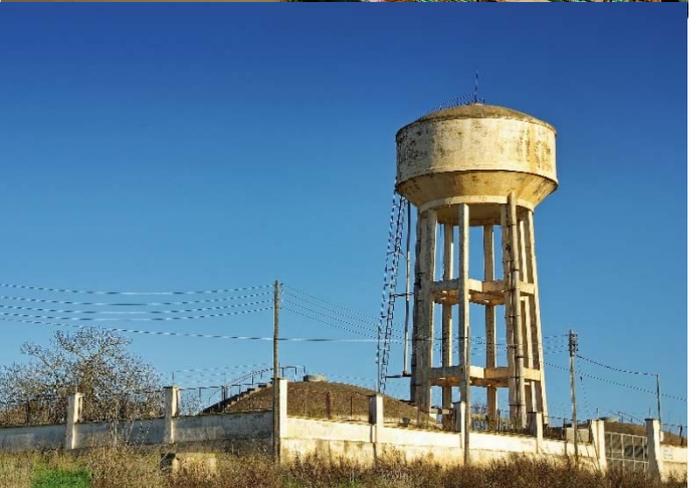




Netherlands Commission for
Environmental Assessment

MALDIVES (ORIO13/MV/01)

Review of the Draft ESIA Report for the Fuvahmulah Coastal Protection



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Advisory Report by the NCEA

To Netherlands Enterprise Agency (RVO.nl)

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From the Netherlands Commission for Environmental Assessment (NCEA)

Date 2 December 2016

Subject **Review of the Draft ESIA Report for the Fuvahmulah Coastal Protection, Maldives**

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1. Introduction

1.1 The initiative: Coastal protection of Fuvahmulah, Maldives

The island of Fuvahmulah in the Maldives (the only island in the Gnaviyani-atoll) is exposed to strong wave action and southwest monsoon winds. An extreme storm event coupled with high tide can compromise the integrity of the ridge surrounding the island, breaching it and causing flooding of the majority of the island. This flooding can have several negative impacts, as the saline water will cause damage to crops, households, infrastructure and contaminate the freshwater aquifer for years.

An Environmental and Social Assessment (ESIA) has been prepared for coastal protection works in Fuvahmulah. Various options for protection have been considered, including offshore breakwater, onshore revetment, applying sand nourishment, land reclamation and ecological engineering. Technical, environmental and social reviews in the feasibility study have shown that of these options offshore breakwater and onshore revetment are considered the most feasible solutions for the coastal protection. Based on further analysis of the environmental and social consequences in the ESIA, the onshore revetment is selected as the preferred option.

1.2 Request of ORIO and involvement of the NCEA

The project is benefitting from ORIO funding from the Government of the Netherlands. The RVO, who manages the ORIO fund, has requested the Netherlands Commission for Environmental Assessment (NCEA) to review the quality of the draft ESIA report (version 27 October 2016). The review has been prepared based on a desk review only, and therefore does not constitute an in-depth technical review of the ESIA report contents based on a verification 'on the ground' in the Maldives. To remedy this handicap, it was decided to engage external expertise.

The aim of the review is to check whether the ESIA report contains sufficient information to guarantee the full integration of environmental and social considerations in decision-making. If shortcomings are found, the seriousness of this lack of information for decision-making will be assessed and recommendations will be given for supplementary information. The ESIA report was reviewed as a stand-alone document, meaning that all information necessary for decision-making should be contained in the ESIA report, without requiring the reader to consult other documentation to complement gaps in information in the ESIA itself.

2. Findings

2.1 Conformity with national E(S)IA procedure

The ESIA report has been prepared according to the Terms of Reference (ToR) for this particular project. The ToR have been approved by the Maldivian Environmental Protection Agency (EPA) on 30 June 2016. On request of RVO, the NCEA has reviewed the draft ToR. This review (quick-scan by the NCEA secretariat, 7 July 2016) has not been incorporated in the ToR, but has been forwarded to the ESIA authors¹.

The ESIA report has been submitted to the EPA on 31 October 2016. The EPA has submitted an *Approval of Environmental Impact Assessment* on 15 November 2016.

The NCEA concludes that the ESIA procedure has been correctly followed. All key issues addressed in the ToR have been dealt with in the report.

2.2 IFC Performance standards

ORIO requires that the ESIA report meets the standards of the International Finance Corporation (IFC). Therefore the ESIA follows, in addition to the relevant Laws and Regulations of the Maldives, the IFC Performance Standards (PS). Paragraph 3.6 of the report lists the objectives of the eight IFC Performance Standards and discusses their applicability for the project. The report concludes that – apart from PS 5 (Land Acquisition and Involuntary Resettlement) and PS 7 (Indigenous Peoples) – all Performance Standards apply to the project. Furthermore, the consequences of the applicability are mentioned in short, with reference to specific sections in the report where impacts and measures are further addressed.

The NCEA concludes that the ESIA report sufficiently addresses the applicability and consequences of the IFC Performance Standards. See Annex I for more detailed observations on the IFC PS.

2.3 Quality of technical content and main conclusions

The NCEA is of the opinion that the ESIA report is well written, well-illustrated and that it provides a clear and complete description of the problem analysis, possible solutions, impacts of these solutions and mitigation measures.

The report shows that the preferred alternative – the onshore revetment – will be effective to solve the problems associated with coastal erosion and possible future chance of flooding. The second alternative – offshore breakwater could be an acceptable solution as well, but has certain uncertainties about its effectiveness. The revetment proves to be more effective and has less adverse impacts than the breakwater, because it is assumed that the breakwater structure will have more impact on longshore currents with related sediment transportation and erosion patterns. Therefore it will have a higher chance of affecting marine life (coral

¹ <http://www.eia.nl/en/our-work/advisory-reports/7202>

reefs) and the protected Thundi Beach area. The NCEA concludes that the ESIA provides sufficient ground to account for selecting the onshore revetment as the preferred alternative.

The main environmental impacts from the onshore revetment are expected to occur during the construction phase of the project: transportation and storage of rock, construction of the revetment, noise (vibration), air and soil contamination and waste generation. To reduce construction impacts to a minimum, it is essential to implement the mitigation measures that are proposed in the report, in close consultation with the stakeholders in all phases of the project: in the elaboration of the technical design, in detailing the environmental and social management plan, and during construction.

A significant permanent and irreversible impact will be the change of the landscape of the existing north-eastern coastal zone. However, the impact on the landscape is inevitable, and the long term erosion of the coastline has already altered the area significantly.

In chapter 3 the NCEA presents key observations and recommendations. The NCEA strongly recommends to take these into account during further development of the project plan, the environmental and social monitoring plan and preparations for construction. In chapter 4 the NCEA presents other observations, following the tasks according to the ToR.

3. Key recommendations

3.1 Impact on marine environment

The ESIA report shows that, for both the onshore and offshore alternative, environmental and social impact will be rather limited. However uncertainties remain, in particular concerning the (protected) area of Thundi Beach (longshore currents, tidal flows, sedimentation and erosion), partly due to lack of sufficient (historic) data.

§ 5.3.6. states that approximately 64% of Thundi beach (4 ha) disappeared between 1969 and 2016. The average area of the Thundi beach up until 2004 was approximately 6.4 ha. Since then Thundi Beach did not extend to the west as much as it used to. The now remaining beach according to the surveys is approximately 2.2 ha (meaning 66% reduction between 2004 and 2016). The causes of this loss are not clear. The tsunami of 2004 and other natural phenomena could have been of major influence, but also the construction of the harbor in 2003 could have been a factor. This means the impact of the coastal protection measures will be difficult to predict exactly. Nevertheless, these impacts are expected to be of lower importance compared to climate (change) factors (monsoons, sea level rise) in the long run.

§ 5.6 provides an extensive analysis of the marine environment (coral reefs, fish and benthic cover), although only in a limited area. Line Intercept Transect (LIT) surveys were carried out (at 4 stations) to assess the benthic types and coral species at the survey sites. The analysis shows that coral reefs have degraded and there is not much live coral left in shallow water areas. However, the surveys were only carried out along the coastal zone to be protected and not – for instance – at the protected nature area near Thundi Beach or in deeper water areas (close to the reef drop). The same counts for the fish study. This means the existing

conditions of the marine environment are uncertain in parts of the area that may be indirectly affected by the project. Therefore the impacts on these areas are largely uncertain.

The uncertainties mentioned above will not influence the choice between the onshore and offshore alternative, because the proposed alternative will probably have less impact than the offshore alternative. However, it is important to monitor the development of the sedimentation and erosion process and the marine environment, which is acknowledged in the ESIA report.

The NCEA recommends to elaborate and ensure the implementation of the environmental monitoring plan, and:

- to involve stakeholders (inhabitants) who may provide (additional) baseline information on the development of the Thundi Beach area especially during the years before and after 2004²;
- to extend the number of transects for monitoring of the marine environment (coral reef, fish, benthic cover), including the Thundi Beach protected area;
- to extend the transects to deeper areas (up to the reef drop).

3.2 Impact on demographic development

According to § 6.3 the Government of the Maldives has the intention to develop Fuvahmulah as a safe island with a concentration of population and facilities that will attract people both from smaller less populated islands as well as offer an alternative for migration to the island of Male. The coastal protection measures will contribute to this objective. Paragraphs 9.2.2.8–9.2.2.10 (for the offshore breakwater, and 9.3.2.8–9.3.2.10 for the onshore revetment) describe the impacts on social well-being, community cohesion and demographic development. It is stated that *“with the protection of the Island against erosion the population will have more confidence in the future and this may have an effect that less people will reside outside of Fuvahmulah and more people may move back to Fuvahmulah. Also people from other islands may move to Fuvahmulah. It is hard to predict how significant the change in migration patterns may be.”*

On the other hand, § 6.4 states that areas that can be used for building purposes are limited. It is stated that *“Geomorphological characteristics of the island limits the areas of the island that can be used for building purposes”* and *“future housing requirements pose a challenge to the island and particularly to some wards.”* This means the revetment could indirectly contribute to overcrowding and negative impacts on social wellbeing, cohesion, natural and public goods and services.

In § 9.2.2.8. (Increased social well-being) as an enhancement measure it is proposed that *“an integrated development plan should be prepared in close consultation with the population of the Island and with the different economic sectors (e.g. agriculture and tourism). This plan should preferably be prepared as an initiative of the Atoll Council. Finances should be sought to implement the plan and it should be carefully monitored.”* Table 50 (Environmental and social impacts and mitigation or enhancement measures of on-shore protection) states that

² This could lead to a better understanding of the causes for the loss of sand at Thundi Beach. Abrupt changes since 2004 could indicate that the tsunami of 2004 has had significant impact, gradual changes could indicate that the construction of the harbor is an important factor.

impact on demographic development is moderately positive and that no mitigation measures are needed.

The NCEA recommends to develop and implement the integrated development plan, accompanied by a demographic development plan to mitigate possible negative impacts of demographic development. This also applies for impact on social well-being and impact on community cohesion (in the ESIA referred to as impact numbers O7, O8 and O9).

3.3 Environmental Management and monitoring

Chapter 9.3 describes environmental and social impacts of construction and operation of the onshore revetment (the preferred alternative) and measures which are needed to mitigate the adverse effects. These impacts and measures are listed clearly in table 50.

Chapter 10 contains an Impact management and monitoring plan, in which mitigation measures are translated into concrete activities. However, several mitigation measures from table 50 are missing (numbers C7, C8, C10, C18, and O10). Not all proposed mitigation measures are translated into activities in table 52:

- C12 (minimize/avoid impact of the workers on the environment): three of the proposed mitigation measures mentioned in table 50 are not mentioned:
 - keep the workforce to minimum necessary;
 - all construction workers and persons on site must be given specific instructions not to catch or harm birds and animals and allow them to retreat into undisturbed areas;
 - basic information on the protected sites and species found on the island shall be given during orientation.
- C13 (minimize/avoid social and cultural impacts of workers): Two important measures proposed in table 50 are missing:
 - orient foreign workers on how to communicate with locals, personal hygiene and sanitation and prevention of sexually transmitted diseases and other infectious diseases;
 - establish rules for the behavior of foreign workers and establish management unit tasked to monitor and discipline individuals who violate rules.

Furthermore, the NCEA stresses the importance of hiring locals and local sub-contractors to enhance benefit to the community and to transfer knowledge and experience to the locals. From the EMP it is not clear how this measure will be ensured.

- C14 (Terrestrial and marine pollution avoided/minimized): Table 50 is very specific on a number of mitigation measures; table 52 only mentions basic thoughts on this subject.
- O4 (Reducing the risk of moving erosion problem to northwest with the risk of affecting Thundi area): bi-annual monitoring is mentioned, but necessary measures if required following the monitoring as mentioned in table 50 are not described (O4).
- O7 (Enhancing social and physiological well-being), O8 (Enhancing community cohesion) and O9 (Enhancing demographic development): as activity only "monitoring of certain developments" is proposed. However, in § 9.2.2.8. (Increased social well-being), indirectly referred to in § 9.3.2.9 (Impact on demographic development) it is proposed that "*an integrated development plan should be prepared in close consultation with the population of the Island and with the different economic sectors (e.g. agriculture and tourism)*" As stressed before in § 3.2. of this advice, to avoid and/or mitigate negative impacts, this should be accompanied by a demographic development plan.

- O10 (provide safe swimming): Although table 50 proposes a list of measures (e.g. reinforcing the existing small tetrapod breakwater, floating lines, information panels), in table 52 no activities are mentioned (except monitoring in general).

Although the Environmental management and monitoring plan (EMP, table 52) seems to contain most of the necessary measures and names the institutional responsibilities, the plan does not specify the costs. This means it is uncertain if there is enough budget to ensure that all measures will be taken, at the right time and in the right amount.

The NCEA recommends:

- to add all activities from table 50 to the environmental (and social) management and monitoring plan (table 52);
- to present the EMP in a form allowing easy implementation and monitoring, including designation of the organizations executing each measure and necessary budget requirements. Distinguish between measures which are absolutely necessary and measures which are optional, including their cost implications and responsibilities.

The NCEA considers implementation of the EMP essential to enhance objectives and sustainability of the project.

4. Other observations and recommendations

In this chapter the NCEA presents other observations, following the tasks according to the ToR and addressing the corresponding chapters.

4.1 General observations

The ESIA report concludes that no significant environmental impact nor major negative impact on the social-economic aspects are to be expected. Therefore it is remarkable that the ESIA report contains almost 300 pages. For future ESIA reports the NCEA recommends to carry out a more serious scoping, to focus more on the most relevant issues for decision-making. Less relevant issues and standard information can be transferred into annexes.

The term “environment” has been used in a broad context to include natural environment, human environment, heritage, recreation and amenity assets and livelihood, lifestyle and well-being of those affected by the project. “Hence the term Environmental Impact Assessment (EIA) shall be taken synonymous to Environmental and Social Impact Assessment (ESIA)”. The risk of not mentioning ‘social’ separately is that the social aspect does not get the attention it deserves. For future ESIA reports the NCEA recommends to change – where applicable – “environmental” into “environmental and social”, including in the title of the report.

4.2 Non-technical summary

The non-technical summary does not contain a map of the project area or any other illustration or matrix. The non-technical summary is an important source of information for both decision-makers and the public and should be easily accessible. In future ESIA reports, the NCEA recommends to add maps, illustrations and/or matrices to the non-technical summary, to make it more easily accessible and understandable.

The non-technical summary states that, based on the findings, the project should be allowed to proceed (with the proposed measures during construction and operational phases). An ESIA report should provide objective information for decision-making and not express an opinion on the desirability of the project.

4.3 Description of the proposed project (Ch. 2)

§ 2.6 describes the project boundary and impact zone of the proposed measures. The secondary impact zone is defined as the area enclosed within respectively 440 m x 4400 m from the project boundary. The NCEA recommends not to define impact boundaries beforehand, based on distances from the project boundaries. Direct and indirect impacts will depend on criteria/indicators and on environmental conditions, which means boundaries should be different depending on the criteria. For instance, impacts on marine environment will probably be relevant for the protected nature area (of which only a small part is located within the defined secondary impact boundary) as well as for the area up to the reef line. This area should be part of the (secondary) impact zone, unless the ESIA clearly explains and demonstrates that no (direct or indirect) impact is expected to occur outside the chosen area of influence.

In § 2.8 and further several activities are mentioned that will be part of the development of the project and the construction phase. The NCEA notices that apparently stakeholders on the island will not be involved in these stages of the project. The NCEA recommends:

- to meet with stakeholders on the island to develop the construction phase health and safety plan and the environmental management system (§ 2.8);
- to collaborate with site-users/owners in assessing the need for removal, relocation and compensation of vegetation (§ 2.11);
- to insist on hiring locals and local sub-contractors (if possible) to enhance the project's benefit to the community and to transfer knowledge and experience to the locals (§ 2.13), possibly by a contractual clause;
- to monitor the effectiveness of the mitigating measures during the construction phase.

In § 2.16 (project schedule) environmental monitoring, auditing and taking mitigation measures when needed are missing. The NCEA recommends adding these activities to the project schedule.

The onshore revetment will be designed for a 50 year lifetime. The ESIA does not provide an analysis of the robustness or extensibility of the proposed measures. This means the report lacks a long term prognosis for the island as a whole, where and what type of further protection works might be necessary after the period of 50 years and a check if the onshore

revetment still fits in this picture. This could be part of the ‘integrated development plan’ for the island of Fuvahmulah that is mentioned on several occasions in the ESIA report.

4.4 Description of the environment (Chs. 5 and 6)

See § 3.1 and § 3.2. of this advice.

4.5 Legislative and regulatory considerations (Ch. 3)

The ESIA provides a description of tasks and responsibilities of different levels of government in the Maldives. The island of Fuvahmulah currently has an Atoll Council, but by January 2017 Fuvahmulah will have city status, meaning that a new City Council will take over the responsibilities under the current Island and Atoll Council. It is unclear which consequences this will have on responsibilities for the project, mitigation measures, monitoring etc.

The NCEA recommends to make responsibilities for each of the next project phases clear in the ‘project plan’.

4.6 Alternatives to proposed project (Ch. 8) and potential impacts (Ch. 9)

In chapter 8 possible alternatives for coastal protection are described. In § 8.3.1 a basic comparison is made for all alternatives (except for the no-development option) on criteria that are considered to be crucial for selection of the most favorable options. This leads to selection of two alternatives for further analysis, the onshore revetment and offshore breakwater. Chapter 9 of the ESIA report describes environmental and social impacts of the offshore breakwater and the onshore revetment alternatives. The description of possible impacts, both in the construction phase and operational phase, is clearly described and sufficiently accounted for. These two alternatives were also compared in a multi-criteria analysis. For this, the impacts were quantified in impact matrices (tables 43, 46, 48 and 49), according to the methodology described in § 1.6.3. The results are summarized in tables 41 and 42, in which weighting factors were added to result in a weighted score for each alternative.

This methodology suggests that all impacts can be quantified and that all impacts are comparable along scales of “magnitude and importance”, ranked from 1 to 10. This can easily lead to ‘pseudo-accuracy’ and misunderstandings. Furthermore, the use of weighting factors needs plausible justification and will not only be depending on technical aspects. Weighting factors can differ between experts, decision makers and different stakeholders. In table 41 and 42, the scores on the main criteria (effectiveness, cost, impact on vegetation, impact on reef, impact on Thundi area and social impact) are not justified properly and cannot be (easily) derived from the description of impacts in Chapter 9. The weighting factors are also not explained or justified. “Impact on coral reef” even gets a 0,0 weighted score, meaning this impact is considered not relevant, although existing conditions and impact on the reef has been extensively described in the report. Different sensitivity scenarios are mentioned, but the results of these scenarios are not presented in the report.

The NCEA concludes however that the lack of explanation and justification for the multi-criteria analysis will not significantly influence the selection of the preferred option. The description of impacts in chapter 9 and the formulation of mitigation measures provide sufficient justification of this choice. For ESIA reports in the future in which multi-criteria analysis is used, the NCEA recommends to provide extensive explanation, motivations of the weights and justification of the scores and to add sensitivity scenarios, which will help and clarify decision-making.

4.7 Mitigation and management and monitoring plan (Chs. 9 and 10)

See § 3.3. of this advice.

4.8 Stakeholder consultation (Ch. 7)

Chapter 7 describes the stakeholder consultation process and findings. Table 36 (summary of stakeholder discussions) shows that many stakeholders have expressed concerns on several matters, especially about the sediment balance and possible impacts on Thundi beach. The table suggests that after the final meeting in October 2016 all stakeholders agree on the selection of the proposed onshore revetment. However, it is not clear which measures are being taken to meet the concerns that stakeholders have expressed earlier.

As mentioned in § 3.3. of this advice, the NCEA recommends to involve stakeholders from the island in next steps in preparation and implementation of the project.

Annex 1: IFC Performance Standards

PS 1: Assessment and Management of Environmental and Social Risks and Impacts

The project has been identified as category “B”, a full-fledged ESIA has been conducted. The ESIA identifies both positive and negative environmental and social impacts and measures to mitigate adverse effects. The ESIA contains an Environmental and Social management plan in which mitigation measures were translated into concrete activities. However, several measures are missing. See § 3.3. of this review. Stakeholders have been identified and on several occasions been involved in the process (see § 4.7 of this review).

PS 2: Labor and Working Conditions

The ESIA estimates that between 50 – 60 workers will be employed during the construction phase of the project. The contractor will be encouraged to hire locals and local sub-contractors to enhance benefit to the community and to transfer knowledge and experience to the locals. The NCEA acknowledges this, although from the ESIA it is not clear how this statement will be ensured. Chapter 2 of the ESIA contains a description of organization, management, risks and measures associated with the workforce. Furthermore, the ESIA (p. 62/63) states that “Contractor will be required to meet the basic rights of the workers and providing them with safe and healthy working conditions through the legally binding contract agreement to be signed between the proponent and the selected contractor”. No use of child labor (workers under age 18) or forced labor is allowed (in accordance with the Employment Act of the Maldives).

PS 3: Resource Efficiency and Pollution Prevention

The ESIA addresses possibilities of water pollution, land contamination, hazardous materials and waste management, as well as measures to prevent negative impacts. Also, the ESIA addresses the use of resources and energy associated with obtaining and transporting the source materials. Calculations have been made on the CO₂ footprint for the coastal protection project. Measures to reduce the CO₂ footprint have been proposed, but given the distance from the source area to the project site (an average distance of 1.350 km has been used for calculations), a substantial emission of CO₂ will be inevitable.

§ 2.10.6 of the ESIA deals with waste management. The island of Fuvahmulah has no waste management system in place. A waste management area will be designated for collection, sorting and disposal. Wastes that cannot be reused will be transported to Thilafushi waste management center (WMC) or to the new WMC at S. Hithadhoo (expected to be completed in 2018).

PS 4: Community Health, Safety and Security

The ESIA deals with health and safety issues for the local community, especially during the construction phase. § 2.10.7 of the ESIA contains a list of measures associated with health, safety and security. Stakeholders have been involved in identifying possible risks and measures. As mentioned in § 3.3 of this review, the NCEA recommends to involve stakeholders in next steps in preparation and implementation of the project, including the EMP.

PS 5: Land Acquisition and Involuntary Resettlement

The ESIA report states that this performance standard does not apply, because “the project is undertaken in state-owned land and therefore does not involve forceful or involuntary settlement”.

The NCEA acknowledges this, although certain facilities (beach, football pitch) will be temporarily closed for safety reasons.

PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

The ESIA provides an extensive description of natural habitats and species, both terrestrial and marine, and the impacts of the project. As mentioned in § 3.1. of this review, the analysis of impacts in the marine environment has been performed for a limited area. Extensive surveys on coral reefs, fish and benthic cover were carried out, but not in the protected area of Thundi Beach. See § 3.1 of this review. Access to natural resources will not be affected by the project.

PS 7: Indigenous Peoples

The ESIA report states that this performance standard does not apply, because the population of Maldives is ethnically homogenous with no recognized sub-categories. This means there are no “indigenous minority” groups which need to be separately considered. The NCEA acknowledges this.

PS 8: Cultural Heritage

The island of Fuvahmulah is unique for its cultural and heritage value (Buddhist burial mound, Islamic mosques built from coral stones). These have been listed in the ESIA and shown on several maps (figures 76 and 77). As a result of the coastal protection, an old mosque sitting close to the shoreline will be preserved and some graveyards and pre-Islamic archaeological sites will be protected. The ESIA states that “the project will not have a direct impact on the cultural sites of the Island, as a precaution mitigation measures have been proposed in the report for those sites which are likely to fall within the impact zone.”