor was only found on internet after individual search; many experts and authorities did not know about its existence. Discussions about the project performances, including the main concerns expressed in the NCEA comments and the EIS, took place nonetheless, and most people dealing with the project issues are educated and capable of abstract thought and analyses. Furthermore, the connection to and between main authorities in the field is rather short. Island chiefs and Atoll chiefs had contact with government representatives and also EPA members do know and discuss issues with the

members of the different ministries. Direct quality references were provided by the NCEA comments and by the EIA as such, that with all the international attention was regarded as a reference point for sound and high quality EIAs.

Due to restrained resources and in-house capacity the lessons learned could not immediately be translated into the practice of other projects and EIAs that followed the Vilufushi and Villigili projects. The political and regulative context did stalemate application of lessons learned further. The period of the Vilufushi and Villigili projects was characterized by an ill defined regulatory framework –no legally binding guidelines or formats for EAs were defined– and much power for the (international) private consultants who defined the standards for EA in practice. The only rules for EIA were stated in the Environmental Protection Act (4/93) which stated that all major projects should execute an EIA. The EPA was more a guiding body for the EIA performances; main authorities were the Ministry of Energy, Environment and Water (now: Ministry of Housing and Environment) and the Ministry of Planning. This changed only after the political reorganizations of 2008, when the opposition party was sworn into cabinet and the EPA was appointed as the main agency for EIAs.

Current status and the future challenges

To date, the EPA has all formal power and bases their actions upon a (still limited) book of guidelines for EIA that came into force in 2007.²¹ However, there are still apparent flaws: “The legal and institutional framework for the management of environmental issues is not very well co-ordinated and some of the existing laws are not properly enforced...[b]ecause of a lack of capacity, resources and trained personnel in the relevant departments, combined with the complexities of the legal system, crucial elements were reported to be overlooked in the very late 1990s...and were continuing to be overlooked...nearly ten year later” (Zubair et al. 2010; 5).

In addition, other bottlenecks in the Maldivian EIA system are based on a weak capacity base of the key institutions such as the Ministry for Housing and Environment, the EPA and the DMC. Especially the EPA still has a lot to win in capacity and in-house knowledge and resources. Structural archiving and information storage is part of that as well. Furthermore, the regulatory framework is not fully developed yet. The guideline of 2007 did not pass a recent court case due to the fact that they only existed in English, while a constitutional law states that rules only are legally binding when translated in the local vernacular. The book is translated at time of writing this report. In addition, follow-up in terms of compliance inspection, monitoring and enforcement is often rather weak or even non-existent, partly because of lacking capacity and resources of the EPA, partly because of restricted interest and attention for environmental characteristics of the project (-site) and the consequences in practice. The main system bottlenecks of the Maldivian EIA system are listed in table 5 below. These bottlenecks can also be read as future challenges, or points of attention, i.e. lessons that still need to be learned.

The learning effects and transform of knowledge from the Vilufushi project to the Villigili project were rather poor. Some terrestrial issues were taken into account more accurately based on Vilufushi experiences –mainly drainage canals to safeguard flooding puddles on the intersection of the newly reclaimed and the original land– but other learning effects are not noticed by the main authorities. One explanation is again the context that did not facilitate or actively support environmental management. Another explanation is the rather fragile institutional context of EIAs in that time; neither regulations nor organizations with clear mandates for EIAs existed. A third reason

²¹ At time of writing several guideline extensions, generic frameworks and extra rules and regulations were constructed but still in draft form.

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1. EIA follow-up is very weak; no or little field inspections, monitoring and compliance enforcement. Better EIA follow-up and control needed, including post-project surveys.
 2. Regulative framework: more legally binding rules and regulations needed, i.e. law based specifications of the parental Environmental Protection Act (4/93), including guidelines and a penalty act.
 3. Further formalizing EPA –institutional strengthening– including archive system, organizational learning mechanisms and capacity of staff.
 4. Availability, dissemination and transparency of information, including presentation and publication (websites).
 5. Cooperation and coordination with CSOs in general, and NGOs in particular, could be enhanced for more effective and efficient EIAs.
 6. Continue high priority for sustainability, i.e. long term vision for large scale projects including economic, social and environmental interests. Now the least environmental impact as defined in the economic/political context is an accepted goal; large projects now hardly ever get disapproved solely because of environmental concerns.
-

Table 5: current Maldivian EIA system bottlenecks

mentioned by key actors is the character of both projects, which is rather similar and is regarded as a straightforward set of processes with a clear objective: reconstruction and redevelopment.

The main future challenge seem to be the development of SEA. The NCEA underlined the importance for SEA development in their different advisory outputs but the recommendation was not taken up partly due to ignorance –the post-tsunami context marked a political sensitive time where a popular allocation of the large donor funds prioritized socio-economic development at the cost of environment considerations– and partly due to large bottlenecks in the EA system (see table above). To date, with an improved institutional arrangement and EIA guidelines (2007) in place attention for SEA gradually emerges. The president even ordered the EPA to initiate a preliminary framework. Knowledge about effective steps forward is still lacking though: “SEA is very important, but we need some help with that” (EIA authority).

4.6 Summary

A summary of the learning results is presented in table 6 below. All learning indicators are about system-level feedback loops. In other words, the indicators comprise the elements that are present on the EIA project level and, when learned, can enforce changes at the system level. Scores indicate the extent learning on the project level took place. Scores are based on a Likert scale and differ from very weak (--) to very strong (++) . These scores are partly derived from statements of respondents during discussions, and partly based on direct indication of respondents during interviews. Strong learning effects on the project level signify a significant change at the system level. Apparent learning about substantive issues on the project level, for instance, means that actors gained knowledge which they can use in future EIA projects. Capacity to individually (i.e. without outside expert assistance) deal with the EIA in similar projects has grown in that case.

LEARNIING CHARACTERISTIC	SCORE FOR PROJECTS WITH NCEA ADVICE (-, -, -/+, +, ++)	SCORE FOR PROJECTS WITHOUT NCEA ADVICE (-, -, -/+, +, ++)
-Topic of learning:		
1. Substantive issues	++	+
2. Process issues	-/+	-
3. Skills	+	-
4. Compliance issues	+	-/+
5. Compliance enforcement	--	--
6. Single loop learning	+	-
7. Double loop learning	--	--
-Levels of learning:		
1. Individual learning	+	-/+
2. Organizational learning	-/+	-
-Extent of learning:		
1. Acquire new knowledge about EIA	++	-/+
2. Change of mind	+	-/+
3. Behavioural change	-/+	-/+
-Learning mechanisms/stages:		
1. experiencing (new experiences)	++	-/+
2. reflecting	++	+
3. thinking	+	-/+
4. acting (based on new insights)	+	-/+
-Conditions for learning		
1. Availability of information	-/+	-/+
2. Dissemination of information	-/+	-/+
3. Ability for abstract thought	+	+
4. Discussions between key stakeholders about lessons learned	+	-/+
5. Capacity authorities to translate lessons into practice	-/+	-
6. Enabling (political) context	-/+	-
7. Time to learn and implement lessons	--	-
8. Moments of reflection on lessons learned	+	-/+

Table 6: Summary and valuation of learning results for the Maldives

5

Comparative analysis

In this chapter we briefly discuss the main similarities and differences between the outcomes of both the Ghanaian and the Maldivian cases, and relate this comparison to the causal research model in order to clarify the different outcomes in the light of the main research objective as defined in chapter two.

The analytical research model (see chapter two) states that system outputs, outcomes and impacts all have feedback loops in terms of learning mechanisms that affect the state of the system, i.e. the rules, regulations, procedures and capacities of the proponents, authorities, CSOs and epistemic communities. Research data of both the Ghanaian and the Maldivian cases indicate that three indicators determine the actual existence of these feedback loops, and their significance in practice: (1) The *topic* of learning, i.e. technical, process, skill and/or strategic matters, (2) the *characteristics* of learning, i.e. the level, extent and type of learning, and (3) the explanatory factors for learning, i.e. the affecting circumstances. Figure 3 below visualizes the (hypothetical) relations between the three indicators and the research issue.

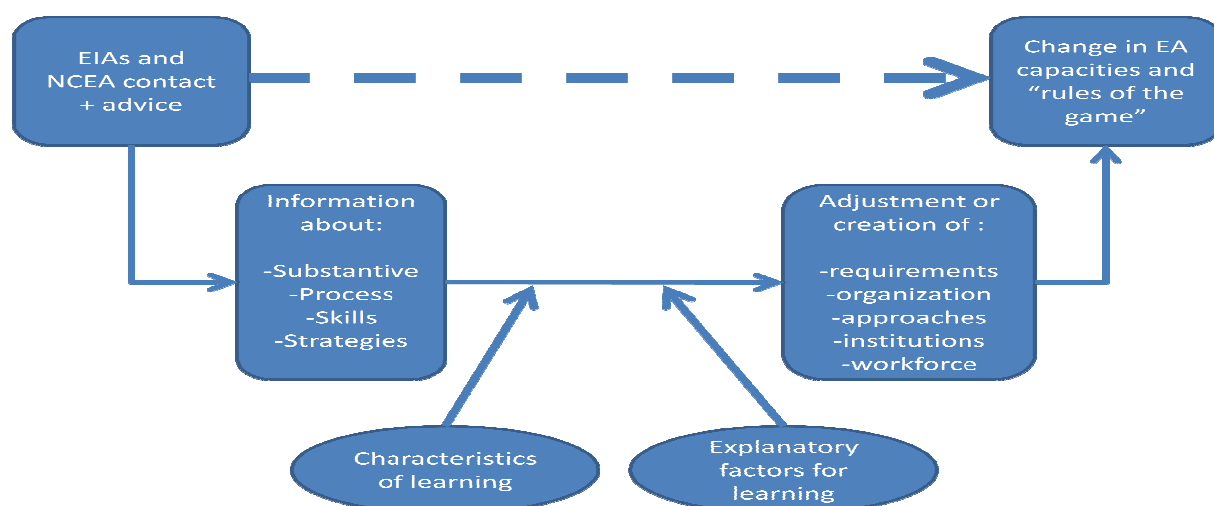


Figure 3: Causal research model

Topic of learning

Lessons that can be learned from the NCEA advisory review comments are about *substantive issues* – such as pipeline routes, marine ecosystem dynamics or potential emissions from construction processes– about *process matters* –such as the inclusion of stakeholder consultation at the start of the project, or the inclusion of an EMP in the EIS– and about *skills* –such as manners to enhance the review process or its output. As it turned out, in Ghana only the first category was actually learned while in the Maldives learning about processes and skills was more apparent. We come back to this in the next chapter.

Another topic of learning is about (policy) strategies to plan and execute EAs in a sound manner. Here technical management aspects and manners to enhance current approaches in practice, i.e. single loop learning, are differentiated from more revolutionary changes in current organizational strategies and policies, i.e. double loop learning.²² The former does occur both in Ghana and the Maldives but is

²² Differences between single and double loop learning resonate the differentiation between technical and conceptual learning (cf. Nilsson 2006). Technical learning is oriented at action and manners to perform certain policies or programs, like

mainly characterized by fact learning –typical technical, project-related aspects like pipeline materials or revetment construction tools– that is rather goal oriented (i.e. realization project) instead of process oriented. Consequently, lessons about management processes are weak or absent and shared by a limited amount of people, who in the case of Ghana are all part of the EPA. A weak dissemination of information and knowledge within and between organizations causes the results of single loop learning mechanisms to be rather ad hoc. On the system level, thus, single loop learning causes enhanced capacity in terms of practical, factual knowledge.

Signs of double loop learning are rather mixed. In the Maldives no significant sign of double loop learning were found, although the comments about a more strategic use of EIA (especially SEA) of the NCEA even during the field work are picked-up at time of writing and even communicated with the president. In Ghana there are signs but focused on specific issues (SEA and decentralization, see chapter three). It seems that on the project level strategic issues are hardly ever discussed. Experiences with the NCEA advisory assistance for the Ankobra and WAGP project in Ghana for instance, equal experiences with projects without NCEA interferences in terms of double loop learning: underlying policies are not questioned, rather implemented and sometimes only slightly adjusted.²³ As a consequence, double loop learning mechanisms on the system level are rather weak, similar to the Maldivian case. This might explain the inaction in organizational learning (no real reflection on organization' capacities) and in the development of a structural knowledge base within the EPAs.

Characteristics of learning

The causal link defined by the topic of learning does not illuminate the required *level of learning*. Solely individual learning does not suffice, for system elements are mainly about organizations and institutions. Individual learning precedes organizational learning, though (cf. Argyris and Schon; 1978). Organizational learning is thereby the integration of lessons learned by individual co-workers in the organizational policies. For both the Ghanaian and the Maldivian cases it can be noticed that individual learning did occur but organizational learning was rather limited. Mainly due to lacking organizational mechanisms that could safeguard organizational memory –like archives and reflective meetings– lessons were not integrated in the organizational policies. This will be further discussed in the conclusions in chapter six.

Understanding the appropriate level of learning does not suffice either, for it does not clarify the required *extent of learning*. Solely information gathering does not suffice; information needs to generate changes in cognition (i.e. interpretation) and behaviour (i.e. internalization) to trigger changes on the system level (c.f. Nilsson 2006). In other words, the extent of learning can be measured via three empirical key elements: knowledge acquisition, interpretation of knowledge and institutionalization of knowledge (*ibid*). The first is about the assimilation of experience as well as new ideas and concepts from other actors. The second is about gaining new understandings of cause-effect relations of policy problems and how to resolve them. Institutionalization of knowledge comprises the processes of incorporation of knowledge into procedures, rules, policies, and other tangible outputs for implementation. As it turned out, the scores are different here. In Ghana learning was limited to knowledge acquisition in most cases, while in the Maldives the lessons changed the mindset of EIA stakeholders to various extents; even to date the EIA cases, including the NCEA comments, are used as examples of international best practice. In this case the extent of learning reaches towards

arranging public hearings or studying ecosystem dynamics, while conceptual learning is more about the ideas and theories that constitute a mandate for action, like plans about EA sequences or about the manners to involve different stakeholders. For this research we used the terminology of Argyris, although overlap with the terminology of Nilsson is never denied.

²³ The latter occurred in the WAGP project where an extensive review team was set-up.

institutionalization of knowledge, although the political context impeded a rapid change in behaviour and results still need to prove their significance in practice to date.

Last but not least, the extent of learning does not tell us the whole story. We still need to define the mechanisms that trigger or generate learning. New experiences alone are not enough but need to be translated via reflection and thinking towards new actions (c.f. Joy and Kolb 2009; Jha-Thakur et al. 2009; Kolb and Kolb 2008; Kolb 2005; Mainemalis et al. 2002; Kolb 1976). In other words, to understand the feedback loops between the project and the system level the type of learning mechanisms needed to be analysed as well. The Experiential Learning Theory (ELT) of Kolb (1976) is often referred to in this case and is used by the NCEA in their capacity development programmes as well. The ELT is a holistic theory of learning and highly interdisciplinary (Kolb and Kolb 2008). ELT defines learning thereby as “the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of *grasping* and *transforming* experience” (Kolb 1984, 41; cited in Mainemalis et al. 2002, 5; own stress). Moreover,

“[t]he ELT model portrays two dialectically related modes of grasping experience –Concrete Experience (CE) and Abstract Conceptualization (AC)– and two dialectically related modes of transforming experience – Reflective Observation (RO) and Active Experimentation (AE). Experiential learning is a process of constructing knowledge that involves a creative tension among the four learning modes. This process is portrayed as an idealized learning cycle or spiral where the learner “touches all the bases” –experiencing, reflecting, thinking, and acting– in a recursive process that is responsive to the learning situation and what is being learned. Immediate or *concrete experiences* are the basis for observations and *reflections*. These reflections are assimilated and distilled into *abstract concepts* from which new implications for action can be drawn. These implications can be *actively tested* and serve as guides in creating new experiences” (Kolb and Kolb 2008; 298-99).

In short, studying learning mechanisms aids to understand to what extent actors have concrete experiences with the project processes, to what extent they translate experiences into concise logical forms (inductive reasoning) and to what extent they (are able to) translate theories into practice. Attention must thereby be paid to the necessary context and conditions to facilitate learning (Jha-Thakur et al. 2009).

When we project the research results on the Kolb Learning Spiral to define the outcomes in experiential learning, we see that the ELS is only partly activated when the NCEA interferes, and remains rather silent in projects without NCEA assistance. New experiences with the NCEA are apparent which lead to some extent to moments of reflection. However, in Ghana results are neither translated into profound new insights in the current EA system dynamics, nor used to change behaviour significantly. This means that full experiential learning does not occur, or only in a weak form. In the Maldives this is somewhat better: there are more apparent moments of reflection and especially the current authorities do think about the EIA system bottlenecks and manners to improve them, because of the experiences with the EIAs in practice and the “international best practice exemplifying cases.” Changes in the manner actors performed their main tasks, i.e. behavioural change in EIA performances, was apparent in subsequent (similar) projects to some extent, and will be even more apparent when the regulations and frameworks for EIA that are partly based on the EIA experiences of Vilufushi and Villigili, including the NCEA advisory reports, are finished and come into force. Full experiential learning did occur, thus, to a moderate extent and the wheel still continues to turn.

Explanatory factors for learning

Due to lacking theoretical accounts about conditions for learning in EIA in LMCs contextual factors that affected the system-level learning outcomes were defined during the field work in both countries. In both Ghana and the Maldives it turned out that the availability of information, including dissemination of project reports, was pivotal for participants to learn from the process. Often, a lacking availability of ill dissemination impeded actors to learn about the EIA design and outcomes in a profound manner. It did opened their eyes about the importance of open information, though; a point forwarded especially by NGO representatives. Furthermore, the ability for abstract thought was present in both countries, but seemed to be more enhanced in the Maldives where more actors with high educational backgrounds operated in the projects. Discussions about learning opportunities were more present in the Maldives, where the recent political reorganization (2008) and the international attention during the projects –where environmental considerations where emphasized– triggered awareness and subsequent discussion about environmental management in general, and EIA in particular. Capacity to translate lessons into practice is in both countries rather low. Resource restrictions, including qualitative personnel, form the stalemate to a great extent. Time (to learn and implement lessons) was not a real problem in Ghana, in contrast to the Maldivian case where post-tsunami reconstructions could not await environmental reports too long. The restrictions in time did affect the EIA processes, as is shown in the NCEA comments as well. Reflection came late, partly because of the time issues, in the Maldives, where only weak moments of reflection and only about individual issues occurred in Ghana.

6

CONCLUSIONS AND RECOMMENDATIONS

EIA systems in LMCs are often rather weak and subject to various outside influences, including the different donor interventions. To date little is known about the actual effects of the latter, especially when it concerns the indirect effects. This research attempts to fill this gap in knowledge by focusing on one particular donor and exploring the possible feedback loops leading from EIA project experiences towards the EIA system. Main research question was: *To what extent does the NCEA contribute to system-level learning via their project-level EIA assistance in LMCs?* In this chapter we formulate an answer to this question, and the sub-questions as formulated in chapter two. Research methodologies are discussed subsequently before final recommendations to realize more significant learning effects for the NCEA are presented in a last section.

6.1 Conclusions

Based on the research experiences in Ghana and the Maldives we can conclude that, in general, the power of learning loops running from project experiences towards the EIA system in LMCs is moderate, and that learning from the NCEA contributions specifically is moderate as well. Main explanation seems to be that for both cases the institutional context determined the learning outcomes to great extent. NCEA advisory comments did not always relate sufficiently to the context elements which hampered profound learning outcomes.

In Ghana the institutional context was characterized by a rather developed EIA system with a clear and powerful mandate for the EPA, including their regional offices, and legal EIA regulations and guidelines in place. Experience with EIAs and even SEA was and still is growing, leading to a general shared belief of a strong national EIA institutional set-up. Bottlenecks are mainly about the availability of skilled personnel (including allocation of financial resources), logistics and other resources necessary for sound operations.

In the Maldives the institutional context was significantly different. All key actors did not believe a strong EIA system was (and to some extent still is) in place. During the post-tsunami projects no EIA regulations were defined and the EPA had little power. Accountability for environmental management was unclear, as was ownership due to the various stakeholders involved (including the international parties), and no professional institute was actively involved or experienced in both EIA and post-EIA practices. Learning outcomes were hard to take up due to the constraining institutional context (no extensive regulatory framework for EIA in place) where no organization fostered possible learning outcomes; a lot of information was lost due to weak information management (no proper archiving of data). To date this is different: The regulatory framework has gained in strength and is developing in a more rapid pace now. Together with the institutional organization that is more ordered and clear –EPA has the central power and is main agent for the review, approval and enforcement of EIA applications and regulations– the possibilities for learning to be effective on the system level are significantly increased.

Notwithstanding the differences in institutional contexts, system level learning outcomes are more apparent in the Maldives. Again, a context analysis provides the explanation: the Maldivians knew a better momentum for learning, i.e. a context that offered possibilities to learn, despite the post-tsunami political games that favoured socio-economic issues above environmental ones. In Ghana many facts and experiences were weakly remembered and actors stated that they learned

only about technical project issues; Awareness and knowledge about EIA procedures and necessary regulations was already rather advanced according to these actors. In the Maldives, an ill defined regulatory framework, a weak institutional organization and a low capacity base of the EPA and the Ministerial authorities to deal with EIAs in a proper manner all determined a momentum for learning that was more apparent compared to the Ghanaian case. The basics of the EIA system were weak and the EIAs with NCEA contributions, that were of unprecedented quality and signified “international best practice”, were exemplifying both in terms of content and procedures. Even to date learning effects are evident as the regulatory framework, the work of the EPA and the work of other actors active in EIAs use and/or refer in some cases to the EIAs of the Vilufushi and Villigili islands –including the NCEA advisory reports.

What are the system-level learning outcomes in the selected EIAs?

The first sub-question of this research, as formulated in chapter two, is about the system-level learning outcomes in the selected EIAs. In general, we can conclude that learning loops in EIA, particularly the ones triggered by the expert interventions of the NCEA, mainly are about basic capacity issues such as technical knowledge, EIA organization and procedures and required (law-based) EIA regulations. In the Ghanaian cases where these basics are already provided to a great extent, learning outcomes are evidently less apparent compared to the Maldivian cases where such basics were strikingly lacking. Moreover, individual learning seems to be the result of new experiences with EIAs where the NCEA advices on the quality of the outcomes; these results are less significant in projects without NCEA support. Organizational learning does fall behind in both cases with and without NCEA support, though. Neither the EIAs nor the NCEA comments evoke insights in the way to allocate relevant lessons for the organization, and manners to safeguard these lessons on the organizational level.

To what extent does the NCEA contribute to learning?

The second sub-question of this research is about the role of the NCEA. A comparison with oral statements about lessons learned in projects without NCEA interferences proves that there are differences, although for most learning outcomes differences are moderate. Overall however, the learning effects are more apparent in projects with NCEA assistance. This is an attribute of the character of the project as well: NCEA only frequents large and complex projects where some knowledge and experience on the side of the recipient key actors is lacking. EPA members are faced with new topics and more stakeholders which increases the complexity and decreases their confidence to forcefully act in the name of the environment. Most striking differences in favour of projects with NCEA presence are about the topic of learning, i.e. learning about substantive issues and in general EIA design. Further smaller differences are about individual learning, single loop learning, learning about processes and learning that changes the frame of mind. Differences remain little, though, as is visualized in figure 4 below.



Figure 4: Research conclusions

Missed changes for learning within the EPAs were mainly caused by lacking mechanisms that safeguard the preservation of lessons learned. In both cases data archiving is poor, reports are often lost or “somewhere in the building” and individual experiences and learning outcomes are not frequently discussed and documented. In Ghana, a strong believe in people instead of ‘system structures’ is stated as the motivation for their confidence in an existing organisational memory, although all members simultaneously acknowledge that improvements in the documentation of reports and experiences is important especially for new members to rapidly learn about past developments. In the Maldives the institutional reorganization and accountability problems are blamed for the current flaws in archiving the material. Improvements are made at time of writing though. Evidently, without the installation of proper mechanisms to foster (organizational) learning the EPAs suffer the danger of falling back in organizational strength when leading key figures, like the EA director, stop working for the EPA. This would imply a major fallback in the current developed capacity of the leading agency for EIAs in both countries, and hence a negative development of the EIA system.

Attitude to learn

Learning effects depend on the attitude and willingness of the local agents, and the EPA in particular, to learn as well. The NCEA assistance needs to be recognized as a learning opportunity, and the NCEA as an agent to learn from, for learning mechanisms to emerge. To date this is not always the case. Although the commission is perceived as a technical expert body with substantial knowledge to offer their presence seems to overweigh their substantial technical input. Overall, to learn from the NCEA is often regarded more as an extra option, or added value, in addition to the significance of their presence. External, international intervention is perceived as a boost for the confidence of the EIA authorities, towards the EIA process and simultaneously towards the project proponent. With the NCEA, for instance, EIA authorities and executors (including NGOs) state that they feel more secure to forward their ideas and interest and issue sensitive decisions. It thereby helps to bring people together as well, as the NCEA sometimes functions as a knowledge broker by emphasizing the importance to take different perspectives into account.²⁴

Whether enhanced trust and stakeholder interactions lead to more power of the EA authorities is debatable. Examples in Ghana prove that the potential for empowerment is apparent though no pre-given fact. During the Ankobra Petrochemical Plant EIA the power of the EPA increased substantially to such extent that they were able to force strict measures, against the initial will of the MoE, which even lead to a withdraw of the American project proponent. However, during the WAGP EIA and the Jubilee Field EIA no significant changes in their power position were noticed by EPA personnel.

Altogether, EIA cooperation with international agents like the NCEA is often perceived more as the intervention of a referee instead of a teacher offering learning opportunities. Only in cases where the EIA system does not have clear reference points of qualitative EIAs, as was the case in the Maldives, the referee function is taken-up a bit more as an opportunity to learn as well. Still the symbolic presence of the international expert as a safeguard for confidence and quality prevails. They are the leading frame of reference. This seems to be in general the most important feature of the intervention, at least through the eyes of the recipients.

²⁴ The NCEA contribution to the oil and gas SEA in Bolivia is a fine example here. See www.eia.nl for more information.

In sum

Altogether, oral statements of Ghanaian and Maldivian key actors about their EIA experiences with and without NCEA assistance indicate that the relation between NCEA individual project advisory services and the development of the EIA systems in LMCs is fragile and rather dependent of context. System-level learning outcomes are mainly about substantive, technical issues related to the projects and about basic EIA ingredients in cases where such knowledge was lacking. Outcomes and effects dependent thereby to a large extent on the institutional context which either hampered or enabled the learning loops in practice. Where the basic system elements were already in place (Ghana) no hard evidence about structural, influential lessons learned that affect rules, regulations, procedures and capacities of organizations and individuals involved in EIAs was found. Where such basics were lacking (the Maldives) lessons learned did affect the regulatory framework and the capacities of key actors to a fair extent, although much depended on the political context and the availability of information.

6.2 Recommendations for improvement for the NCEA

Post-EIS processes and skills are widely recognized as the main pitfalls in the EIA practices in both countries to date. This means that opportunities for NCEA project comments to affect the development of the EIA system are said to be about manners (i.e. skills) to improve the post-EIS processes. A stronger emphasize on skills development should then be guided by practical and concrete suggestions. Monitoring, evaluation and ensuring compliance are the main task areas that need attention. Practical and easy to comprehend suggestions are desired, such as specific directions for compliance monitoring, necessary equipment and procedural steps for field inspections, practical hints about the compliance requirements, indicators for EMP reviews, and options or guidelines to ensure compliance and effective communication with the project proponent.

Furthermore, to prevent that the key EIA institutions (especially the EPAs) fallback in capacity after unexpected events or the resignation of current leaders the NCEA' approach needs to be slightly adjusted. Many EIA authorities acknowledge that more extensive exchanges during the review process, as well as face-to-face meetings also after presentation of the advice, would help enormously to ensure adequate interpretations and sound follow-up activities. They recognize the logistic limitations –i.e. the dependence on the availability of resources, including time, money and manpower– but argue that increased exchange is highly desirable when effects that transcend the project level are aimed for. One Ghanaian EPA member stated that increased interactions after the presentation of the formal advice *“means more learning opportunities for us. Better follow-up could help to remember people what they have learned. Follow-up could be send again via comments of the NCEA, where outcomes of the post-advice interactions are summarized to indicate the learning moments.”* Another possibility could be a forum where the final NCEA advice is posted and all EIA participants are invited to give reactions on the relevance of the comments and the follow-up. Such a forum could be uploaded on the NCEA website to ensure easy access and transparency. Online discussions could continue during the project installation and operation phases, and twitter-like messages could help to assist EPA and other stakeholders when they have small but burning questions about the EA follow-up. This would catalyze broad post-EIS participation as well.

In addition, clear steps about the integration of EIA policies within other governmental agencies, in particular within ministries of energy, environment and planning, are regarded as pivotal for successful future developments as well. To date both the EPAs and the ministerial departments

lack insights in the best way forward. Awareness about its relevance is present in both countries, though, as is the willingness to invest in this development. This means that there is a great opportunity for the NCEA to positively affect the EIA systems in terms of the institutionalization of environmental management. On the project level this would imply the inclusion of clear and practical hints in the review comments about the manners to take the respective governmental agencies on board during the EA processes, including the M&E phases. Discussions based on this advice could aid to ensure such hints will generate lessons on the system level in terms of the organization of EIA, i.e. enhanced capacity for inter-agency cooperation. A precondition is then that these agencies need to be involved in the review process (to ensure focused interactions) and commit themselves openly to the suggestions of the Commission.

To enlarge the changes for greater learning effects on the system level it seems further relevant to ensure a wider audience that actually read the NCEA comments (and possibilities to debate these comments) and invest in mechanisms that overcome problems of memory and information dissemination and storage. Examples are mentioned above (follow-up meetings or forums) and could be extended with references in the advisory reports to lessons learned in earlier projects as a kind of memory check. A formal request for a reaction to the provided advice from all stakeholders, for instance via the commission' website on a forum, would help to ensure a wide audience of the review comments or at least insight in the level of attention.

Furthermore, more reflection could be evoked by including a brief institutional analysis of the leading agent(s) in the review comments, include more links between project flaws and impediments at the system level –i.e. link comments about the project to the current capacities of key agents (on the system level) or the existing regulations. Practical suggestions about the way to overcome current challenges at the project level could be included in such a way that these challenges will not reoccur in future projects.

In short, most options to realize more significant learning loops that affect the EIA system via NCEA review comments are about typical capacity development issues. Capacity development is thereby defined as “the process of augmenting, mobilising and enhancing the EA capabilities of a country, organization, professional body or group of individuals” (Sadler 2003; 7). Capabilities can be technical, procedural or executive in character. This might be an open door and suggest that capacity development projects are needed to produce system changes instead of specific project contributions. However, this would imply that the current NCEA project assistance is not relevant for development of the EIA system and only effective on the project level. This is not the case, as proven by the Maldivian example. Although in general project advisory comments do affect the system only to a moderate extent (in the eyes of the EIA actors), there are plenty opportunities to increase its impact.

Compared to capacity development activities, project contributions are maybe even more promising due to their constant link with the daily practices of the project developments where lessons can be tested and executed directly (under auspice of the Netherlands Commission).

System-level challenges as foci for future learning

It is recommended that future NCEA projects focus on the main system weaknesses, via and in addition to their comments related to the EIA project, in order to realize the most significant system-level learning effects. Current challenges for EIA system development both in Ghana and the Maldives are:

- Capacity and confidence for large and complex projects

- Structural archiving of information
- Dissemination of information and knowledge; intern and extern communication
- Organizational memory
- Monitor and Evaluation
- Inspection and enforcing compliance
- Cooperation with NGOs
- Integrating EA in other ministerial divisions
- Motivation and skills of the personnel
- Resource limitations, mainly financial and logistics
- Continue high priority for sustainability

In short

To stimulate learning to a greater extent in future projects, it is recommended that the NCEA takes the following notes into account:

1. Slightly change the presentation of the advice

- Ensure a larger audience for review notes, including whole TRC and NGOs
- Allow discussions during the issuing of the formal advice (interpretation)

2. Expand content of the advice

- More focus on post-EIS follow-up in the formal advice (monitor procedures, compliance issues, enforcement options).
- More practical and concrete advice on skills and process enhancement.
- Include comments on the approach and outcome of the (local) TRC.
- Refer to comments of other projects in the past to structure learning mechanisms; what were the difficulties and what actions were taken and why? How does that relate to current project activities?
- Include more examples of similar projects in other countries; frame of reference of TRC members must be broader to stay focused and memorize the issues.
- Include practical suggestions about the manners to involve other governmental institutions (institutional integration; necessary already during composition TRCs).
- Include links to the institutional context; illuminate bottlenecks and options for enhancement.

3. Stimulate use of the advice

- More contact in period after advice (e.g. discussion forum, blog with advice and comments).
- Mention ways to ensure organizational learning to safeguard institutional memory.
- Mention ways to archive and store project information.
- Encourage dissemination of information (regional EPA offices, NGOs), including review comments and permit conditions.
- Include suggestions about organizational mechanisms to reduce dependency on NCEA for large and complex projects, like installation of internal sub-divisions (e.g. for oil and gas or island development) or an own independent review committee.²⁵

²⁵ NREG programme (if present) might be able to help to overcome the resource problems here.

Altogether, the conclusions and suggestions for improvement presented above imply that lessons about EIA performances in some cases depend on extra-project activities of the NCEA. This is explicitly acknowledged by key actors in both countries. A strong desire of the EIA authorities –and of NGOs although their role still needs to be determined– to maintain communication after the final review advice is submitted by the Dutch commission is apparent. Gatherings or discussions centring around the main lessons inherent to the review advice, including their practical operationalization, would help to remember the recipients what the key issues are and how these issues link to their current individual, organizational and institutional capacities and future challenges, i.e. developments at system level. Online forums (e.g. blogs) or other information tools are an option to facilitate these moments of post-EIS review communication. Openness and accessibility are key: Broad, post-EIS participation, enhanced dissemination of information and a closer monitoring of post-EIS activities need to be aimed for.

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APPENDICES TO THE MASTER THESIS

LEARNING LOOPS IN EIA: Analyzing system-level learning and the contributions of the Netherlands Commission for Environmental Assessment –the cases of Ghana and the Maldives

(Appendix 1 till 4)

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Appendix 1 Methodology and research complications

Fieldwork in Ghana was executed in March 2010. Representatives of the Ministry of Environment, the Ministry of Energy, the EPA, the Energy Commission, WAPCo, several NGOs, research institutes and CSOs were interviewed during face-to-face interviews of about 45 minutes. The research was complicated by the following factors:

- Historical reconstruction needs data, both oral and written in documents, that is not or only to a limited amount available (people tend to forget a lot, key actors leave their positions and documents are not or only to a limited extent stored and archived in a structural and transparent manner). Institutional mechanisms that safeguard the organizational memory, and exists independent of people, are weak or often even non-existent.²⁶
- Motivation and cooperation of key respondents is essential but often lacking. Staff members within the key organization work for low salaries and find it hard to keep focused for a longer period of time. They are used to flexible time schedules and an ill structured organization of meetings, which makes it difficult to arrange interviews and profound, sometimes time consuming discussions.
- Comparison between different EA cases is hard because in most cases different practitioners were involved. In addition to the project specific characters that differ, the composition of the TRCs is not similar and different agencies, including ministries, are involved in different projects with different members. Comparison between projects, thus, often comes down to the comparison between individuals, which makes it more difficult to generalize about organizations, not to mention interactions between organizations and their effects on the system level.
- No singular theory of change exists. Different system inputs are characterized by different theories of change which trigger or affect system elements in a different manner, without clearly unveiling their interactions. This contributes to the complexity of EA practice in Ghana. For instance, a donor lead capacity program like the GeaCap or CLEAA initiatives may adhere to a program driven approach where the program defines the incremental procedures towards a predefined outcome or program goal. NCEA assistances, in contrast, approaches the EA projects only when it is demand driven; needs signified by the local actors are key to their approach. Such programmes can run simultaneously or follow each other several times, in a context of changing political relations and socio-economic circumstances. Effects on the system level are consequently not direct traceable to one approach based on a singular theory of change: Is an emerging need for more and better skilled M&E personnel within the EPA a consequence of capacity development programs that increased public communications about EA regulations and procedures which lead to the submission of more EA applications to the EPA, or a consequence of NCEA contributions within complex projects where TRC members were trained which lead to an awareness of the current pitfalls at the M&E stages, or both?

²⁶ Many development countries face this challenge, like Mozambique or Georgia (see Lof 2010).

Research was executed in the Maldives from June 29th until July 11th. Representatives of the Ministry of Planning, the Ministry of Housing, Transport and Environment, the Housing and Construction Board, the Environmental Protection Agency, the Disaster Management Centre and several consultancies, architects, NGOs and CSOs were interviewed during semi-structured face-to-face interviews of about 45 minutes, some of them during the site Vilufushi visit. Conclusions are based on outcomes of these interviews and project documents and must be read as such.

The research was complicated due to the following factors:

- In 2008 state reorganization changed the ministerial division of governance posts. Many former officials left their job or changed from function, making it harder to trace the people who were actually involved in the EIAs or have sufficient knowledge about its developments.
- The line between EIA and the re-development project as a whole was not always clear. This made it more difficult to allocate outcomes and changes in practice. What are the effects from the project in general, and of the EIA in particular?
- Although the EIA was finished respectively five or six years back, the project was not fully finished until mid 2009 when the island residents of Vilufushi moved back to the island. The measure actual impacts on the long run in extended detail more time is needed.
- Databases with socio-graphic, socio-economic, ecologic and other environmental data are for most elements lacking or ill compiled.
- Due to the recent rehabilitation of the island Vilufushi –residents moved back in the fall of 2009– sufficient official data about the new socio-economic conditions is still lacking.
- The EA system is gradually developing in the Maldives. Only since about two years EIAs are actually filed and stored structurally. As a consequence, documents from preceding projects are hard to find and many officials are not sure which department stores what documents.
- It is unclear what actually happened with the NCEA advisory reports in the Maldives. The reports were primarily submitted to the international financial donor agency (FMO). FMO used the reviews of the NCEA for project guidance and endorsement of the financial assistance. The advice reports were sent (as a cc.) to The Ministry of Environment and Construction, the Ministry of Planning and Development and the Ministry of Finance in the Maldives as well, but it is unclear who actually received the reports and what the Maldivian authorities did with the comments. Part of the explanation most likely lies in the fact that the international donor was the leading agency and defined project conditions partly based on NCEA comments.
- Knowledge about project characteristics and outcomes in practice is scarce at the side of the project financing agency (FMO). However, due to the time passed and a reorganization at FMO –several projects plus documentation, including the Maldivian cases, are handed over to a private consultancy firm (PWC)– there is an ill recollection of the facts and knowledge about the project characteristics and the whereabouts of the related documentation at the side of FMO.
- Time for this evaluation was rather short due to planning restrictions. More time to consult people from the contractor, the financing agency and the current holder of the project and the related documentation (PWC) would enrich the data and might affect the outcomes.

Appendix 2: Summary of the advisory comments of the NCEA for the Ghanaian projects

The West African Gas Pipeline:

1. The safety aspects of the pipeline: to include a quantitative risk assessment, including information about the shipping and anchor characteristics, and more information about coastal erosion and the risks for the stability of the pipeline?
2. Factual information on Health, Safety and the Environment: To include all HSE aspects mentioned in the Scoping Report (at least spatial planning and emergency response)?
3. Spatial planning: To include assurances for the prevention of conflicting forms of land use?
4. Emergency Response: To include ER capacity and capabilities that WAPCo will establish in Ghana as well as the additional demands to be made on Government or Private Emergency Response Organizations?
5. Health, Safety and Environmental Management Systems (HSEMS): To take up accredited certification of the HSEMS of WAPCo as a license condition?
6. To develop insights in a most environmental friendly alternative?
7. The development of an EMP, and its integration in the strategic framework of the EIS?
8. The annual reporting obligation on the progress of the EMP: To enable monitoring of HSE performance of the WAPCo on a policy level, as well as periodic updating of the EMP?
9. Making the EMP progress reports publicly accessible and subject to external validation and verification?
10. Hydrotesting, dewatering and drying: To take up a guaranteed application of the method introduced by the NCEA for the discharge of test water as a precondition in the license?
11. Stakeholder Consultation: (1) WAPCo should respond about the manner stakeholder' inputs are processed, by whom and the effects and follow-up, (2) Inclusion of 2nd stakeholder round, (3) permanent structure for stakeholder consultation, (4) pay attention to follow-up of stakeholder consultation, (5) CA should deal with all this similarly.
12. Keeping record of the outcome of discussions between WAPCo and Ghana Port Authorities and Tema Development Co-operation in an MoU or Agreement?
13. The necessary presence of WAPCo in future dredging planning and implementation phase, even determined by legislation?
14. The EPA review process: (1) To invite the proponent at the start of the review process, (2) to schedule a site visit with the whole review team, (3) to continue to review supplementary information and the EMP?
15. The accessibility of the EIS: to include maps of the pipeline route?
16. The EPA review output: (1) Clear ToR for review framework, as to what for decision making and what for the license, (2) make use of issues raised during public hearings in final EPA review document, (3) representation/reference of team: more on coastal zone management and marine and safety aspects.
17. The significance to add verifications to the texts in the addendum?
18. Weighing procedures of alternatives and variants: To be as transparent and reproducible as possible, for the EPA' decision on the license, and even as a license precondition?
19. The Health Safety and Environment (HSE): That the EPA should check whether arrangements are foreseen with the Ghanaian Authorities with respect to communication responsibilities and incident response plans.

The Ankobra Petrochemical Plant:

1. Hazards: Inclusion of hazard assessment (spills, explosion, other incidents).
2. The description of the local environment: To include a base line assessment?
3. Enhancing the information about the social environment?

4. Tanker (up)loading: More information on (1) Construction SPM and pipeline, (2) location characteristics and alternatives, (3) oil spill scenarios, (4) waste water discharge, (5) use of chemical, (6) marine ecosystems, (7) abiotic information, (8) biotic information.
5. The pipelines to and from the petrochemical complex: More information on (1) characteristics of pipeline and route, (2) way of operation, (3) alternative routes, (4) risk assessment of explosion/fire, (5) anti fouling measures of intake, (6) dispersion calculations for operational intake, (7) onshore transect description.
6. The petrochemical complex: More information on (1) site location, (2) energy use by fossil fuels, (3) air pollution, (4) SO₂/H₂S, (5) NO_x, (6) hydrocarbons, (7) particles, (8) water pollution, (9) noise, (10) light, waste, (11) odor/stench, (12) soil, (13) external safety.
7. Social impacts: More information on (1) water and protein sources, (2) impact of temporary workers, (3) impact permanent workers, (4) percentage indigenous employees, (5) respiratory infection, (6) malaria, (7) sabotage prevention.
8. Including a quantitative data analysis on emission and waste management?
9. To include a risk assessment: To assess the seriousness and significance of impacts?
10. Assessing the social impacts, like effects of (temporary and permanent) workforce on local communities?
11. Leveling with the international standards about a specification of expected emissions/immission: i.e. the inclusion of a quantitative data analysis?
12. Using maps for the description of the local environment (base line assessment)?

Appendix 3: Summary of the advisory comments of the NCEA for the Maldivian projects

The Vilufushi project:

Main issues of advice on the IEE

1. Work out possibilities for SEA for safe island policy that includes the Vilufushi initiative.
2. Communicate IEE with Ministry of Environment and Construction and licensing agency for appraisal and decision making on the need for full fledged EIA.
3. Expert mission for screening (and in case of full EIA, for scoping as well).
4. Coherence and coordination with World Bank initiatives.

Main issues advice on ToR

1. Clear problem definition needed
2. Address preconditions for successful implementation
3. Indicate required follow-up
4. Clear definition of objectives for alternatives and criteria for M&E needed
5. Quantify objectives
6. Description regulatory framework, including probability of compliance
7. Description of institutional, legal and administrative framework, also for follow-up
8. Description of stakeholders and their opinions, including island inhabitants
9. Description of site preparation (Debris removal)
10. Description of dredging activities, and alternatives
11. Description of land reclamation by filling activities, and alternatives
12. Description of harbour related activities
13. Mitigation measures and alternatives need to be presented
14. Implementation alternatives need to be described
15. Description of natural and socio-economic environment and its autonomous development, including for the natural environment: climate, geology and geomorphology, hydrography/hydrodynamics, ground water, soil and ecology, and for socio-economic environment: demography, economy, social and living conditions.

16. Description of impacts on natural, socio-economic environment including the construction related hazards risks
17. Comparison of implementation alternatives
18. Gaps in information and knowledge should be described
19. Elements for the EMP and a project evaluation plan need to be included
20. Format and presentation of EIA report should mirror ToR advice

Main issues of advisory review

1. Include environment in motivation for site selection.
2. Clear objective and insight in goal achievement.
3. Clear accountability and allocation of tasks.
4. Evidence of stakeholder consultations, including the public.
5. Information on debris removal and treatment.
6. Protection borrow area during high re-suspension levels: provide quantifications, alternatives and impact assessment.
7. Explain the design of the reclamation area, including erosion prevention .
8. Information needed on risks of accelerated erosion of new constructed area plus consequences for design.
9. Information needed to guarantee reclamation material availability and comparison borehole sites.
10. Information and evidence of chemical waste damaging the aquifer, rainfall patterns 2005, desalination of fresh water aquifer and ground water.
11. Description of preferred alternative and the max. sustainable alternative.
12. Socio-economic impacts of follow-up activities and involvement of local inhabitants.
13. Information on planning and execution of Monitor Plan. Including more base-line information, quantification (critical values), flow velocities, erosion neighbouring islands, additional monitor sites, parameters and methodology and involvement local people.

Main issues of advice on SIA

1. Mitigation concerning: limited space of plots for home gardening, fish processing and thatch weaving (especially disadvantageous to the income generating activities of women and space for extended families).
2. Needs for extended families not sufficiently taken into account
3. Little time for improving SIA or mitigate negative impacts
4. Income generating potential of women; effects unclear, mitigation not described
5. Weak response relevant organizations
6. Figures relating to the impacts of the reconstruction project are lacking
7. Questions about land tenure remain
8. Important information is lacking about provisions for domestic water supply, waste water disposal and treatments systems, and solid waste disposal systems
9. Measures to be taken to anticipate potential problems at Buruni Island are not defined.
10. Impacts Buruni Island after the Vilufushi residents left the island again are not described
11. There is no monitoring plan on socio-economic developments (population growth etc.)

The Villigili project

Main issues of advisory review

1. Information on impacts on habitats, naturalness, use by residents, value for biodiversity and conservation.
2. Information on consultative meetings with government departments, including the results.
3. Present correct figures on fisheries activities to justify harbour extension

4. Describe relation between Dengue and reclamation / drainage of the swamp areas, plus impact assessment of alternatives.
5. Provide demographic data.
6. Increase suspended solids and sedimentation monitoring frequency.

Main issues of assessment on Monitor Plan

1. The need for more an increased suspended solids and sedimentation monitoring frequency in such a way that the recommendations in the Second Monitoring Report for the Vilufushi land reclamation will be met , is fulfilled.

Appendix 4: Description and outcomes of the consultation meeting with the Vilufushi inhabitant representatives

(translation Ibrahim Mohammed, EPA)

On Thursday July 8th a consultative meeting was held with the key actors within the Vilufushi community. The consultation was held in local vernacular. Main objective was to discuss the environmental and socio-economic consequences of the reclamation and reconstruction project, including current open questions and lessons learned. Of a total of 15 men and 2 women the following actors joined the meeting:

- Island chiefs (3, one senior and two assistant island chiefs)
- Fishermen chiefs (3)
- Boat owners (2)
- Women Development Committee (2)
- Youth representative (1)
- Contractor co-worker (1)
- Representative of retail trade (1)
- Representative of the health sector (1)
- Representative of the utility company (power) (1)
- Fish processor (1)
- Representative of the island education system (1)

After a individual introduction the group was subdivided into three groups. Each group worked with two papers consisting one question on each paper. The goal was to list answers to these questions. The total of 6 papers were headed by the following questions:

1. What were the most important positive changes in the environment, during and after the project?
2. What were the most important negative changes in the environment, during and after the project?
3. What were the most important positive socio-economic changes, during and after the project?
4. What were the most important negative socio-economic changes in the environment, during and after the project?
5. What most important questions are still left unanswered?
6. What are the most important lessons learned?

After approximately 10 minutes papers shifted between the groups in such a manner that after about 30 minutes each group had discussed all six questions. Subsequently the papers were hung on the wall on front of the room. Every single answer written on the papers was read out loud by one of the participants to open-up discussion. During the discussion the group attempted to achieve agreement, define the main motivation for the answers and complement the lists were necessary. Results of the discussion were noted in minutes in English by a translator from the EPA. Participants showed enthusiasm and the group work including the final discussions were rather lively. All group members agreed in the end on all the points on the lists. In the end they forwarded their appreciation for consultation and shown interest. The final order of priority of the outcomes per issue were determined in a discussion meeting with the Vilufushi project manager and a member of the EPA who were present during the community meeting. The outcomes are listed below.

Topic	Outcomes (order based on assigned priority)	Motivation / explanation
Positive changes in environment	<ul style="list-style-type: none"> ▪ A large part of the island is protected by sea wall ▪ The island is raised much higher above sea level than the original level ▪ Ground water extracted from the island can be recharged after treatment (sewage treatment plant has tertiary level treatment) ▪ More space available for plantation of trees ▪ Power house and sewerage treatment plant kept further away from residential area ▪ Residential area and fish processing area is separated and designated areas for fish processing ▪ Opportunities are provided to plan the island better where by allocation of land for different activities is possible 	<ul style="list-style-type: none"> ▪ Protection from disaster and erosion ▪ Protection from disasters (swells and waves) ▪ Water availability is needed ▪ Good for environment (still need more) ▪ Public nuisance (noise, pollution) less ▪ Public nuisance (unspecified) is less ▪ Pollution and noise does not reach the residential area
Negative changes in environment	<ul style="list-style-type: none"> ▪ The culverts used for circulation of water in the harbour shifts sand in to the harbour basin causing shallowing of harbour basin ▪ Areas without sea wall for protection are getting eroded rapidly, including fish market area and areas to the south of the fish market ▪ The sand in the allocated green area is not suitable for plant growth and re-vegetation is slowed down ▪ The harbour basin is filling with waste materials and not cleaned and maintained properly ▪ Lack of a proper waste disposal and management facility causes great impacts to the island environment ▪ The spaces in between the revetment around the island accumulates waste washed ashore from the sea ▪ Replanting trees is a huge burden due to big size of island after reclamation 	<ul style="list-style-type: none"> ▪ Plan and design of harbour is bad which hampers effective use; location is disputed as well (efficiency) ▪ Each m² lost to erosion is waste of investment money ▪ Need to replant planned green area for shade and harvest ▪ Aesthetic argument ▪ Pit-burning bad for the environment ▪ Fish guts and dirt (waste) accumulates in these spaces, so that it becomes a place for pests such as rats or mosquitoes ▪ Less trees makes it hot on the island; this intimidates people to go outside to plant trees

<p>Positive socio-economic changes</p> <ul style="list-style-type: none"> ▪ Increased land area to live on ▪ Most of the island population are provided with good quality housing ▪ The school, power house and sewerage system are of high standard ▪ Water from sewerage can be treated and recycled to be recharged into the ground ▪ Existence of an excellent urban development plan ▪ Presence of a bigger harbour than the one existed before 	<ul style="list-style-type: none"> ▪ More space for social activities like play ground and youth centre. ▪ Compared to the past life is much better now because of good housing (not yet for everyone). ▪ All services are important for a proper and healthy standard of living. ▪ Quality of the groundwater improved for more hygienic non potable use. ▪ Land use plan can help to effectively designate areas for commercial, residential and recreational purposes. ▪ More people can use the harbour, this increases the activities for commercial purposes as well.
<p>Negative socio-economic changes</p> <ul style="list-style-type: none"> ▪ Harbour design impedes effective and efficient use ▪ Roads are not constructed properly ▪ Fishing market not useable ▪ Unavailability of a slip way and boatyard facilities to carry out boat repair and maintenance ▪ Bigger land, less opportunities to utilize space ▪ Unfair division of houses ▪ Health centre and school cannot function properly ▪ Lack of proper organic and food waste disposal mechanism ▪ Rubble and debris piles lying around different parts of the island ▪ Erosion in the southern part of the island (concerns about effects for community) ▪ Accelerated erosion in the nearby islands (concern) ▪ New cemetery is not completed 	<ul style="list-style-type: none"> ▪ Even though the harbour is big, efficient use of harbour is not possible due to shallowing, and there is no extension of the harbour wall in to the harbour channel causing strong currents which hampers mooring of vessels in the harbour ▪ Streets are not properly defined; hard to recognize the road from the sides ▪ Even though a fish market is build it cannot be used as there is no access for fishing boats to unload fish ▪ Boar owners need to go to other islands for boat repair. The repair facilities were promised during project planning and consultation, though never fully constructed. ▪ Even though more land is reclaimed the housing plots got smaller and there is no provision of land plots for commercial activities. Now shops and a café in the living room. ▪ Some families without a house have to share a house with their nuclear family (after tsunami marriages) while others have more houses in the extended family ▪ Not enough skilled doctors and educated teachers ▪ Smell and pests and throwing rubbish in ocean cause environmental damage ▪ Public nuisance: obstacle for walking and aesthetic bad ▪ Feeling unsafe and insecure ▪ Island can be used for other purposes, like hydroponics and agriculture. Feeling exists that erosion is threatening those plans. ▪ Feeling exists that space is not sufficient to bury the death; high concern that staple burying is the only option, though not the preferred one.

<p>Open questions</p> <ul style="list-style-type: none"> ▪ Study on ways to carryout proper waste disposal and management, including awareness raising ▪ Find out possibilities for more economic activities and creation of jobs for island community ▪ Study on how to improve agriculture in the island ▪ Study on what can be done to make the existing harbour more usable to include shallowing of harbour basin and reducing currents in the harbour basin ▪ Monitor ground water extraction in the island ▪ Monitoring the southern part of the island which is eroding ▪ Monitoring the changes occurring due to revetments around the island ▪ Study on how re-vegetation can be speeded ▪ Ways to use the excess sand piled up in the island 	<p>→ All these questions were agreed upon and most of them refer to the significant changes and challenges mentioned in the main report.</p>
<p>Lessons learned</p> <ul style="list-style-type: none"> ▪ Environmental Impact Studies done for reclamation and shore protection should be carried out with public consultation ▪ Raising the island to compensate for future sea level rise is an effective measure ▪ To ensure safety of the whole reclaimed land using hard engineering such as sea wall and revetments ▪ The reclaimed island should be properly levelled for proper drainage and to prevent water clogging in depressions in the island ▪ Harbours should be designed keeping in mind the potential for future use and possible environmental impacts ▪ Harbour basin should be designed for maximum circulation of water in the basin, yet ensuring stability inside the basin ▪ If islands exist next to reclaimed island the Environmental Impacts to the neighbouring islands should be minimised ▪ Newly reclaimed islands should be provided with a separate area from the island for waste management and disposal ▪ Waste water from sewerage system should be treated 	<ul style="list-style-type: none"> ▪ Public consultation can provide local (traditional environmental) knowledge and can help to improve design and choice of location ▪ To ensure more safety ▪ To protect the whole island ▪ Otherwise internal flooding will make local life more hard ▪ To make the use of the harbour more efficient ▪ To protect the (effective use of the) harbour ▪ Make sure that there are no adverse impacts on the neighbouring islands ▪ Waste processes need to be carried out in a separate place to avoid inconvenience ▪ For sustainable water management, including fresh non-potable water use

and recharged into the ground

- Houses to be built based on best orientation to ensure minimum impact from wind and maximum use of natural light and ventilation
- Revetments around the island should be designed properly

- To avoid sand, rain and difficulties in accessing the houses.

- To minimise damage to the revetment