Strategic Environmental Assessment (SEA) for the Aquaculture Development Programme of the Northern Province

Annexes

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Consulting Engineers & Architects Associated (Pvt) Ltd.

List of Annexes

Annex 1- List of References

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Annex 2 – Terms of Reference for the SEA study

TERMS OF REFERENCE
Strategic Environmental Assessment (SEA) for the
Aquaculture Development Program of the Northern Province

ASA on Sustainable Fisheries Management and Ecosystems that Support them

1. INTRODUCTION

National Aquaculture Development Authority of Sri Lanka (NAQDA) has prepared the Aquaculture and Culture Based Fisheries Sector Development Plan to be implemented between 2020-2025. The plan outlines production forecasts for the freshwater and coastal sub-sectors by each province and for each year between 2020 - 2025. This plan envisages aquaculture sector's contribution to the realization of the Government's macroeconomic policy framework - the National Policy Framework: Vistas of Prosperity and Splendour in terms of three key policy pillars - (i) People centric economic development, (ii) Sustainable Environmental Management, and (iii) Technology based Society. In the proposed Aquaculture and Culture Based Fisheries Sector Development Plan (2020-2025), under the coastal aquaculture sub-sector, the objectives set out are to increase the coastal aquaculture and mariculture production from 7,238 Mt to 60,000 Mt in 2025 and to increase export earnings from costal aquaculture and mariculture sub-sector from Rs 8,017.02 Mn to Rs 91,973 Mn by 2025.

To achieve the envisaged targets in coastal aquaculture and mariculture, NAQDA has plans to establish a number of development ventures including Aquaculture Industrial Parks, Sea cucumber villages, Hatcheries with new technology, intensive shrimp farming units in targeted areas along the country's coastline and to introduce new farming technologies and expand small-scale marine / brackish water fish farming. While multiple factors would underlie the successful implementation of this plan, a fundamental aspect in developing a viable industry would be to ensure aquaculture development plans are fully integrated with social and environmental sustainability at the strategic level as well as the investments level. For example, the process of site identification for coastal aquaculture development should consider the impact to existing coastal land uses, especially coastal ecosystems and livelihoods, other sectoral development agendas as well as impact from climate change. In order to provide this strategic basis and direction for planning and implementing NAQDA's proposed expansion plan, a Strategic Environmental Assessment (SEA) is deemed a pre-requisite.

The World Bank is engaged with the Government of Sri Lanka (GoSL) in an Advisory Services and Analytics (ASA) work entitled 'Sri Lanka: Priorities for Sustainably Managing Sri Lanka's Fisheries and the Ecosystems that Manage Them'. The development objective of this ASA is to support the government in prioritizing investments and policy actions to enhance the welfare and resilience of coastal fishing communities and fisheries' contribution to the national economy including in the light of the COVID-19 pandemic and climate risks. The ASA is also part of the

Bank's support to the GoSL in its efforts to build back better after the COVID-19 crisis. The ASA will analyze opportunities and challenges under three main pillars (i) coastal fisheries (ii) multi-day fisheries and (iii) coastal aquaculture.

As part of the ASA work carried out in support of sustainable development of coastal aquaculture, a number of analytical work have been planned focusing on the Northern Province as the pilot area. These include:

1. Assessment of technical and financial feasibility of NAQDA's plan for coastal aquaculture production 2020-2025; identification of potential markets, product form, prices and aquaculture models that will make up the industry.
2. Development of standard business models that can inform potential investors of the likely performance of their investments.
3. Assessment of NAQDA capacity development needs to implement a sustainable aquaculture plan.
4. Piloting of sustainable production levels (carrying capacity) in identified sites for Northern Province consistent with Best Practices under the Ecosystems Approach to Aquaculture development.
5. Preparation of a Strategic Environmental Assessment to inform the development of coastal aquaculture in the Northern Province.

The SEA, stipulated in task 5, will assess the environmental impacts of implementing the Northern Province Coastal Aquaculture Development Plan at a strategic level in the Northern Province. In terms of task 4 above, assessing the environmental and social viability of identified sites is a pre-requisite to piloting the carrying capacity assessments in order to determine sustainable aquaculture production levels in each of the sites, which will be carried out via a separate consultancy.

The present document covers the suggested scope of work for the Strategic Environmental Assessment on the Northern Province Coastal Aquaculture Development Plan. World Bank intends to engage a group of consultants ("the Consultant") to develop the SEA as per the Terms of Reference outlined below.

Integrated Strategic Environmental Assessment (ISEA) of the Northern Province 2014

In 2014, Central Environment Authority (CEA) and the Disaster Management Centre (DMC) partnered to carry out an Integrated Strategic Environment Assessment covering the Northern Province with funding from the UNDP. The overarching objective of ISEA – North was to better understand the natural resource base after the civil conflict and provide strategic information and guidance to facilitate the intended accelerated development in the Province.

The preparation process of the ISEA included (i) compilation of available baseline information; collectively identifying data gaps and engaging Govt. agencies with mandates ranging from conservation, development and regulation to generate new data and (ii) extensive stakeholder deliberations in Colombo and in the field on proposed land uses, projects and programmes and conservation needs (iii) development of maps and digital databases, notably the opportunity maps that identified potential development areas after excluding forest, wildlife, marine and coastal conservation; archaeological sites; and areas prone to natural disasters.

While the ISEA was completed in 2014 and does not capture changes between 2014-2020 that may be of high relevance to the present study, the ISEA forms an important base document to prepare the proposed SEA which will largely focus on coastal and marine areas where aquaculture activities will be carried out.

2. OBJECTIVES

The overall objective of the SEA is to ensure that strategic social, environmental and climate change concerns are appropriately and adequately integrated in the development and implementation of **coastal aquaculture in the Northern Province** as envisioned in NAQDA's Aquaculture and Culture Based Fisheries Sector Development Plan (2020-2025)

It is anticipated that the findings and recommendations of the SEAs will provide vital information for NAQDA in putting in place the required safeguards to promote ecosystem based & sustainable coastal aquaculture development.

The objectives of this SEA are to identify, describe and assess:

- The likely significant social and environment impacts resulting from implementing the *Aquaculture and Culture Based Fisheries Sector Development Plan (2020-2025) for the Northern Province* of Sri Lanka.
- The most important environmental, social, and climate change-related constraints that will bear upon the performance of the proposed plan.
- The opportunities for *Aquaculture and Culture Based Fisheries Sector Development Plan (2020-2025) for the Northern Province* to contribute to enhancing the state of the environment, socio-economic status of communities, building climate resilience and promoting low carbon development.
- Adequacy of existing policies, laws, regulations and the institutional capacity of the GoSL to addresses identified environmental/social sustainability challenges and climate change risks related with coastal aquaculture development in the Northern Province.
- Strategies on how potential negative social, environmental and climate change impacts can be minimized and how positive impacts can be optimized, with a particular focus on the adequacy of institutional capacities at the national and local levels, as well as of the regulatory framework, to address identified concerns associated with the implementation of the proposed plan.

The SEA will provide the GoSL and its development partners with relevant information on key environmental social and climate change challenges and opportunities in developing coastal aquaculture in the Northern Province and ensure that these concerns are appropriately integrated in the decision-making and implementation processes. Further the SEA will inform the scope of project-specific environmental impact assessments (EIAs), initial environmental examinations (IEEs) and other safeguards instruments that will be necessary during the investment period.

3. RESULTS

The SEA is composed of two parts: a scoping study and an SEA study. The scoping study will define the key issues that need to be addressed in the SEA study, considering the specific context in which the proposed sector support is being developed and is likely to be implemented.

The SEA scoping study will provide the following with reference to the coastal aquaculture sector and in particularly to the Northern Province, where relevant:

- A description of the sector (*as per the Aquaculture and Culture Based Fisheries Sector Development Plan (2020-2025)*) and its alternatives;
- A brief description of the sector's policy, institutional and legal framework, focusing on those related to environment and climate change;
- A brief presentation of the environmental and climate change policies and objectives in the country that are relevant to the sector;
- An identification of key stakeholders and an overview of their interests and concerns with regards to the implementation of the proposed plan
- An indication of the scope of the environmental baseline to be prepared;
- An indication of the main impact identification and evaluation methodologies to be used in the SEA study;
- An indication of possible changes to and reallocation of time amongst experts, based on findings of the scoping study.

The SEA study will deliver the following results:

- An environmental assessment of the *Aquaculture and Culture Based Fisheries Sector Development Plan (2020-2025) focusing the Northern Province*, taking into account the environment- and climate change-related risks, constraints and opportunities,
- Recommendations for the formulation of environmentally sustainable and climate resilient coastal aquaculture sector development for the Northern Province.

4. SCOPE OF WORK:

4.1 SCOPING STUDY

1. Overview of the sector plan, its policy, institutional and legal framework

- Identify policy, institutional and legal framework relating to coastal aquaculture sector development with particular attention on institutions/entities responsible for environment and climate change issues relevant to the implementation of the *Aquaculture and Culture Based Fisheries Sector Development Plan (2020-2025) focusing on the Northern Province*, as well as to the relevant environmental and climate change policy and legislation.
- Describe how the SEA will be linked to the existing planning frameworks for national and regional environmental management and climate change adaptation/mitigation.

2. Description of key stakeholders, their interests and concerns

- Identify key stakeholders - groups and institutions, environmental agencies, climate change related institutions, non-governmental organisations, representatives of the public and others, including those groups potentially affected by the likely environmental impacts of implementing coastal aquaculture.
- Review records of any national/regional public consultation process that may have taken place as part of the *Aquaculture and Culture Based Fisheries Sector Development Plan (2020-2025)* preparation process, if available. Based on this review and on additional consultations, identify key stakeholders' interests, concerns and values with respect to the proposed coastal aquaculture expansion program under consideration and propose a plan for systematic an structured stakeholder engagement under the SEA.[1]
- Carry out consultations with the identified stakeholders and reflect the outcomes of these discussions in the SEA findings and recommendations.

Note: The Consultants will have to ensure wide participation and must keep records of all consultation held and comments received, as the outcome of these consultations will have important implications for the direction and focus of the SEA study. Consequently, a structured analysis of all consultation outcomes will be needed to determine the key conclusions on areas of concern.

3. Description of key aspects to be addressed in the SEA

- Identify the key environmental and climate change issues that should be addressed in the SEA study– i.e. the key sector plan-environment/climate change interactions that need to be given special consideration and emphasis in light of:
  - potential significant impacts on the coastal and marine environments, contributions to greenhouse gas emissions (in relation to national emissions), and risks relating to climate vulnerability associated with the implementation of the proposed plan;
  - the key environmental, natural resources and climate change aspects that could potentially impinge on sector performance and are not adequately addressed in the proposed plan;
  - social impacts, notably from the perspective of livelihoods and poverty reduction.
  - potential conflicts between the proposed plan and environmental and climate change policy objectives (at national or sub-national level) as well as other economic sector development policies and plans.
  - key opportunities for the proposed sector plan to make a significant contribution to environmental sustainability, climate resilience, low carbon development in the Northern Province;

[1] Due to the large geographical areas that may be covered by the sector strategic document, stakeholder engagement could focus on key stakeholders, especially targeting directly affected and vulnerable groups as well as key stakeholders that may not have been adequately represented in the sector strategic document preparation.

4. Description of the scope of the environmental baseline to be prepared in the SEA study

- Undertake a detail review of the ISEA conducted for the Northern Province in terms of the extent of baseline data available through the study, their relevance to the present context, information gaps that need to be filled in the current SEA and maps that would need to be created/updated.
- Based on the above tasks, identify the scope of the environmental baseline required for the SEA study, ensuring that it will be adequate to examine in more detail the key aspects identified above.
- This could include a proposal on the geographical units that will need to be targeted. If so, geographical units identified for inclusion/exclusion in the environmental baseline assessment should be justified.

5. Recommendations on specific impact identification and evaluation methodologies to be used in the SEA study

- Describe impact identification and evaluation methodologies that will be used in the SEA study. Special attention should be given to identifying those environmental interactions that will require quantitative analyses and those for which qualitative analyses should be carried out.

6. Finalize scoping report and disseminate findings with key stakeholders:

- Prepare a succinct scoping report covering the outcomes of the above tasks.
- Conduct a consultation workshop with key stakeholders to validate the findings of the scoping study.

4.2 SEA STUDY

The SEA study will be based on the results of the scoping phase (following approval of the scoping study report) and include an environmental baseline study, the identification of environmental and climate change constraints and opportunities, the identification and assessment of the potential environmental impacts, an appreciation of the institutional capacities to address the environmental and climate change challenges identified and conclusions and recommendations.

7. Environmental baseline study

- Describe the current state of the environment in the coastal and marine areas of the Northern Province in terms of key physical, ecological cultural and socio-economic characteristics (focusing on those key environmental components identified in the scoping study), in order to better understand the key issues identified through the scoping study. Specifically, carry out ecological survey of areas indicated in government's draft national aquaculture development plan in order to assess, including through stakeholder consultations, the potential impacts on natural capital and ecosystem services of various aquaculture development scenarios.
- Describe trends and pressures on important coastal and marine environmental components, to the extent possible, and how such trends and pressures will change under the assumption of 'no implementation' scenario and 'full plan implementation' scenario. In doing so impacts of climate change (to the extent they can be predicted with some reliability) and other external factors including the influence of policies and plans of other economic sectors must be taken into account.

8. *Identification and evaluation of environment-related risks, constraints and opportunities*

- Identify, describe and assess the environmental and climate change factors that can affect (positively or negatively) the effectiveness and sustainability of the proposed coastal aquaculture expansion in the Northern Province.
- These factors may include the availability of natural resources necessary to achieve the plan's objectives, as well as the current and projected effects of climate change.
- Assess how the *Aquaculture and Culture Based Fisheries Sector Development Plan (2020-2025) for the Northern Province* could respond to these constraints and opportunities. Similarly, and as relevant, the study should assess whether the proposed plan, includes an adequate response in terms of adaptation to climate change in view of identified vulnerabilities.
- If the plan is not adequately responsive to environment and climate issues, assess how they can be potentially be addressed via proposed revisions.

9. *Identification and evaluation of impacts*

- Describe potential environmental consequences of implementing the plan, including the positive or negative contribution to greenhouse gas emissions (*if significant relative to national emission levels*), for each alternative being studied; Specifically, potential impacts on natural capital and ecosystem services of various aquaculture development scenarios.
- The significance of these impacts should be determined taking into account the nature and extent of the impact, the views and concerns of stakeholders and the sensitivity of the environment. In doing so, the potential cumulative impacts of implementing proposed sector activities should be identified.
- Those impacts which are significant should be assessed in detail taking into account:
    - the views and concerns of stakeholders;
    - consistency with international commitments (bilateral and multilateral environmental agreements);
    - socio-economic consequences (especially on vulnerable groups and minorities);
    - compliance with environmental and climate change regulations and standards in the country;
    - consistency with environmental and climate change objectives and policies and their implications for sustainable development.

10. *Identification and evaluation of impacts in terms of vulnerability to climate risks*

- Identify, as relevant, direct and indirect impacts of implementing the sector plan in terms of increased or reduced vulnerability to climate variability and climate change (*e.g. the construction of new infrastructure in 'climate-sensitive' areas such as sheltered coastal zones may lead to population migration to these areas, thus exposing more people to climate risks; on the contrary, sector-wide measures may contribute to increase the population's resilience to climate change*)

11. Preparation of baseline, vulnerability and opportunity maps

- Develop digital maps that clearly indicates important baseline conditions as well that indicates the level of vulnerability/opportunity of the coastal/marine areas for coastal aquaculture development.

12. Appraisal of the capacities to address environmental and climate-related challenges

- The capacity of regulatory institutions to address the identified environmental and climate-related issues, both in terms of adaptation and mitigation, should be appraised.

13. Stakeholder engagement

- Stakeholders should be engaged throughout the SEA study according to the stakeholder engagement strategy agreed at the scoping phase

14. Identify appropriate institutional arrangements:

- In association with the Ministry of Fisheries and NAQDA, identify the optimal arrangements to oversee the implementation of the further assessments and mitigations measures during the implementation stage of the sector plans. Such an arrangement may include setting up a task force of relevant agencies.

15. Conclusions and recommendations

- Summarise the key environmental issues for the sector involved, including policy and institutional constraints, challenges and main recommendations.
- Recommend how to optimize positive impacts and make best use of environment-natural resource- and climate change related opportunities, as well as on how to mitigate adverse effects, adapt to environmental and climate change constraints and manage risks.
- Propose the best alternative scenario and any revisions to the sector plan, targets and implementation and monitoring modalities.
- Present the limitations of the SEA and its assumptions.
- The recommendations should take into account the views presented by stakeholders and explain how these were integrated. In the case of concerns that were not integrated in the final recommendations, the reasons thereof should be given

4.3 REPORTING

- The scoping study must be presented in a format that will be agreed between the World Banka and the Consultants.
- A stakeholder engagement plan must be presented in two weeks from contract signing.
- The draft scoping report should be presented for comments 4 weeks from contract signing. Comments should be expected from the World Bank and the Technical Working Group (TWG)[2] within 14 day. The Consultants will organize a workshop to present the

[2] A Technical Working Group (TWG) has been appointed by the Ministry of Fisheries to guide the implementation of the ASA, chaired by the Director General/Technical of the Ministry of Fisheries and

draft scoping report to the TWG and other relevant stakeholders, as defined in the engagement plan. The Consultants will take account of those comments in preparing the final scoping report.

- The SEA study will begin no later than a week after the submission of the final scoping report. The SEA report content and structure must be agreed with the Bank team.
- The draft SEA report is to be presented for comments by the 20th week. Within 2 weeks of the draft SEA submission, comments will be received from the Technical Working Committee. The Consultants will organize a workshop to present the draft scoping report to the TWG and other relevant stakeholders, as defined in the engagement plan. The consultants will take account of these comments in preparing the final report and the final report will be submitted by the 24th week from date of inception.

consisting of key agencies of the Ministry, National Planning Department and Coast Conservation Department as members.

Annex 3 – Final Scoping Report for the SEA Study

Strategic Environmental Assessment (SEA) for the Aquaculture Development Program of the Northern Province

Final Scoping Report

March 2022

Consulting Engineers & Architects Associated (Pvt) Ltd.

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Abbreviations

ACBFSDP	Aquaculture and Culture Based Fisheries Sector Development Plan
ADB	Asian Development Bank
ADC	Aquaculture Development Center
ADZ	Aquaculture Development Zone
ASA	Advisory Services and Analytics
BOI	Board of Investment of Sri Lanka
CBF	Culture-based Fisheries
CBFMCC	Culture-Based Fisheries Management Coordinating Committee
CBM	Community Biodiversity Management
CBO	Community Based Organization
CC&CRMD	Coast Conservation & Coastal Resource Management Department
CEA	Central Environment Authority
CEAA	Consulting Engineers and Architects Associated (Pvt) Ltd
DFAR	Department of Fisheries and Aquatic Resources
DMC	Disaster Management Center
DAPH	Department of Animal Production and Health
DS	Divisional Secretariat
DWC	Department of Wildlife Conservation
EA	Environmental Assessment
EAA	Ecosystem Approach to Aquaculture
EAFM	Ecosystem-based Approach to Fisheries Management
EBM	Eco System Based Management
EIA	Environmental Impact Assessment
EPL	Environmental Protection License
ESF	Environmental and Social Framework
FAO	Food and Agriculture Organization
FFPO	Fauna and Flora Protection Ordinance
FGD	Focus Group Discussion
GHG	Greenhouse Gas
GIS	Geographic Information System
GND	Grama Niladari Division
GoSL	Government of Sri Lanka

GSMB	Geological Survey and Mines Bureau
IAS	Invasive Alien Species
IEE	Initial Environmental Examination
ISEA	Integrated Strategic Environmental Assessment
MEPA	Marine Environmental Protection Authority
MFAR	Ministry of Fisheries and Aquatic Resources
MSP	Marine Spatial Planning
NAQDA	National Aquaculture Development Authority
NARA	National Aquatic Resources Research & Development Agency
NDC	Nationally Determined Contributions
NEA	National Environmental Act
NIASP	National Invasive Alien Species Policy
NGO	Non-Governmental Organization
NPD	Department of National Planning
PAA	Project Approving Agency
PS	Pradeshiya Sabha
SDG	Sustainable Development Goals
SEA	Strategic Environmental Assessment
SEACAM	Secretariat for Eastern African Coastal Area Management
SLTDA	Sri Lanka Tourism Development Authority
TOR	Terms of Reference
TSF	Taprobane Seafood
UDA	Urban Development Authority
UKMO	United Kingdom Meteorological Office
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WSSV	White Spot Syndrome Virus

1 Introduction

1.1 General

The National Aquaculture Development Authority of Sri Lanka (NAQDA) has prepared an Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) for 2021-2025. The World Bank is engaged with the Government of Sri Lanka (GoSL) in an Advisory Services and Analytics (ASA) work entitled 'Sri Lanka: Priorities for Sustainably Managing Sri Lanka's Fisheries and the Ecosystems that Manage Them'. As part of the ASA work carried out in support of sustainable development of coastal aquaculture, a number of analytical works including a Strategic Environmental Assessment (SEA) have been planned focusing on the Northern Province as the pilot area.

World Bank has engaged Consulting Engineers and Architects Associated (Pvt) Ltd (CEAA) to conduct SEA for aquaculture development program in the Northern Province.

The Inception Report including the Stakeholder Engagement Plan was submitted on 21st September 2021. Revised Inception Report and Stakeholder Engagement Plan incorporating the comments from World Bank, NARA and NAQDA was submitted on 10th October 2021.

Draft Scoping Report was submitted on 24th November 2021. Few Comments were received from the World Bank for Draft Scoping Report and a Meeting was held on 13th December 2021 to discuss the comments on Draft Scoping Report.

The Revised Draft Scoping Report incorporating the comments from World Bank, NARA and NAQDA was submitted on 23rd December 2021.

A Provincial level stakeholder meeting was organized and conducted on 11th February 2022 at Jaffna District Secretariat to disseminate findings of the Scoping Study and to obtain views/concerns and suggestions of Key Stakeholders.

This Final Scoping Report incorporates the comments and concerns of the stakeholders received during the stakeholder meeting and community consultations.

1.2 Coastal Aquaculture Sector in Sri Lanka

Aquaculture is one of the most dynamic sectors in the world economy with an annual growth rate exceeding 10%. Although the development of this sector has been slow and erratic in Sri Lanka, there is a vast potential for aquaculture, in terms of climate and resources. Traditionally, fish is an important commodity in Sri Lanka in relation to the protein supply to its population both coastal as well as inland. Fish provides more than 60% of the animal protein requirement of people in the country. Thus, aquaculture is expected to increase rapidly in volumes and diversity of cultured species, and thereby become the main source of food and protein supply in the future. In 2019, the per capita fish consumption was reported as 16.6 Kg/year which is below the expected target (Fisheries Statistics, 2020). The total inland and aquaculture fish production was 90,340 MT in 2019 which is 17.8% of the total fish production in the country (Fisheries Statistics, 2020). Out of the total export value in 2018, 19% consists of coastal aquaculture products (Fisheries yearbook, 2018). Coastal aquaculture and culture production still consisted less than 4% of the annual fish production in 2019 (Fisheries Statistics, 2020).

Currently Sri Lanka has a limited, but stable, shrimp production industry and a developing finfish aquaculture production. Many farms are small scale in nature and aim in supporting smaller local communities with income and food supply. Numerous research trials have been carried out during the last few years, in different regions of the country including sea cages and land-based installations from fish and shrimps. With such know-how and outputs, small scale fin fish cage farming was widespread while there was a growing interest to install bigger sea cages with circumference up to 60 meters in the Northeast Sea area. It is envisaged that Sri Lanka will be developing as a target country for foreign investment in aquaculture since countries such as Norway, Scotland, Vietnam, Japan, USA, and Canada have made investments during the last decade.

Table 1: Present status of Coastal Aquaculture in Sri Lanka (2021)

Type	Production (Mt.) in Sri Lanka	Production (Mt.) in Northern Province	Contribution from Northern Province (%)
Shrimp Farming	14,413	921.64	6.4%
Seaweed Farming	218.1	216.93	99.5%
Sea bass Farming	465.6	4.79	1.03%
Crab Farming	6.4	4.29	67.0%
Sea cucumber Farming	579.82	579.82	100.0%
Milk Fish Farming	5.09	2.03	39.9%
Other	509.92	5.01	1.00%
Total	16,198.6	1,735.0	10.71%

(Source: NAQDA)

In the proposed ACBFSDP, 2021-2025 plan, under the coastal aquaculture sub-sector, the main objective is to develop coastal and marine aquaculture of marine/brackish water fish/crustacean species to uplift the living standards of coastal fisher communities by engaging them in the farming of high valued fish/crustacean species, mainly targeted at the export market. It is expected that, the coastal fisher communities will acquire the necessary technical expertise through training and demonstration of farming techniques, eventually resulting in the development of prosperous livelihoods for the coastal fisher communities.

However, development of the coastal aquaculture sector could cause adverse impacts on the extremely sensitive environments around the Northern coastal belt consisting of coral reefs, seagrass beds, lagoons, etc., unless adequate precautions are adopted during plan implementation. Protection of these fragile eco systems will also ensure the continued sustainability of the aquaculture sector.

The development of sustainable aquaculture in coastal areas requires attention to policy, management, incentive structures, and institutional issues, including the need to determine the appropriate role of the Government in future development work.

1.3 Overview of Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) (2021-2025)

The overall objectives of the ACBFSDP (2021 – 2025) of NAQDA was to enhance freshwater and coastal aquaculture fish/shrimp production with the aim of fulfilling the nutritional needs of the people by providing a cheap source of protein to the rural population, while at the same time alleviating poverty, generating livelihoods and foreign exchange earnings through export of high-valued aquaculture products and services.

The plan targets to increase the total export earnings of aquaculture from Rs. 8,017.02 million to Rs. 91,973 million in year 2025 by increasing production from inland aquaculture, coastal aquaculture, and mariculture. The ACBFSDP (2021-2025) has separately evaluated the production targets envisaged under freshwater fisheries and aquaculture development, and coastal aquaculture since the strategies adopted for the two sectors are different from each other.

Coastal aquaculture production target by 2025 has been forecasted as 60,000Mt while it is anticipated to develop 30,000 employment opportunities and 415 million USD in foreign exchange earnings. Specially, the overall objective of the Plan is to increase the coastal aquaculture production from 7,568 Mt to forecasted production of 60,000 Mt in 2025. It is well depicted the strategies developed to achieve the production targets from coastal aquaculture by proposed commodities. Shrimp aquaculture has been specified with a highlight by introducing more potential species, for instance *Litopenaeus vannamei*, indicating the benefits of intensification which need less energy use per metric ton of shrimp yield. Seabass, sea cucumber, seaweed, milkfish, and crabs are the other major aquaculture species considered in the plan.

Table 2: Production targets for Coastal Aquaculture in Northern Province

Species	Culture System	District		2021	2022	2023	2024	2025
Shrimp	Ponds	Mannar	P. *monodon*	200	700	1,500	2,700	4,000
		Mannar	L. *vannamei*	3,800	5,400	6,000	10,000	12,000
		Jaffna			1,000	2,000	3,000	4,000
		Total		**4,000**	**7,100**	**9,500**	**15,700**	**20,000**
	Circular Tanks	Mannar	L. *vannamei*	94	105	146	154	230
		Jaffna		48	53	67	82	120
		Killinochchi		24	29	34	38	50
		Mullativu		24	29	34	38	50
		Total		**190**	**215**	**270**	**312**	**450**
	Total Production (Ponds & Cages)-Mt			**4,190**	**7,315**	**9770**	**16,012**	**20,450**

Species	Culture System	District	2021	2022	2023	2024	2025
Seabass	Lagoon Cages	Mannar	3	4	5	6	7
		Killinochchi	2	3	5	6	7
		Jaffna	2	2	4	5	6
		Total (Cages)	7	9	14	17	20
	Ponds	Mannar	13	18	20	20	20
		Killinochchi	10	12	13	14	15
		Total (Ponds)	23	30	33	34	35
	Total Production (Ponds & Cages)-Mt		**30**	**39**	**47**	**51**	**55**
Crab	Ponds	Mannar	105	110	112	120	120
		Kilinochchi	5	5	5	6	8
		Jaffna	6	6	6	6	7
	Total Production (Ponds)-Mt		**116**	**121**	**123**	**132**	**135**
Sea Cucumber	Pen	Mannar	15	15	25	25	25
		Kilinochchi	420	620	1,175	1,175	1,350

Species	Culture System	District	2021	2022	2023	2024	2025
		Jaffna	165	365	800	900	1,125
	Total Production (Mt) - Wet		**600**	**1,000**	**2,000**	**2,100**	**2,500**
Seaweed	Raft	Mannar	350	375	400	410	540
		Kilinochchi	400	450	500	500	600
		Jaffna	100	175	180	200	200
	Total Production (Mt) - Wet		**850**	**1,000**	**1,080**	**1,110**	**1,340**
Milk Fish	Ponds	Mannar	10	15	15	15	25
		Kilinochchi	5	5	5	5	5
		Jaffna	4	15	40	40	50
	Total Production (Mt)		**19**	**35**	**60**	**60**	**80**
Total Production-Northern Province (Mt)			**5,805**	**9,510**	**13,080**	**19,465**	**24,560**

(Source: NAQDA)

The three key policies considered in relation to the development plan included, People centric economic development, Sustainable Environmental Management, and Technology based Society.

Further to achieve the envisaged targets in coastal aquaculture, NAQDA has planned new initiatives to establish aquaculture industrial parks, sea cucumber villages, hatcheries with new technology, new intensive shrimp farming units, farming with new technologies and the expansion of small-scale marine / brackish water fish farming.

1.4 Objectives of the Strategic Environmental Assessment (SEA)

SEAs are usually carried out for Policies, Plans and Programmes and is one way in which strategic level issues relating to the environment could be resolved at an early stage of a policy, plan or programme. This will make the subsequent Environmental Impact Assessment (EIA) process for the individual projects within a given plan or programme much less tedious and also pave the way for easy project implementation without impediments.

Although the SEA process is not yet legalized in Sri Lanka, many projects and programmes funded by the World Bank undergo a SEA prior to the EIA process for individual projects.

The main objective of the SEA for the Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) is to identify opportunities and risks so that plan implementation can promote sustainable aquaculture. The SEA will also identify any impediments to the implementation of the plan at the strategic level.

A major focus will be the presence of any protected areas which are legally protected under the Forest Ordinance, Fauna and Flora protection Ordinance, Coast Conservation act No 57 of 1981 its Amendment Act No 49 of 2011 and the National Environmental Act of 1980 and its amendment acts mainly. The SEA will also identify the presence of any environmentally sensitive areas within the project area which may not yet be protected under the above-mentioned acts or any other act. Other aspect such as social and cultural issues will also be closely examined in the SEA study. The social impacts of the proposed plan could be both positive and negative depending on the site identified for the aquaculture projects.

A potential major issue is the conflict of the aquaculture projects with traditional fisheries in the region. There is a perceived threat to traditional fisheries in the region which is being expressed by

fishermen organizations as well as the regional and district officers of Department of Fisheries and Aquatic Resources (DFAR). Stakeholder and Community consultations to be carried out to identify potential conflicts for coastal aquaculture development.

In addition, pollution aspects relating to aquaculture projects and climate change related impacts on the proposed plan as well as the plan induced climate impacts if any will also be studied.

The Objectives of this SEA as per the Terms of Reference issued by the World Bank are given below.

- Identify the likely significant social and environment impacts resulting from implementing the Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) (2020-2025) for the Northern Province.
- Identify the most important environmental, social, and climate change-related constraints that will bear upon the performance of the proposed plan.
- Identify the opportunities for ACBFSDP to contribute to enhancing the state of the environment, socio-economic status of communities, building climate resilience and promoting low carbon development in the Northern Province.
- Adequacy of existing policies, laws, regulations and the institutional capacity of the National, Provincial and regional authorities to addresses identified environmental/social impact and challenges related with coastal aquaculture development in the Northern Province.
- Strategies on how potential negative social, environmental and climate change impacts can be minimized and how positive impacts can be optimized, with a particular focus on the adequacy of institutional capacities at the national and local levels, as well as of the regulatory framework, to address identified concerns associated with the implementation of the ACBFSDP.

Since aquaculture projects are prescribed projects under the National Environmental Act the projects will require to undergo an EIA or Initial Environmental Examination (IEE) as the case maybe prior to implementation.

2 Overview of the sector plan, its policy, institutional and legal framework

2.1 Policy, institutional and legal framework related to the implementation of Coastal Aquaculture Development Programme

The following is a description of the legislations and acts in Sri Lanka related to the implementation of Coastal Aquaculture Development Programme. This legislation relates to the development of aquaculture projects as well as protection of the environment.

2.1.1 The Constitution of Sri Lanka

The constitution of Sri Lanka includes the following principles;

- The rights to a clean and healthy environment.
- Sets out principles on which land shall be held, used, and managed.
- Empowers the state to regulate the use of land in the public interest
- Regulates the sustainable exploitation, utilization, and management of natural resources.

2.1.2 National Aquaculture Development Authority Act (No. 53 of 1998)

NAQDA was established in 1999 under the National Aquaculture Development Authority of Sri Lanka Act, No. 53 of 1998. NAQDA's functions include development and management of all freshwater aquatic resources i.e. inland fisheries, which are generally culture-based, and the aquaculture industry including sea farming (MFARD: Fisheries Sector Development Strategy 2010-2013).

The following act and amendments constitute the provisions for establishing and operating NAQDA:

1) The National Aquaculture Development Authority of Sri Lanka Act, No. 53 of 1998

2) The National Aquaculture Development Authority of Sri Lanka (Amendment) Act, No. 23 of 2006

The principal act is mostly relevant to the administrative functions of NAQDA while there are some significant adjustments for developing aquatic resources and aquaculture industry. Consequently, NAQDA has the management function of aquaculture and medium to local private sector investment in aquaculture.

Also, NAQDA functioning in managing "inland waters fisheries and especially that of culture-based fisheries".

The Director General, NAQDA, Chief Executive Officer of the Authority is responsible for exercise and discharge of the powers and functions related to Coastal and Fresh water Aquaculture under the NAQDA Act.

The aquaculture regulations under the NAQDA Act includes,

- The Shrimp Aquaculture Management (Operation of Crop Cycle) Regulations, 2008.
- The Live Rock Culture for Export Regulations No. 1 of 2011
- The Aquaculture Management Regulations of 2011
- The Regulations of 2012 (Amendment to Regulations No. 1 2011)

2.1.3 Fisheries and Aquatic Resources Act No 2 of 1996 and amended (2016)

The Fisheries and Aquatic Resources Act (1996) relates to the management, regulation, conservation and development of the fisheries and aquatic resources in Sri Lanka. Part VI of the Act addresses aquaculture while Part X of the Act grants the Minister of Fisheries and Aquatic Resources overall authority to make regulations concerning the matters indicated in the Act, including the management and regulation of aquaculture. Several regulations have been gazetted under the Act, which have an impact on aquaculture and aquaculture products.

Under the regulations made under "Conservation of Fish and Aquatic Resources within Sri Lanka Waters" by Extra Ordinary Gazette No. 2008/30 of 2017, no one shall dispose of any pollutant, waste or foreign matter and fill or reclaim the sea areas in a manner causing destruction to fish and aquatic resources in Sri Lankan waters, engagement in removing, cutting or altering mangrove ecosystems grown in the coastal belt or any area adjacent to Sri Lankan waters, engagement in any activity which causes a threat to the conservation of fish species in Sri Lankan waters or the coastal belt adjacent to it. It affords special protection to the aquatic resources to the danger of extinction and to preserve the natural breeding grounds and habitats.

2.1.4 National Aquatic Resources Research and Development Agency (NARA) Act, No. 54 of 1981 and amendment No 32 of 1996

NARA was established in 1982 under the National Aquatic Resources Research and Development Agency Act, No. 54 of 1981 and amendment No 32 of 1996 to conduct research and provide advisory and consultancy services on scientific, technological, and legal matters relating to exploitation, management, conservation and development of aquatic resources.

2.1.5 The Animal Diseases Act (1992) and Animal Diseases (Control and Prevention) Regulations (1998)

The Animal Diseases Act (1992), which defines animals and animal products as including "all varieties of fish, crab, prawn, lobster, and turtle, marine as well as freshwater fish, whether cooked, canned, dried, salted or smoked", may apply to aquaculture. This Act lists a number of measures that can be taken by the Director of Animal Production and Health in case of animal diseases, including sealing of infected premises and areas, power to close roads to animal traffic, disinfection and destruction and disposal of animal products. The Act also deals with the import and export of animals and animal products. Import permits are issued by the Controller of Imports and Exports, on the recommendation of the Director, after submission of a health certificate from the country of origin. The permit and notification procedures and the powers that may be used by the Director to enforce the Act are further regulated in the Animal Diseases (Control and Prevention) Regulations (1998).

2.1.6 Board of Investment (BOI) Act (2002)

The Board of Investment (BOI) Act (2002) seeks to promote and facilitate investment in Sri Lanka and provides for the establishment of the Board of Investors. The Board has identified priority sectors for attracting foreign and local investments, including "shellfish and other products of mariculture and aquaculture".

2.1.7 Fauna and Flora Protection Ordinance No 2 of 1937 and its (Amendment) Act Nos. 49 of 1993 and amendment act no 22 of 2009

Fauna and Flora (Protection) Ordinance No. 2 of 1937, as amended by the Fauna and Flora (Amendment) Act No. 49 of 1993 and Act No. 22 of 2009 provides regulations for the protection, conservation and preservation of the fauna and flora of Sri Lanka, for the prevention of the commercial exploitation of such fauna and flora; and to provide for matters connected therewith or incidental thereto".

Five categories of protected areas are mentioned under the provisions of the Fauna and Flora protection Ordinance as follows; Strict Nature Reserves, National Parks, Nature Reserves, Jungle Corridors and Intermediate Zones including sanctuaries.

Department of Wildlife Conservation (DWC) is responsible for all fauna and flora within national parks, reserves and sanctuaries and for protected species that are listed in the schedules to the Act throughout Sri Lanka.

The provisions in this law will apply to aquaculture projects, if the project is in close proximity to a sanctuary or National Park protected under the Fauna and Flora Protection Ordinance (FFPO) or has any impacts on such areas.

According to this Act, any development activity of any description whatsoever proposed to be established within a National Reserve or within one mile from the boundary of any National Reserve, is required to be subjected to EIA/IEE, and written approval should be obtained from the Director General, Department of Wildlife Conservation prior to implementation of such projects. The FFPO follows a similar process as the National Environmental Act (NEA) in conducting scoping, setting the TOR preparation of Environmental Assessment (EA), review of EA and public consultation and disclosure.

2.1.8 National Environmental Act (NEA) No 47 of 1980 and its Amendment Acts no 56 of 1988 and Act No 53 of 2000

The National Environmental Act No 47 of 1980 is the main piece of legislation with provisions for environmental Management and Protection. There are two main regulatory provisions in the National Environmental Act which is relevant to the implementation of aquaculture projects as follows.

- Environmental Impact Assessment (EIA) procedure for large scale development projects which are “Prescribed Projects”
- Environmental Protection Licensing (EPL) procedure for waste generating industries.

Under provisions of Part IV C of the National Environmental Act No. 47 of 1980 and subsequently stipulated in Gazette (Extra Ordinary) No. 772/22 dated June 24, 1993 the Government of Sri Lanka (GoSL) made Environmental Assessment (EA) a legal requirement for a range of development projects. The list of projects requiring an EA in the form of Environmental Impact Assessment (EIA) or Initial Environmental Examination (IEE) is prescribed in the above Gazette notification.

Aquaculture development projects of extent exceeding 4 hectares is listed as a “Prescribed Project” under the Part I of National Environmental Act.

In addition, the Gazette notification includes a list of line ministries and agencies that are designated as Project Approving Agencies (PAA). The PAA's are responsible for the administration of the EIA process under NEA. The Regulations also provide the guidelines which the Project Approving Agencies are required to follow in approving prescribed projects.

2.1.8.1 Environmental Impact Assessment (EIA) Process

The EIA process in Sri Lanka applies only to so call "Prescribed Projects" which have been published in the Government Gazette No 772/22 dated 24th June 1993 under section 23 Z of the National Environmental Act. This gazette notification lists two groups of projects that require an IEE or EIA before they can be implemented. Part 1 of the gazette notification lists seventeen different types of projects (excluding industries) that are considered as having significant environmental impacts. The second list in Part 11 of the Gazette notification sets out very high polluting industries which need an IEE or EIA irrespective of where they are located. Part 111 of the Gazette notification lists environmentally sensitive areas within which any project, irrespective of its magnitude, will be caught up in the EIA process. The environmental sensitive areas gazetted under the EIA Regulations are as follows;

- Within 100 meters from the boundaries of or within any area declared under the National Heritage Wilderness Act/ the Forest Ordinance
- Any erodible area declared under the Soil Conservation Act (Chapter 450)
- Any Flood Area declared under the Flood Protection Ordinance (Chapter 449) and any flood protection area declared under the Sri Lanka Land Reclamation and Development Corporation Act No 15 of 1968 as amended by Act No 52 of 1982.
- 60 meters from the bank of a public stream as defined in the Crown Lands Ordinance (Chapter 454) and having a width of more than 25 meters at any point of its course.
- Any reservation beyond the full supply level of a reservoir.
- any archeological reserve, ancient or protected monument as defined or declared under the Antiquities Ordinance (Chapter 188)
- any areas declared under the Botanical Gardens Ordinance (Chapter 446)
- Within 100 meters from the boundaries of or within any areas declared as a Sanctuary under the Fauna and Flora Protection Ordinance. (Chapter 469)
- Within 100 meters from the high flood level contour of, or within, a public lake as defined in the Crown Lands Ordinance (Chapter 454) including those declared under section 71 of the said Ordinance.

Any project, irrespective of its magnitude will be required to undergo an Environmental Impact Assessment study if located partly or within the above mentioned environmentally sensitive areas.

Since most of the proposed coastal aquaculture projects will be situated within the coastal zone the approval for the IEE or EIA will be granted by the Coast Conservation Department under the provisions of the Coast Conservation Act. The Director General Coast Conservation has the discretion to decide whether an IEE or Full-scale EIA will be carried out for a given aquaculture project situated within the coastal zone. Most aquaculture projects within the coastal zone are approved by the CCD

subsequent to an IEE. For aquaculture projects which are situated outside the coastal zone the CEA will act as the project approving agency which approves the IEE or EIA.

2.1.8.2 Environmental protection Licensing Procedure for Waste Generating Industries

In addition to the EIA procedure there is another regulatory procedure of the CEA called Environmental Protection Licensing process for waste generating industries which also applies for aquaculture projects. Under the EPL regulation any industry or process which generates wastewater, air emissions, solid waste, hazardous waste, noise or vibration is required to obtain an Environmental Protection License (EPL) on an annual basis. The EPL for the specific industry will specify the environmental standards to be complied with by the industry when discharging wastewater, air emissions or noise into the environment. The industry is required to abide by the standards stipulated in the EPL and repeated violations of the standards could result in legal action being taken against the industry. Industries which require an EPL are given in gazette notification No 1533/16 dated 25.01.2008. In this gazette, Industries are classified as being High Polluting, Medium Polluting or low polluting.

Although aquaculture projects are not listed as requiring an EPL in this gazette notification, some of the aquaculture projects are caught up within the EPL regulation, as any industry which discharges more than 10 or more cubic meters of wastewater falls under part A of the gazette notification are considered as being high polluting industries. EPLs for such high polluting industries are usually issued by the CEA head office. Similarly, an aquaculture project discharging 3 or more cubic meters and less than 10 cubic meters of wastewater is considered as being a medium polluting industry and will require an EPL which is issued by the relevant regional office of the CEA. The standards required to be complied with by these projects are stipulated in the EPL and will depend on the final discharge point of the effluents.

2.1.9 Forest Ordinance no 16 of 1907 and its Amendment Act no 65 of 2009

This ordinance deals with conservation, protection, and sustainable management of forest resources which would be applicable to the forest resources found within the project area.

The last amendment Act No 65 of 2009 states as follows - An Ordinance to consolidate and amend the law relating to the conservation, protection and sustainable management of the forest resources and utilization of forest produce. The Forest Ordinance has been enacted with the express intention of protecting forests.

Conservation forests are under the control of the Conservator of Forests and are subject to conditions and restrictions as prescribed. The Forest Ordinance has specifically stated the types of activities that are not permitted within such Reserve/Conservation forests. Therefore, such aquaculture projects will not be allowed to be established within such areas under protection status as per the Forest Ordinance.

2.1.10 Coast Conservation Act No 57 of 1981

According to the provisions in the Coast Conservation Act the “Coastal Zone” is defined as follows;

“Coastal Zone" means that area lying within a limit of three hundred meters landwards of the Mean High Water line and a limit of two kilometers seawards of the Mean Low Water line and in the case of rivers, streams, lagoons, or any other body of water connected to the sea either permanently or

periodically, the landward boundary shall extend to a limit of two kilometers measured perpendicular to the straight base line drawn between the natural entrance points thereof and shall include the waters of such rivers, streams and lagoons or any other body of water so connected to the sea;

The sections of the coast conservation Act which will apply for coastal aquaculture projects are as follows.

- Control of development activities within the coastal zone (section 16)
- The declaration of "Conservation Areas" of any area in which special measures need to be taken for the protection of the coastal and aquatic eco system (section 22d)
- Areas within or adjacent to the coastal zone can be declared as a "Special Management Area" in order to plan resource management within the area.(section 22 e)

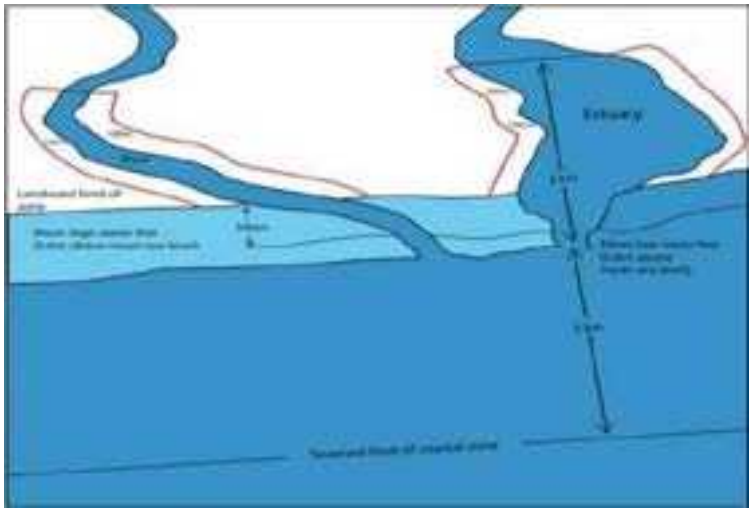


Figure 1: Costal zone as defined by Coast Conservation Act

Control of development activities within the coastal zone: Under this section coastal aquaculture projects will require to obtain a permit from the Coast Conservation and Coastal Resources Management Department (CC & CRMD) to implement the project. Upon receipt of an application for a permit to engage in a development activity within the Coastal Zone the CC & CRMD may require the applicant to furnish an IEE report or an EIA report relating to the development activity. Most aquaculture projects within the coastal zone usually undergo IEE.

The declaration of "Conservation Areas" within the coastal zone: No development activity or collection and gathering of aquatic resources shall be carried out in any area declared as a conservation area. The CC & CRMD may however issue permits, in respect of applications made in the prescribed form, to persons intending to engage in scientific study and research within such area. The Minister may make regulations prescribing the manner and mode of administrating such areas, the activities permitted within such areas and the persons who may engage in such activities within such conservation areas.

Special Management Areas: The Minister may make regulations prescribing, the persons entitled to have access to these areas and the activities which can be carried out within such areas.

2.1.11 Marine Pollution Prevention Act, No. 35 of 2008

The Marine Pollution Prevention Act, No, 35 of 2008 (Government of Sri Lanka, 2008) provides the administrative arrangements for the prevention, control and reduction of pollution in the territorial waters of Sri Lanka or any other maritime zone, its foreshore and the coastal zone of Sri Lanka. The Act provides for the establishment of the Marine Environmental Protection Authority (MEPA) and Marine Environmental Council, reception facilities and preventive measures against pollution, maritime casualties, prevention of pollution in respect of criminal and civil liability, and prevention of pollution when engaged in exploration of natural resources including petroleum or any related activity.

2.1.12 Antiquities Ordinance No. 9 of 1940 and Antiquities (Amendment) Act No. 24 of 1998

This is an Ordinance to provide for the better preservation of the antiquities of Sri Lanka, and of sites and buildings of historical or archaeological importance In Sri Lanka. Minister in charge of the Subject can declare archaeological monuments by a notice published in the government gazette in terms of sections 16,17,18 and 19 of the Antiquities Ordinance.

Ancient constructions of historical and archeological value which are older than 100 years are declared as archaeological monuments in accordance with the legal provisions of the Antiquities (Amendment) Act No. 24 of 1998.

Subsequent to the declaration of monuments, a prescribed zone of 400 yard from the monument are reserved and erection of buildings, carrying on of ruining, quarrying or blasting operations are prohibited within such reserved zone. Nearly 200 archaeological sites have so far been identified in the Northern Province by the Department of Archaeology.

2.1.13 Policy, institutional and legal framework relating to Climate Change

Several sector-specific national policies in Sri Lanka and the National Climate Change Policy of Sri Lanka developed by the Ministry of Environment have paid attention to the impacts the climate change. The National Climate Change Policy of Sri Lanka aims to provide guidance and directions for addressing the adverse climate change impacts efficiently and effectively by all the relevant stakeholders. The policy has guiding principles and broad statements that could be transformed to action for addressing the challenges imposed by climate change.

Sri Lanka Coastal Zone and Coastal Resource Management Plan, gazetted in May 2018, provides an extensive description of the anticipated future climate change impacts including those from sea level rise; the projected inundation areas in each district including/excluding water bodies and the sea level exposure map for Sri Lanka are included, and proposed action for mitigating the impacts from climate change are extensively dealt with. The above plan was developed to ensure the long-term sustainable use of the coastal environment and resources, in line with the national development goals.

In addition, there are national level action plans such as the Action Plan for Haritha Lanka Programme, one of the missions of which is meeting the challenges of climate change. Caring for the Environment: Path to sustainable development (NEAP of 2008- 2012), also has considered issues and

problems in the marine resource sector and related polices, strategies and relevant actions promoting sustainable development and resource use in marine areas.

2.1.14 Policy, institutional and legal framework for related Land Acquisition aspects

Though straightforward policies or acts are not available in Sri Lanka to address social and cultural issues specifically in relation to aquaculture development, policies and acts are available to manage the social impacts arising from land acquisition and involuntary Resettlement.

Aquaculture development may cause permanent or temporary loss of land, productive assets, and access to assets, income sources and means of livelihoods.

2.1.14.1 Land Acquisition Act(LAA) No. 9 of 1950 and its amendments and regulations (2008 and 2013)

Gives directives for land acquisition in the public interest and provides statutory and Ex-gratia payments and benefits to title holders and non- titleholders.

2.1.14.2 National Involuntary Resettlement Policy (NIRP) of 2001

Land Acquisition Act provides compensation only for land, structures, and crops and provisions are not available to address key resettlement issues to mitigate or avoid impacts on people resulting from land acquisition. In addition, people without titles to the land and other dependents on land cannot be assisted under the LAA.

The NIRP also highlighted the need for consultation of APs and their participation in the resettlement process actively.

The basic principles of the NIRP are as follows.

- Avoid, minimize, and mitigate negative involuntary resettlement impacts by reviewing alternatives to the project.
- Project affected persons are adequately compensated, relocated, and rehabilitated.
- Assist the affected persons in dealing with any psychological, cultural, social, and other impacts caused by compulsory land acquisition and resettlement
- Gender equality and equity should be ensured and adhered to throughout.
- Project Executing Agencies should bear the full costs of compensation and resettlement.

It aims to ensure that people affected by development projects are treated fairly and equitably and ensure that they are not impoverished in the process.

2.1.14.3 World Bank's Social Safeguard policies- Environmental and Social Framework (ESF) (2018)

The Environmental and Social Framework (ESF) applies to all Investment Policy Financing (IPF) projects initiated after October 1, 2018.

The basic principles of the ESF related to land acquisition are as follows.

- Minimize involuntary resettlement and loss of land, structures, other assets, and incomes by exploring all viable options.
- Resettlement of the project affected persons will be planned and developed as an integral part of development interventions.

- Women will be given equal access to resources and services and provided with opportunities that would empower them.
- Compensation at replacement cost is paid fully before taking possession of any land or property or both.
- The affected parties are compensated irrespective of their status of ownership.
- Whenever community facilities such as social, religious, and cultural facilities are affected by development interventions those need to be restored in the relocation areas.

2.1.15 Approvals/Permits required for Coastal Aquaculture projects

1) **Forest Department** – Approval is required if an aquaculture project is within or in close proximity to a conservation forest including mangroves.

2) **Department of Wild Life Conservation (DWC)** – The Department of Wildlife Conservation is responsible for protected areas declared under the Fauna and Flora Protection Ordinance. If an aquaculture project is located within a protected area declared under the Fauna & Flora Protection Ordinance such as a Sanctuary, or within 1 mile from the boundary of a protected area such as a National Park, approval is required from DWC.

3) **Central Environmental Authority (CEA)**-Aquaculture projects are required to go through an IEE or EIA depending on its magnitude and location.

   The other regulatory procedure under the National Environmental Act is the Environmental Protection Licensing (EPL) Procedure. According to the EPL regulation only aquaculture projects which discharge more than 10 cubic meters of wastewater (high Polluting category) and projects which discharge more than 3 cubic meters and less than 10 cubic meters of wastewater (medium polluting category) are required to obtain an annual license from the CEA.

   The EPL issued by the CEA will specify the environmental standards and criteria to be met, both during the project construction and implementation stage. This will include standards specified under the National Environmental Act such as water quality standards, air quality standards including both ambient air quality as well as air emission standards, Noise and vibration standards to be complied with. The EPL will specify the maximum limits allowed for any wastewater discharges as well as conditions to be complied with in disposing of solid waste generated by the aquaculture project during the operational stage. The stipulated wastewater standards will be decided on basis of the final discharge point of the wastewater.

4) **Coast Conservation and Coastal Resources Management Department (CC & CRMD)** - For the aquaculture projects to be located within the coastal zone, the approval need to be obtained from the CC & CRMD and subject to an EIA or IEE or both as specified by the CC & CRMD. The requirement of an IEE or EIA will be decided by CC & CRMD subsequent to a site visit to the proposed location. Depending on the scale of the project and potential impacts of the project on the surrounding environment, a decision will be made on the requirement of an IEE or EIA. In most aquaculture projects IEEs are usually carried out by the project proponent, based on the terms of reference issued by the CC & CRMD.

2.2 How the SEA will be linked to the implementation of the NAQDA Plan for Coastal Aquaculture Development

The SEA will basically ensure that there will be no conflicts with the plans prepared by other National/Provincial/local government agencies in addition to national and regional environmental management plans when the NAQDA plan is being implemented. The SEA will also study the potential issues which may arise from those involved in traditional fishing activities within the project area.

A major issue faced during the implementation of development plans including aquaculture projects is the very high possibility of impinging on environmentally sensitive areas and/or protected areas under the Forest Ordinance, Fauna and Flora Protection Ordinance, Coast Conservation Act and the National Environmental Act. The Northern coastal areas consist of many vital and extremely sensitive areas of which some are protected while many are not. Through the early identification of such areas through the SEA, NAQDA would be provided guidance on the areas to be avoided in particular due to the presence of protected areas and/or environmentally sensitive areas. This would make the implementation of the proposed plan much easier as a major impediment to implementation of aquaculture projects is the presence of environmentally sensitive areas.

In addition, the SEA will also take into consideration the proposed development plans of other agencies such as the DFAR, Sri Lanka Tourism Development Authority (SLTDA), Board of Investment (BOI), Ceylon Electricity Board (CEB), Sri Lanka Sustainable Energy Authority (SLSEA) and the Ministry of Industries. It is possible that these institutions may have future plans within the areas being proposed for the development of aquaculture projects. The SEA will therefore peruse the proposed development plans of these agencies to ensure that there will be no conflict between the plans proposed by these agencies with the coastal aquaculture development plans proposed by NAQDA.

The SEA will strategically assess the potential impacts of the proposed coastal aquaculture development plan although it will not go into detailed assessments of individual sites. The SEA will make the subsequent EIA process smoother for the proposed projects as any issues or impediments to the implementation of the aquaculture projects will be identified and resolved at an early stage of project implementation. The SEA will ensure that the proposed aquaculture development projects do not cause conflicts with other development plans in the area or have impacts on protected areas as well as environmentally sensitive areas which are not yet protected. Depending on their scale Aquaculture projects will require to undergo an EIA or IEE where detailed ecological and social assessments will be made on an individual project basis. The SEA will make the projects more environmentally sustainable as any environmentally sensitive areas or protected areas in close proximity to the projects will be identified through the SEA. Similarly, any potential social issues related to the identified projects will be identified at an early stage thereby providing an opportunity to resolve such issues thereby ensuring smoother implementation of the plan.

2.3 Identify appropriate institutional arrangements for the implementation and Monitoring of Coastal Aquaculture in Northern Province

The Director (Coastal Aquaculture Development) under the Director General of NAQDA is responsible for overall implementation and monitoring of coastal aquaculture development projects. The Coastal Aquaculture Monitoring & Extension unit – Northern Province was established in 2017 in order to monitor and regulate coastal aquaculture in the Northern Province.

The Assistant Director, Coastal Aquaculture Monitoring and Extension Unit, Pooneryn, Kilinochchi is responsible for monitoring and regulating coastal aquaculture in the Northern Province.

One aquaculturist is assigned for each district under the Assistant Director of Northern Province (coastal aquaculture). The present capacity of the Coastal Aquaculture Monitoring and Extension Unit, Northern Province is clearly insufficient for the purpose of monitoring all the suggested aquaculture projects within the Northern Province. Hence institutional strengthening through the allocation of more field officers is strongly recommended in order to ensure the sustainability of the existing aquaculture projects as well the projects which are planned under the new NAQDA plan.

The Planning, Monitoring & Evaluation Division (PMED) proposed in the NAQDA plan, will fulfil the requirements related to environmental evaluations in order to ensure environmental sustainability while the proposed Resource Development Center (RDC) will act as a coordinating body in order to avoid unnecessary delays during land allocations and also assist in accelerating licensing processes.

A Culture-Based Fisheries Management Coordinating Committee (CBFMCC) has been suggested in NAQDA plan. It has also recommended to establish a similar Coordination Committee for the coastal aquaculture sector which will resolve issues related to the development of the coastal aquaculture sector.

3 Scope of the Environmental Baseline to be prepared in the SEA study

3.1 Proposed study area for the SEA study

The SEA study area will include the following stretches of land-based area.

1. Stretch between the A32 road and Coast from Mannar to Pooneryn, including the Mannar island.
2. Islands in Jaffna and Kilinochchi districts (Kayts, Karainagar, Punkudutieevu, Delft,Mandadivu, Eluvativu, Analaitivu, Palativu and Iranativu)
3. Stretch between Mullativu-Kokkilai Road (B297), Paranthan-Mulativu Road(A35) and coast in Mulativu District including Vadamarachchi Lagoon, Chundikkulam Lagoon, Nandikadal lagoon and Nayaru lagoon.

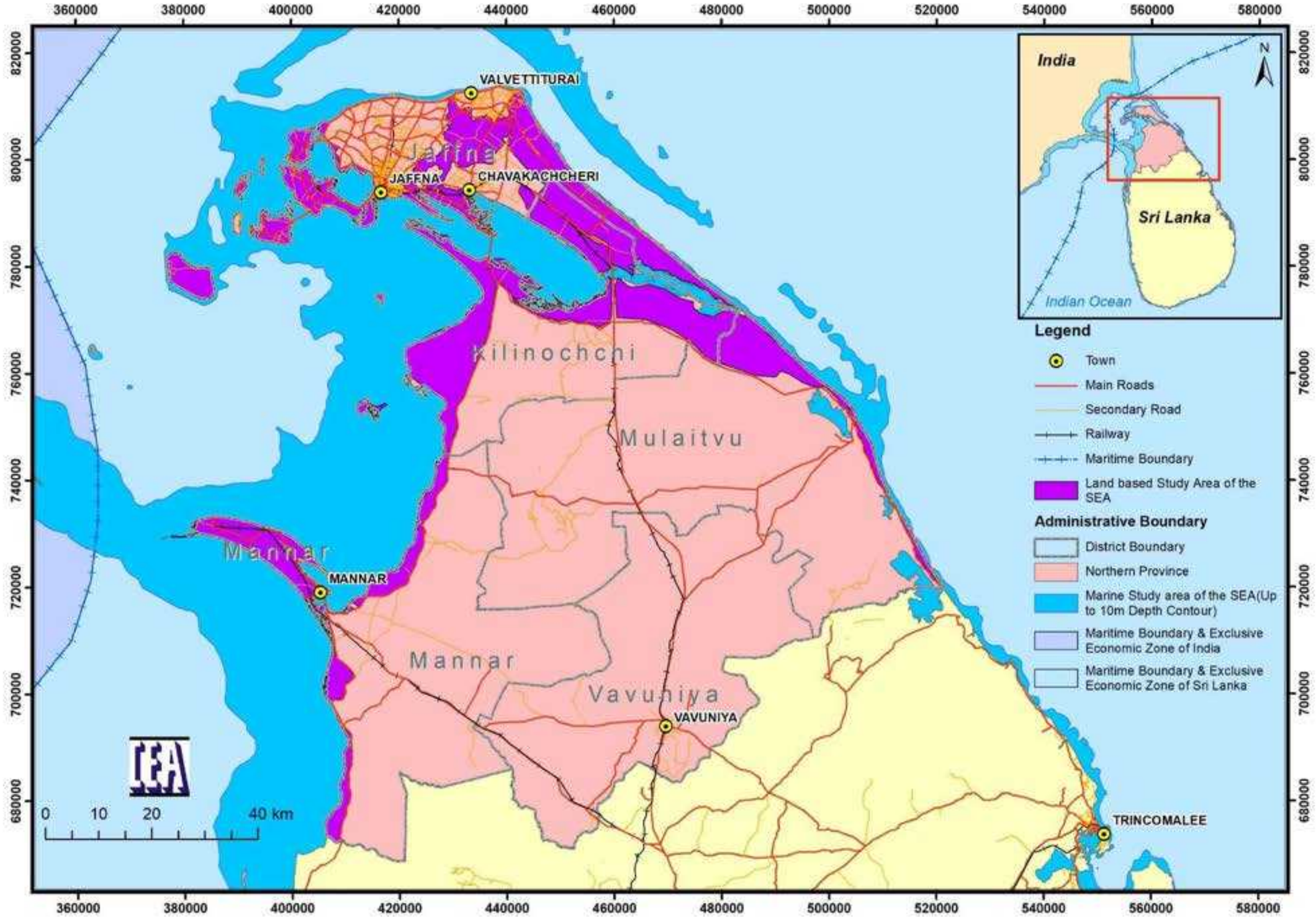
The Study area of the SEA will include the area up to 10m depth contour seawards of the Mean Low Water line.

Accordingly, the landward boundary of the land-based SEA study area varies between 300 m and 13 km landwards of the Mean High-Water line. Also, the study area includes rivers, streams, lagoons, or any other water bodies connected to the sea either permanently or periodically within that stretch.

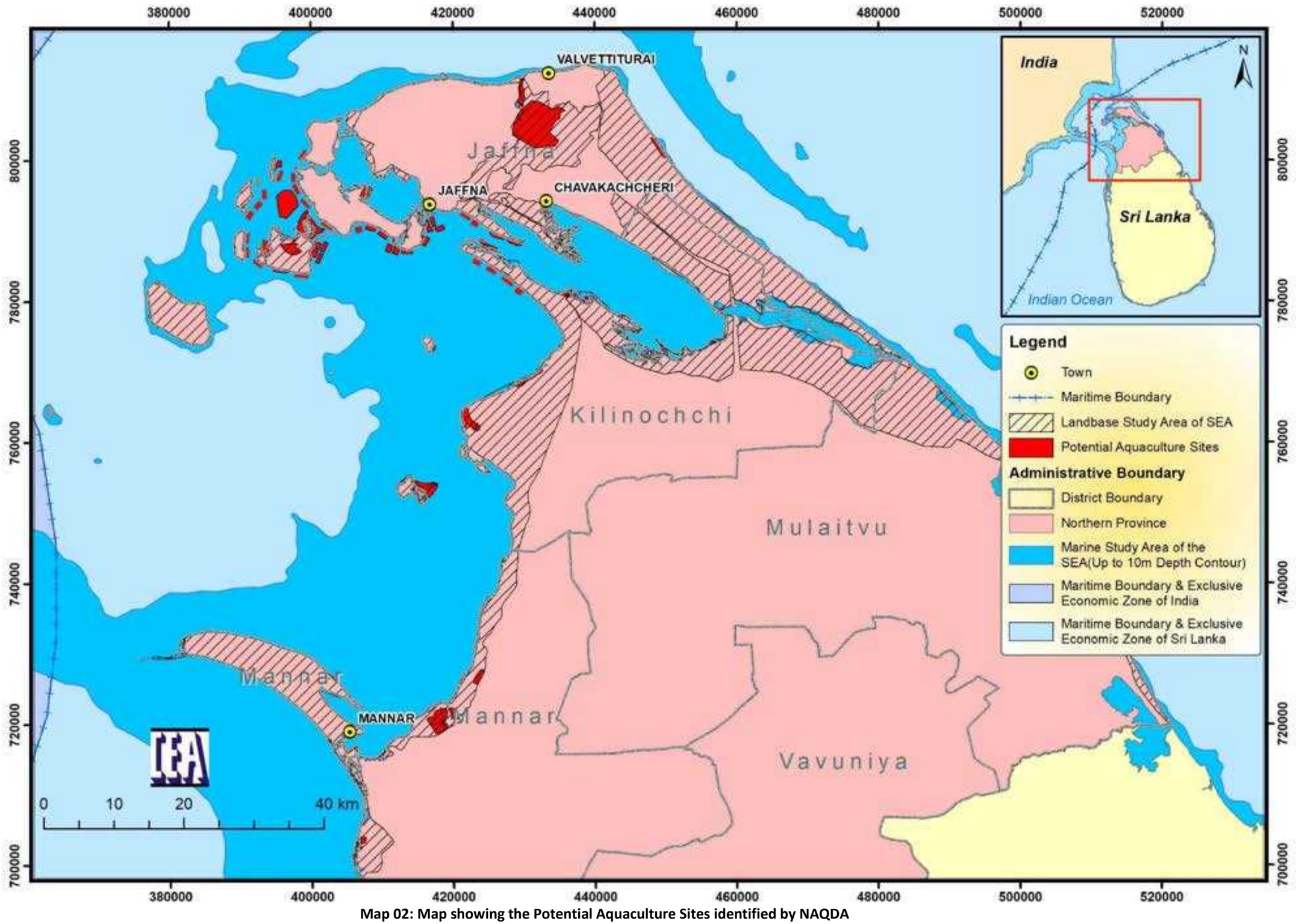
Although the SEA study will be focused on the area defined as above if there are any environmentally sensitive areas immediately outside or in close proximity, these areas will also be taken into account in the SEA study.

The SEA study will also include the potential aquaculture sites identified by NAQDA since these Potential aquaculture sites are located within the study area.

The map showing the Land and Marine Based Study Areas of the SEA and a Map showing the Potential Aquaculture Sites identified by NAQDA is given below.



Map 01: Map showing the Land based and Marine Based Study Areas of SEA



Map 02: Map showing the Potential Aquaculture Sites identified by NAQDA

3.2 Key Issues identified from Scoping, Data Gaps and Data Collection Methods

Table 3 below summarizes the Key Issues identified during Scoping Study, Stakeholder and Community Consultations and Field Visits. Table 3 also provides data gaps identified and data collection methods proposed for the SEA study.

Table 3: Key Issues identified from Scoping, Data Gaps and Data Collection Methods

Key issues identified from scoping, site visits and consultations	**Data available**	**Data gaps identified**	**Baseline study and data collection method**
Ecological			
Lack of updated information on key marine and coastal ecosystems and critical habitats	Data on Protected areas	Information on Sensitive and critical habitats outside the Protected Areas are scattered or mostly unavailable	Some baseline data will be collected in areas proposed for aquaculture and areas identified during field visits and Rapid Ecological Surveys will be conducted. Questionnaire was distributed to obtain additional information on proposed Protected Areas' and other ecological sensitive areas known by main stakeholders (CEA, DWC, FD, CC&CRMD, MEPA and Divisional Secretariats in particular).
Lack of recently updated maps on key ecosystems	Data on Protected areas, ISEA, Study reports (EIA/IEE), Rapid Under water Ecological assessments conducted by Ecologist	Maps needs substantial improvements with up-to-date information	GIS Maps with Coral Reef habitats, Sea grass habitats and other marine eco systems in the Study area will be prepared. Will also consider to develop web-based interactive maps by GIS expert
Lack of extensive biodiversity surveys to identify any Marine Non-native, invasive species that would cause detrimental impact on native biota	Nil	It is mandatory to have a comprehensive survey to understand indigenous and Non-native, invasive species as biofouling and Non-native, invasive species	Some data will be collected during the rapid ecological surveys during the SEA and will be a recommendation for future studies

Key issues identified from scoping, site visits and consultations	Data available	Data gaps identified	Baseline study and data collection method
		would be a major concern in Aquaculture	
Lack of estimates on carrying capacity within the lagoon in particular	Nil	Information on carrying capacity is critical factor to determine the culture practices	will obtain from the ongoing study conducted by Prof. Jayasinghe's team
No scientific studies on impacts of aquaculture farming on critical habitats (sea cumber and seaweed culture on seagrass beds) in local context	Nil	This information is critical since the seagrass beds play key role in fisheries as well.	Beyond the scope of an SEA. Can be a major recommendation for NAQDA to cooperate with universities / other institutes to conduct long-term research
Lack of baseline and long-term monitoring of physico-chemical data to predict impact of culture practices on key ecosystems.	NARA, Study reports (EIA/IEE/Research)	Some material available but not long-term studies following standard scientific studies	Beyond the scope of an SEA. NAQDA and MEPA has initiated, but NAQDA need to cooperate with Universities to conduct research
No proper understanding on impact of fishing on the ecosystems that support fisheries. Eventually, any reduction in fish production may blame the other developments (i.e., Wind power, Aquaculture)	A few scientific studies, but not long-term studies, Study reports (ISEA, River for Jaffna)	Long-term studies on impacts of fishing in northern region on the critical habitats and to fisheries	Beyond the scope of SEA Will be a recommendation, for IEE and EIA for the in the future
No concern on conservation of sensitive/ critical areas outside the PAs.	Nil	Lack of Community biodiversity management (CBM) or Eco System Based Management (EBM) concepts as well as Marine Spatial Planning (MSP).	Some information can be obtained from stakeholder responses to questionnaire. Will be a recommendation for stakeholder institutes to integrate green concepts, CBM, EBM and MSP in future development plans.

Key issues identified from scoping, site visits and consultations	Data available	Data gaps identified	Baseline study and data collection method
Potential of obtaining stocking fingerlings from wild populations (i.e. Sea cucumber)	Major concern among fisherfolks. No data available	This need to be a critical concern that wild populations will badly be affected.	Will be a recommendation to consider during formulation of legislation and regulations for the development
Socio Economic			
Conflict for space between traditional fisheries and coastal aquaculture	Nil	Maps of capture base fishing grounds are required.	Participatory mapping process with the Assistant Director, Fisheries Inspectors of DFAR, Representatives of the Fisheries Organizations in each district in NP will be conducted.
Re-location of fishery-related facilities (landing sites etc.) due to security reasons and natural disasters in the past. Displaced Fisherman communities tend to reestablish their previous landing sites, in the future.	Such incident has been identified in Achchankulam, Mannar during the Community Consultations. A previous fishery landing site has been identified by the NAQDA for culturing crabs and shrimp.	Data and maps of previous landing sites before the civil conflict period are not available with DFAR.	Participatory mapping process with the Assistant Director, Fisheries Inspectors of DFAR, Representatives of the Fisheries Organizations in each district in NP will be conducted.
Physical			
The farmers raised the problem of low survival of hatchery produced fingerlings so that they still tend to collect fingerlings from the wild for culture after obtaining the license.	Major concern among sea cucumber farmers. No scientific data available.	Data gap on survival of hatchery juveniles stocking in the field conditions & need of additional water based nursery phase in the culture procedure	Beyond the SEA, Will recommended to conduct long term research and monitoring through NAQDA, NARA & Universities
Salinity variation issues associated with fresh water inputs in drought and rainy seasons for the sea cucumber and seaweed farming. Aquaculture Farmers confront with issues such as loss of produce.	Freshwater input data, water quality data collected by NAQDA ,NARA	Data on Long term seasonal changes of water quality	Participatory mapping process and analysis of freshwater input in the study area with available data and practical experience of farmers. Will be a recommendation, for site specific IEE and EIA for the in the future.

Key issues identified from scoping, site visits and consultations	Data available	Data gaps identified	Baseline study and data collection method
Problems regarding fish migration due to deploying of improper pen structures around Jaffna islands	Ongoing research studies, and verbal communication with University academics	Data on migration patterns of economically important fishery species	Participatory mapping in identifying major zones. Can be a major recommendation for NAQDA to cooperate with NARA, Universities and other institutes to conduct long-term research. Also it is further recommended to consider the issue in the site specific IEE and EIA .
Coastal and Hydrological			
Information related to freshwater inflow into the sea at the sites with aquaculture development potential are not available	Rainfall data is available	Lack of river flow data to assess the freshwater inflow into the sea	Freshwater outfalls at the sites with aquaculture development potential were identified. The seasonal river flows at the 24 major streams and at the other selected locations will be estimated using the runoff yield curves published by the Irrigation Department.
No trends of rainfall and river discharges are known.	Only the rainfall data are available.	Trends of rainfall and river flows are not established.	Trends of monthly rainfall will be estimated using the rainfall data collected at the 4 principal stations in and around the Northern province. However, the trends in river flows will not be estimated due to the unavailability of data.
Locations with potential of coastal erosion due to the planned aquaculture development activities has not been identified.	A regional scale sand movement study is available (UNESCO-IHE/ ADB, (2016); Comprehensive modelling of longshore sediment transport).	Site specific sand movement data is not available.	Sites with potential for beach erosion will be flagged using the general sediment transport trends given in the UNESCO-IHE/ ADB study and an assessment of high wave and current conditions.

Key issues identified from scoping, site visits and consultations	Data available	Data gaps identified	Baseline study and data collection method
Impacts on the natural drainage pattern due to the land-based aquaculture facilities have not been identified	Major drainage paths can be very approximately traced using satellite images.	No data are available on the proposed land-based facilities as details of the development plans are limited and accurate topographical data are not available.	Major flow paths will be mapped, so that they can be avoided during the planning of the new facilities. Minor drainage paths are site specific and cannot be mapped at this stage.

4 Description of key stakeholders, their interests, and concerns (Stakeholder Engagement Plan)

4.1 Description of key stakeholders

4.1.1 Ministry of Fisheries and Aquatic Resources (MFAR)/ State Ministry of Ornamental Fish, Inland Fish and Prawn Farming, Fishery Harbour Development, Multiday Fishing Activities and Fish Exports

Ministry of Fisheries and Aquatic Resources (MFAR) is responsible for the administration of marine fisheries sector in the Exclusive Economic Zone (EEZ) of 517,000 square kilometers and 489,000 hectares of the brackish & freshwater fisheries sectors.

To sustainably manage these resources MFAR directly engages itself in the formulation of policies, strategies and plans and in consultation with the Department and agencies under its purview.

The agencies come under the purview of MFAR (Cabinet Ministry) include, Department of Fisheries and Aquatic Resources (DFAR) and Northsea Ltd.

The agencies come under the purview of State Ministry include, NAQDA, NARA, Ceylon Fisheries Corporation (CFC), The Ceylon Fishery Harbors Corporation (CFHC) and Cey-nor Foundation Ltd.

4.1.2 The National Aquaculture Development Authority (NAQDA)

The NAQDA, under the provisions in the National Aquaculture Development Authority Act (No. 53 of 1998), is the leading state-sponsored organization mandated for the task of development of the aquaculture and inland fisheries sector in Sri Lanka. Presently, it comes under the purview of the Ministry of Fisheries and Aquatic Resources. NAQDA is the proponent of this aquaculture development plan. Further, the NAQDA has the overall authority and responsibility to facilitate, regulate, and monitor the implementation of this plan. NAQDA is also responsible for ensuring that the targets given in this plan are achieved. Although this plan has reached the SEA level, there was not much consultation during the preparation stage of the NAQDAs plan. As such the views and opinions of the connected stakeholders are yet to be incorporated in the plan.

Director (Coastal Aquaculture Development) under the Director General of NAQDA is responsible for overall implementation and monitoring of coastal aquaculture development projects. Coastal Aquaculture Monitoring & Extension unit – Northern Province was established in 2017 in order to monitor and regulate the coastal aquaculture in Northern Province.

Assistant Director, Coastal Aquaculture Monitoring and Extension Unit, Pooneryn, Kilinochchi is responsible for monitoring and regulating coastal aquaculture in Northern Province.

Four Aqua culturists for Jaffna, Mannar, Kilinochchi and Mullaitivu has been appointed under the Assistant Director.

4.1.3 Department of Fisheries and Aquatic Resources (DFAR)/ District Fisheries Extension offices

The DFAR comes under the purview of the Ministry of Fisheries & Aquatic Resources. It is the foremost institute responsible for the development and management of the fisheries sector in the country. There are four district-level DFAR offices in the SEA's study area. Under these district-level offices, fisheries inspectors, social development assistants, and fisheries resources management assistants regulate and monitor fishery-related activities. Further, the Brackish Water Fisheries Management division of the department is responsible for the conservation and development of lagoons by further identifying the existing potentialities in the sector and formulating the necessary legal system.

There are 291 coastal Grama Niladhari divisions (GND) under the 23 Divisional Secretariat (DS) Divisions belonging to 4 Coastal (fishery) districts in the Northern Province. Out of the five districts, Vavuniya District does not have a coastal area. As the aquaculture industry could conflict with the traditional fisheries sector, the DFAR could influence the implementation of the aquaculture development plan. The SEA team will consult with the department at the National and District level in order to familiarize themselves with the views and plans of the department and to gather the required information and maps of existing and proposed fishery-related activities in the area.

4.1.4 National Aquatic Resources Research and Development Agency (NARA)

The NARA is the apex national institute vested with the responsibility of carrying out and coordinating research, development, and management activities on aquatic resources in Sri Lanka. The NARA has conducted numerous scientific studies in the field of fisheries and aquatic resources. NARA also provides services for the development and sustainable utilization of living and non-living aquatic resources.

The inputs of NARA on the current SEA study are prominent, in providing information and maps of aquatic resources in the Northern Province. SEA team will consult with NARA continuously through formal communication channels such as personal interactions and letters and e-mails.

4.1.5 Ministry of Environment

The Ministry of Environment is responsible for managing the environment and natural resources of the country. The Ministry's Environment Planning and Economics Division integrate sustainable development principles into the national policy and planning process. The ministry will be consulted through key-informant interviews and formal communication to get information related to the Environmental sensitive areas, National Policy Framework on Biodiversity, climate change, chemical and waste management, etc.

4.1.6 Central Environmental Authority (CEA)

Under the National Environmental Act No: 47 of 1980, the CEA is responsible for integrating environmental considerations in the country's development process. The CEA possesses broader regulatory powers under the National Environment (Amendment) Acts No: 56 of 1988 and No: 53 of 2000. The aquaculture industries situated outside the coastal zone are required to obtain environmental clearances from the CEA depending on the scope of their farms. The CEA will specify the necessary environmental assessments and licenses required for the aquaculture industry. The

CEA will be consulted through key-informant interviews and formal communication to obtain information about the environmental protection areas, pollution aspects, environmental standards, waste management and requirements of the Environmental Protection License process for aquaculture projects etc.

4.1.7 Department of Wildlife Conservation (DWC)

The Department of Wildlife Conservation (DWC) is the principal government institution responsible for the protection of wildlife resources of the country over its entire land and sea territories. DWC also bears the legal authority to establish and manage the country's network of Wildlife Conservation Areas. The total wildlife conservation area in the Northern Province is around 43,497 ha, which includes National Parks, Nature Reserves and Sanctuaries. The DWC may influence the project's site selection criteria.

The SEA team will consult the DWC to gather information on wildlife conservation areas in the study area.

4.1.8 Forest Department

Forest Department is responsible for forestry in Sri Lanka. Its mission is to protect and expand Sri Lanka's forests and woodlands. There is 478,685 ha of forest conservation areas in the Northern Province. The interventions within this area have to be consented by the forest department. As like the DWC, the FD has the mandate to exclude NAQDA's interventions within their reservation.

The SEA team will consult the Forest Department regarding forest reserves declared or to be declared under Forest Ordinance and other forest areas in the Northern Province.

4.1.9 Coast conservation and coastal resource management Department (CC&CRMD)

The jurisdiction on the coastal zone is with the Coast Conservation and Coastal Resource Management Department (CC&CRMD). The department should consent to the land-based and marine based aquaculture projects if they are falling within the coastal zone.

4.1.10 Irrigation Department

All the drainage channels in the areas subject to flood and the parts spreading up to the coast along with the rivers to which drainage channels join, comes under the jurisdiction of the Irrigation Department. All the main rivers and medium scale tanks and connected rivers and drainage channels belong to the Irrigation department. There is a limited amount of paddy fields in the coastal belt of the Northern Province which are fed by the irrigation systems of the Irrigation Department.

4.1.11 Provincial Irrigation Department

The tanks that do not belong to the Irrigation Department (of the central government) and of which the command area is over 200 acres and all the connected canal systems comes under the Northern Provincial Irrigation Department. Therefore, the paddy fields and farmlands under these tanks are governed by the Provincial Irrigation Department.

4.1.12 Agrarian Services Department

The Agrarian Services Department has the authority over the small irrigation systems with command areas less than 200 acres, streams and drainage canals that do not come under any of the above categories.

4.1.13 Department of Archaeology

As per the ISEA (N) report, the Northern Province of Sri Lanka possesses a special place in history with over two million pre-historic sites and over 4 million historical locations. However, during the last hundred years, only 10,000 such identified sites had been properly listed. From Pre-historic time up to the colonial Regime, this particular area has presented a unique social profile. Anticipated rapid development may induce significant pressure on the archaeological monuments and sites. The proposed development plan could impact such identified or unidentified archeological monuments and locations. The department of archeology will be consulted to gather the detail and maps of the archeological sites and other precautions to be included in the SEA report in this regard.

4.1.14 Ministry of Lands/Survey Department of Sri Lanka/Department of Land title Settlement

Ministry of Lands is responsible for formulating and implementing state land policies, conserving state lands, and implementing activities related to land settlement and land acquisition for public purposes. Ministry of Lands and Survey Department will be consulted to gather information/maps of northern coastal areas, information on land titles etc.

4.1.15 Disaster Management Center (DMC)

Disaster Management Centre (DMC) is mandated with the responsibility of implementing and coordinating national and sub-national level programs for reducing the risk of disasters. Its' main activities are Research and Development, Mitigation, Planning Preparedness, Dissemination of Early Warning for the vulnerable population, Emergency Response, Coordination of Relief and Post Disaster Activities in collaboration with other key agencies.

District Disaster Management Coordinating Units of Jaffna, Mannar, Kilinochchi and Mullaitivu districts will be consulted.

4.1.16 Marine Environment Protection Authority (MEPA)

The MEPA is under the purview of the State Ministry of Urban Development, Coast Conservation, Waste Disposal, and Community Cleanliness. Marine Pollution Prevention Act No 59 of 1981 and a new act Marine Pollution Prevention Act; No 35 of 2008; provides for the prevention, reduction and control of pollution in Sri Lankan waters, and gives effect to international conventions for the prevention of pollution of the marine environment.

The authority has the mandate to regulate aquaculture farms in the marine environment. MEPA is therefore an essential and highly influential stakeholder.

4.1.17 Sri Lanka Tourism Development Authority (SLTDA)

Sri Lanka Tourism Development Authority (SLTDA) is the government authority tasked with planning, development, regulation, and policy implementation of tourism and related industries. Before SLTDA was established in 2007, these functions primarily resided with the Ceylon Tourist Board/Sri Lanka Tourist Board/Sri Lanka Tourism Board. The SLTDA will be consulted to identify the tourist locations and proposed plans of tourism that could interact with the proposed aquaculture development plan.

4.1.18 National Water Supply and Drainage Board (NWS & DB)

There are some water bodies in the Northern Province, which are used as water sources for the drinking water supplies, which are administered by the NWS & DB.

4.1.19 District Secretary (Jaffna, Kilinochchi, Mannar, Mullaitivu) / Divisional Secretariats

The divisional secretariats are the hub for most of the central governments' departments. The divisional secretary should approve the land utilization (state) for the aquaculture industries. The SEA team will gather land use maps and divisional resource profiles to extract required socio-economic baseline data required for the SEA.

4.1.20 Northern Provincial Council

Northern Provincial Council has legislative power over a variety of matters including agriculture, education, health, housing, local government, planning, road transport and social services. Following Ministries/Departments/institutions under the purview of Northern Provincial Council will be consulted during the SEA.

1. Provincial Department of Industries
2. Provincial Department of Social Service
3. Provincial Department of Animal Production and Health
4. Provincial Department of Agriculture
5. Provincial Department of Irrigation
6. Tourism Bureau

4.1.21 Ministry of Defense /Sri Lanka Navy/ SL Army/ Sri Lanka Coast Guard

Sri Lanka Navy, Sri Lanka Army, and Sri Lanka Coast Guard under Ministry of Defense ensures the national security, first and foremost safeguarding the aspirations of the people of Sri Lanka. There are high security zones in the SEA study area declared by the Ministry of Defense/Security Forces. The SEA team will consult the Ministry of Defense about security-wise sensitive areas and other restrictions being imposed in the northern coastal areas.

4.1.22 The private sector entities engaged in coastal aquaculture

There are very few large-scale private sector aquaculture farms in Northern Province at the moment. The Taprobane Seafood (TSF) is one of the region's significant aquaculture and seafood processing industries. Their contribution to national seafood export and introducing the latest technologies to the area is substantial. The TSF will be consulted to identify the industry's socio-economic constraints and the mitigation measures taken, the economy of aquaculture in the area, availability of labor,

financial and technical supply in the region, and the suggestions for developing the industry in the region.

4.1.23 The community operated, small scale aquaculture farms

The NAQDA facilitates small-scale aquaculture farms, especially seaweed farming, owned and operated by poor and vulnerable households in the study area. Poverty reduction is the main objective of these farms. The SEA will consider them as critical stakeholders to communicate, with the aspect of seeing aquaculture as a livelihood for the poor and vulnerable. The traditional fishers who share the same fishing area will also be consulted.

4.1.24 Government or non-governmental technical/training institutions

The availability of skilled workers in the area is a crucial factor for successful aquaculture and to avoid the impacts of labor influx. Department of Fisheries Science of the University of Jaffna, Ocean University in Jaffna, Vocational training authority of Sri Lanka, German Tech in Kilinochchi district contribute to provide formal education relevant to the sector. The SEA team will consult these institutions on their capacity and technical relevancy.

4.1.25 Local community and representing CBOs in projects' direct and indirect impact area including Fishers/Farmer/Women/Youth organizations and Fishermen/Farmers, residents of the area, and CBOs representing them.

One of the primary stakeholders of the proposed development plan is the local community. The local community will realize and react to the positive and negative impacts of the proposed project. Similarly, there are people operating aquaculture farms on a small scale in the study area. The NAQDA assists the local community, including women, owning and operating aquaculture activities, especially the seaweed culture projects. The SEA team will capture the positive and negative impacts of the local community and the beneficiary/owner of the small and large-scale aquaculture industries. The CBO represents the local community, workers of those farms from the local community, fishers operating in nearby marine and lagoon of large-scale aquaculture farms, women's group of the villages involved in seaweed farming will be consulted in this regard.

4.1.26 Migrant fishers

Anglers in other areas migrate seasonally to the Northern Province for fishing and collect sea cucumber. The interaction between their fishing practices and the proposed development plan will be studied through an FGD and included in the SEA report.

4.1.27 Local governments (Municipal councils, Urban Councils, and Pradeshiya Sabha)

The local government has the authority to approve the land use for aquaculture purposes. There are incidents where land requests for aquaculture projects were rejected or delayed for approval in the Northern Province. The SEA will consult with the local authorities to identify their concerns, adequacy of the existing legal frameworks, and capacity in this regard.

4.2 Stakeholder Analysis

Based on their influence over the project and the impacts of the project on them, the stakeholders could be ranked as follows.

Table 4: Ranking of Stakeholders based on their Influence and Impacts on them

		Degree of Potential Impacts from the implementation of Proposed Program		
		High (Direct)	**Moderate (Indirect)**	**Low or None**
Degree of Possible Influence on the Proposed Aquaculture Development Program	**High**	• Existing Aquaculture Operator-TSF, Annai Sea Food (large scale-private) • Fishers operating closer to the aquaculture farm (Erukkalampiddy,Mannar) (large scale-private) • Fishers operating closer to the aquaculture farms (Small scale aquaculture operators of the village-Valaippaadu) • Local authorities hosting the aquaculture farm (Pradesha Sabha of Erukkalampitty and Valaippaadu) • Community hosting the Aquaculture farms and the Representing CBO leader of the Host community (Erukkalampiddy, Mannar) of aquaculture farm-TSF (large scale-private)		• Department of Archeology • CEA -NP • CC & CRMD • DWC • Forest Department • MEPA • Self-organized, non-governmental organizations interested in environmental conservation, religious and cultural protection, poverty reductions, and livelihood development.
	Moderate	• Small scale aquaculture operators (Public)-Seaweed farmers (Women group) of Valaippaadu and Sea cucumber cultivator association of Jaffna). • Farmers adjacent to aquaculture farms	• Migrant Fishers (Naai Aru) • Migrant fishers (Sea Cucumber collectors)	• Department of Fisheries and Aquatic Resources • Department of Agrarian Development • Sri Lanka Tourism Development Authority • Provincial Tourism Bureau • District Secretary (Jaffna, Kilinochchi, Mannar, Mulativu) / Divisional secretariats • Disaster Management Centre • Government or non-governmental technical donors (Ocean University in Jaffna, Vocational Training Authority) • Academia with a specialty in Aquaculture and CBF

				(Department of Fisheries Science, University of Jaffna) • Sri Lanka Aquaculture Development Alliance • Government or non-governmental financial donors (People's Bank, Bank of Ceylon etc.)
	Low or None			• Aquaculture farm workers form the host community (Erukkalampiddy, Mannar)- TSF (large scale-private) • Ministry of Lands/Survey Department of Sri Lanka/Department of Land title Settlement • Department of Irrigation • Water Resource Board • Department of Agriculture • Sri Lanka Army/Sri Lanka Navy/ Sri Lanka Coast Guard

4.3 Stakeholder Engagement plan

The stakeholder engagement plan is given in the Table 5 below. A provincial level stakeholder meeting was conducted on 11th February 2022 at the Auditorium of the Jaffna District Secretariat, with the participation of the provincial level and district level government stakeholders in Northern Province.

SEA team will conduct Key Informant Interviews with the national, provincial and district level officers of the government institutions. A structured questionnaire will be used to consult the other stakeholders including private sector aquaculture operators, CBOs and local community.

Table 5: Stakeholder Engagement Plan

No	Stakeholder (provide specific detail)	Mode of Consultation	Purpose of the consultation	Proposed Time line
01	Existing Aquaculture Operators(Large Scale, Private)- Taprobane Sea Foods	Individual Meeting	Identify socio-economic impacts faced and mitigation measures taken, Labor availability, and labor influx, contribution for local economy, support of local financial and technical institutions	Conducted in February, 2022
02	Representing CBO leader of the host community (Erukkalampiddy,	Individual Meeting	Concerns and impacts experienced the farms and the	Conducted in January, 2022

No	Stakeholder (provide specific detail)	Mode of Consultation	Purpose of the consultation	Proposed Time line
	Mannar) of aquaculture farm-TSF (large scale-private)		adequacy of the mitigation measures being taken	
03	Aquaculture farmworkers from the host community (Erukkalampiddy, Mannar)-TSF (large scale-private)	Focus Group Meeting (03 workers of each farm)	Opinion about the aquaculture farming, positive and negative impacts experiencing, further suggestions on expanding the industry in the province	Conducted in January, 2022
04	Fishers operating closer to the aquaculture farm (Erukkalampiddy, Mannar) (large scale-private and Small scale community operated farms)	Focus Group Meeting (from each location)		Conducted in January, 2022
05	Small and medium scale aquaculture operators (Public)-Sea weed famers (Women group) of Valaippaadu	Focus Group Meeting		Conducted in February, 2022
06	Sea cucumber cultivator association of Jaffna	Focus Group Meeting		Conducted in January, 2022
07	Prospective large scale aquaculture farmer (Annai Sea Food, Suganth International ,Jaffna)	Individual Meeting	The approach of the local and other institutions on approving the proposal, support of local financial and technical institutions, opinion and feed back of the host communities, adoption of design and scope changes to mitigate or satisfy the host community and other stakeholders.	Conducted in February, 2022
08	Local authorities hosting the aquaculture farm (Pradesha Sabha of Erukkalampitty and Valaippaadu)	Individual Meeting	Concerns and impacts experienced the farms and the adequacy of the mitigation measures being taken, adequacy of the institutional capacity on approving and monitoring	3rd Week of March 2022
09	Farmers adjacent to aquaculture farms	Focus Group Discussion	the aquaculture farming, positive and negative impacts	4th Week of March

No	Stakeholder (provide specific detail)	Mode of Consultation	Purpose of the consultation	Proposed Time line
10	Migrant Fishers (Naai Aru)	Focus Group Discussion	experiencing, further suggestions	2022
11	Migrant fishers (Sea Cucumber collectors- Mannar/Jaffna/ Kilinochchi)	Focus Group Discussion		
12	Tourism Bureau, Northern Provincial Council	Individual Meeting	Gather plans and information on ongoing and proposed tourism development projects in the study area	Conducted in February, 2022
13	Government or non-governmental financial donors (Regional office of people's bank)	Individual Meeting	Availability of loan schemes to aquaculture industries, level of risks	4th Week of March 2022
14	National Fisheries Solidarity Movement (Non-governmental organizations working on fishers rights).	Individual Meeting	Socio-economic Concerns of aquaculture in north, factors to be considered, suggestions.	4th Week of March 2022
15	Central Environment Authority-Head Office	Individual Meeting	Existing plans and publications related to environmentally protected areas, maps of protected areas declared or to be declared under National Environmental Act	Conducted in Oct 2021
16	IUCN	Individual/common Meeting with few officials	Information on existing studies in the northern coastal and marine environment.	By appointment
17	Academia with specialty in Aquaculture and CBF (Department of Fisheries Science- University of Jaffna etc)	Individual/ common Meeting	Expert views on the proposed plans and major concerns, Concerns of sustainable aquaculture development	By appointment
18	Government or non-governmental technical donors (Ocean University in Jaffna, Vocational Training Authority)		Availability of courses on aquaculture, institutional capacity, gaps in demand and supply	
19	District Secretary (Jaffna, Kilinochchi, Mannar,	Provincial level stakeholder meeting	Gather information on land use plan maps, district and divisional profiles, contact details of	

No	Stakeholder (provide specific detail)	Mode of Consultation	Purpose of the consultation	Proposed Time line
	Mullaitivu) / Relevant Divisional secretariats		community-based organizations(CBO), and support on organizing consultations with CBOs and other village level stakeholders	
20	Ministry of Defense /Sri Lanka Navy/ SL Army/ Sri Lanka Coast Guard/National Mine Action Centre		Obtain details of security-wise sensitive areas and other restrictions being imposed in the northern coastal areas	
21	Department of Hindu Religious and Cultural Affairs		Obtain information related to cultural heritage sites/Hindu Temples located in the study area	
22	Department of Animal Production and Health		Obtain information on requirements for importing the juveniles for the aquaculture projects	
23	Department of Irrigation		Obtain the views on proposed plan	stakeholder meeting conducted on 11th February 2022 at Jaffna District Secretariat
24	CEA –NP		Obtain the views on Management of solid and liquid waste generated from aquaculture operations	
25	CC&CRMD		Plans related to Northern coastal zone and information on sensitive ecosystems, mangroves and maps of special management areas declared under Coast Conservation Act, Obtain the views and suggestions under its purview on proposed plan	
26	Department of Wildlife Conservation		Identification of existing and proposed conservation areas, Obtain the views and suggestions under its purview on proposed plan	
27	Forest Department		Information/maps of Forest reserves declared or to be declared under Forest Ordinance and other forest areas in the Northern Province	

No	Stakeholder (provide specific detail)	Mode of Consultation	Purpose of the consultation	Proposed Time line
28	Department of Agrarian Development		Obtain views on impacts of aquaculture	
29	Sri Lanka Aquaculture Development Alliance		Obtain views on proposed plan, Identification of data gaps	
30	Disaster Management Centre- District Disaster Management Coordination Units		Maps/details of sea level rise, disaster prone areas, areas vulnerable for storm surges, Obtain views on the proposed plan, etc.	
31	Water Resources Board		Extraction capacity of ground water and availability of surface water	
32	Department of Archaeology		Concerns regarding Coastal aquaculture development, Collect information and maps related to Archaeological sites located in the study area	
33	Marine Environment Protection Authority (MEPA)		Views on marine pollution aspects of aquaculture and to obtain opinions on the proposed plan	
34	Department of Agriculture		Obtain the views and suggestions under its purview on proposed plan	
35	DFAR- Assistant Directors of District Offices	Individual meeting /Common Meeting	Views on possible conflicts between aquaculture and fisheries and Obtain views on the proposed plan	1st week of April 2022
36	Structured interview with minimum 01 person from each type aquaculture operators, capture based fishers	Structured interview	To assess the impacts of aquaculture	1st week of April 2022

5 Stakeholder and Community consultations

5.1 The Consultations taken place as a part of the Aquaculture and Culture-Based Fisheries Sector Development Plan (2021-2025) preparation process.

According to the Appendix: IV of the Aquaculture and Culture-Based Fisheries Sector Development Plan (2021-2025), a national level stakeholder meeting has been conducted by NAQDA on 31st August 2021 during the preparation of ACBFSDP (2021-2025). It is understood that the ACBFSDP is primarily a target of the NAQDA on production, and the inputs of the stakeholders on preparing this plan were minimal.

Some Concerns of the stakeholders relevant to the Northern Province were revealed during the preparation of ACBFSDP (2021-2025) and are presented in the Table 6 below.

Table 6: Concerns of the consulted stakeholders regarding the ACBFSDP (2021-2025)

No	Date	Stakeholder consulted	Comments of the Stakeholder regarding the Plan	Consideration to the SEA
1	31/08/2020	Forest Department	Coastal aquaculture production should be promoted while protecting the mangrove and adjacent ecosystems.	SEA team will study all the ecological sensitive areas, including mangrove ecosystems.
2	31/08/2020	Agrarian Services Department	A Representative of the Commissioner General of the Agrarian Services should be included in the Culture-Based Fisheries Management Coordinating Committee (CBFMCC) under section XI of proposed Aquaculture and Culture-based Fisheries Act (ACBFA).	SEA team will include this into the Recommendations and coordinate with NAQDA.
3	31/08/2020	Irrigation Department	A Representative of the Director General of the Irrigation Department should be included in the Culture-Based Fisheries Management Coordinating Committee (CBFMCC) under section XI of proposed Aquaculture and Culture-based Fisheries Act (ACBFA).	SEA team, will include this into the Recommendations and coordinate with NAQDA.

5.2 Stakeholder consultations carried out by the SEA team

5.2.1 Provincial level Stakeholder Meeting

A provincial level stakeholder meeting for the Northern Province was conducted on 11th February 2022 at the Auditorium of the Jaffna District Secretariat, with the participation of the representatives of around 75 stakeholders of the provincial level and district level government agencies in Northern Province.

The District Secretary of Jaffna chaired the meeting. Mr. B. Nirooparaj (Assistant Director/Coastal Aquaculture-Northern Province, NAQDA) and the SEA team conducted presentations on Proposed Coastal Aquaculture Development Programme and SEA study. Stakeholder agencies raised their concerns and suggestions during the discussion session. (Please refer to the Minutes of the Stakeholder Meeting given in Annexure 02.)

Plate 01: District Secretary -Jaffna, Mr.K. Mahesan delivering the Opening Remarks

Plate 02: Mr.B.Nirooparaj (Assistant Director/Coastal Aquaculture-NP) delivering the Welcome Address and Description of the Coastal Aquaculture Development Program

Plate 03: Mr.T.Krishnaraja (Socio Economist-SEA Team) conducting a presentation of Social Aspects of the SEA Study

Plate 04: Dr.Kamal Ranathunga (Marine Ecologist-SEA Team) conducting a presentation of Environmental Aspects of the SEA

Plate 05: Around 75 stakeholders were participated for the Stakeholder Meeting

Plate 06: Stakeholders presenting their suggestions and concerns

5.2.2 Other individual Consultations with the Government Stakeholders

Details on Other individual consultations and Key Informant Interviews conducted by the members of SEA team are presented in the Table 7 below.

Table 7: Consultations carried out by the SEA team to date

No	Date	Venue/ Method	Stakeholder consulted	The outcome of the consultation
01	10th and 12th Nov 2021	Over the phone	Senior Scientist, NARA	Discussed regarding the Involvement of processing and farming of sea cucumber and demarcated areas for sea cucumber in Mannar district
02	29th Oct 2021	NARA Head office	Senior Hydrographer, NARA	Discussed regarding the areas mapped for sea cumber farming
03	15th Sep 2021	Over the Phone	Mr.Susantha Udagedera , Blue Resources Trust	Mr. Susantha is involved in a ground truthing project to prepare a map of the real sea grass areas in Northern Province, which will be available by mid-2022.
04	22nd Oct 2021	Communication via letters and over the phone	Additional Secretary, Ministry of Environment	Discussed regarding maps of environmental protected areas in Northern Province and latest information related to recently declared areas and proposed reserves in Northern Province.
05	22nd Oct 2021	Communication via letters and	Secretary, State Ministry of Wildlife Conservation	Discussed regarding maps of Wildlife Conservation areas in Northern Province and latest information related

No	Date	Venue/ Method	Stakeholder consulted	The outcome of the consultation
		over the phone	Protection Programmes Including Electric Fence and Ditch Construction and Re-Forestation and Wildlife Resources Development	to recently declared areas and proposed wildlife conservation areas in Northern Province.
06	21st Oct 2021	Over the phone	Assistant Director (Protected Areas), Department of Wildlife Conservation	Discussed information related to recently declared areas and degazetted wildlife conservation areas in Northern Province and obtained the contact details of Northern Province Regional Offices.
07	28th Oct 2021	Head Office, Forest Department	Mr. Sumithra Gunathilaka, GIS Division, Forest Department	Obtained the GIS maps of declared and to be declared Forest Reserves in Northern Province.
08	22nd Oct 2021	Over the phone	GIS Division, CEA	Discussed regarding Environmental Protected areas declared by CEA in Northern Province.
09	21st February 2022	Over the Phone	Mr. T. Suboharan, Director , Central Environmental Authority, (Northern Province)	To obtain the information regarding the Environmental Sensitive areas of the Northern Province, which are not protected.
10	21st February 2022	Over the Phone	Mr. Stanley Mascarenhas, Chairman, Tourism Bureau, Northern Provincial Council	To obtain the details and maps of the tourism sites and information regarding the tourism developments in Northern Province.
11	07th Sep 2021	Over the phone	Mr. Sujeewa Ranawaka, Chief Engineer, Coast Conservation Department	Discussed the potential sea level rise information and Environmental Sensitive areas (ESAs) identified by CC&CRMD (CC&CRMD is in the process of declaring Manalkadu sand dunes in Northern Province as an ESA, to be gazetted in 2022).
12	28th Oct 2021	Over the phone	Mr. Damith Perera, NARA	Inquired about any sea level rise and sea surface temperature measurements related to NP (obtained information

No	Date	Venue/ Method	Stakeholder consulted	The outcome of the consultation
				about the tide gauges to be established in Northern Province)
13	15th Feb 2022	Communication via phone and email	Mr. Ranjith Premalal, Former Director General/Meteorology	Discussed regarding Climate projections for Northern Province and obtained information
14	24th Feb 2022	Over the phone	Mr. K.W. Indika, Scientist, Oceanography Division, NARA	Sea level rise projection for Northern Province, based on the measurements at tide gauges in Colombo, Trincomalee, Mirissa, and satellite information
15	24th Feb 2022	Over the Phone	Mr.S.Kokularaja, District Disaster Management Center Unit, Kilinochchi	Obtained details on seawater intrusions, sea surges and cyclonic events in the past in Kilinochchi district

5.3 Community Consultations and Consultations with CBOs, Aquaculture Operators

Community consultations carried out by the SEA team up to date are as follows.

- Fisheries Organization in Achchankulam, Mannar District
- Employees of the Sea weed farm in Marichchakaddi, Mannar
- Employees of the Sea weed farm in Thuraipoor, Velanai, Jaffna
- Employees of the Shrimp farm in Vidathalativu area, Mannar
- Fishermen in Eluvathivu Island
- St. Thomas Fishermen's Co-Op Society in Eluvativu
- Fishermen's Society in Madaththaweli, Punkuduthivu, Jaffna District
- Fishermen's Co-Op Society in Iruppiti, Punkuduthivu, Jaffna District
- Fishermen in Iruppiti, Punkuduthivu
- Sea Cucumber Farm, Puwmpukar, Ariyalai, Jaffna
- Fishermen's society of Valaippaadu, Pooneryn, Kilinochchi
- Management and employees and of Annai Sea Food, Jaffna
- Management and employees and of Suganth International, Jaffna
- Employees of Taprobane Sea Foods (Pvt) Ltd, Mannar

Annexure 03 refers to the minutes of the community consultations.


Plate 07: Discussion with the President of Fisheries Organization-Achchankulam (Proposed area for 20 Acre Crab Culture in Achchankulam, Mannar located closer to the Achchankulam Fisheries landing site)


Plate 08: Discussion with the Owner of existing sea weed farm in Marichchakaddi, Mannar

Plate 09: Discussion with the employees of existing Shrimp farm in Vidathalativu area,Mannar

Plate 10: Both Circular tanks and ponds system are using in the shrimp farm(L.Vannamei)

Plate 11: Community Consultation with fishermen in Eluvathivu Island

Plate 12: Discussion with President and Treasurer of the Eluvativu St.Thomas Fishermen's Co-Op Society

Plate 13: Women Participation for fisheries related activities- Eluvativu Island

Plate 14: Discussion with the Fishermen's Society in Madathtaweli, Punkuduthhivu who are willing to start a sea Cucumber Farm

Plate 15: Discussion with the employees of existing sea weed farm in Thuraipoor, Velanai,Jaffna

Plate 16: Discussion with Fishermen's Co-Op Society in Irupptti, Punkuduthivu

Plate 17: Discussion with Fishermen in Irupptti area who are willing to start Sea Cucumber Farms

Plate 18: Discussion with the Owner of the existing Sea Cucumber Farm,Puwmpukar, Ariyalai, Jaffna

Plate 19: Discussion with the employees of the existing Sea Cucumber Farm,Puwmpukar, Ariyalai, Jaffna

Plate 20: Community Consultation with fishermen's society of Valaippaadu,Pooneryn, Kilinochchi

6 General Methodology adopted for the SEA Study

The most important outcome of the SEA study will be mapping of the areas where coastal aquaculture projects should not be allowed, areas where there will be Low/ High risk for siting of aquaculture projects. In order to determine the relative risk associated within a area, initially the following areas which are considered as being High Risk areas for siting of aquaculture projects will be mapped using GIS.

- Environmentally sensitive areas (already Protected)
- Environmentally sensitive areas (to be protected)
- Environmentally sensitive areas identified from recent studies but not yet under protection (obtained from the questionnaire distributed among relevant agencies and from the study being carried out by the Ministry of Environment)
- Archaeological Sensitive areas
- Socially unsuitable areas (eg: highly populated areas)
- Areas which are reserved for Tourism, industries, BOI zones, Wind Power projects or other infrastructure developments
- Areas in which traditional fisheries is done
- Areas prone to Climate Change (Storm Surges, Sea level rise etc.)

It is clear that out of the above-mentioned areas, areas where traditional fishing is being carried out will pose the biggest impediment to the implementation of the proposed aquaculture projects. Therefore, special attention will be paid to obtain information on such areas. One of the problems is that these traditional fishing areas are not mapped, and information is not available with the Department of Fisheries. Efforts will be made to personally visit and meet with the Assistant Directors and Fisheries Inspectors based in the Fisheries Extension Offices in Jaffna, Mullaitivu, Mannar and Kilinochchi districts in order to obtain information regarding these traditional fishing areas and landing sites to produce a map denoting such areas for the SEA.

Once the map is completed illustrating the above-mentioned areas, such areas will be classified as being no go zones for aquaculture projects and a map could be produced which indicates areas with a lower threat level for aquaculture projects.

In addition to this, the specific sites which have been already identified for aquaculture development by NAQDA will be evaluated at a strategic level in order to determine their suitability in terms of proximity to environmentally and socially sensitive areas, archeologically culturally and historically important areas, in addition to areas which have been already identified for the purpose of developing infrastructure, energy, tourism or industrial projects.

With respect to the mapping of environmentally sensitive areas, information was obtained directly from government agencies such as the Forest Department, Department of Wildlife conservation, Central Environmental Authority, CC & CRMD regarding areas within the study area which are gazetted and already under protected status. In addition, information related to areas which are being proposed to be brought under protection status was also obtained from these agencies and mapped.

An additional effort was made to obtain any information available through the regional offices and field officers of the Central Environmental Authority, Forest Department, Department of Wildlife

Conservation and the CC & CRMD by distribution of a questionnaire. This was for the purpose of identifying any environmentally sensitive areas in these districts which the local officials may be aware of, but which have not yet been identified for the purpose of protection.

6.1 Methodology for preparation of Digital Data Base

6.1.1 Collection of Secondary Data

Required data for each field will be collected from the relevant institutions in printable maps or digital data in available file formats such as jpg, pdf, shp, tif, dwg, mdb and spreadsheet (hard copy, Vector and Raster information). Web resources such as NASA, USGS, and Google earth engine will be used to obtain free data and services.

Such data that will be obtained from institutions are as follows.

- Declared and proposed Forest reserves - Forest Department
- Declared and proposed Wildlife Conservation Areas (Sanctuaries, Nature Reserves and National parks, marine sanctuaries) - DWC
- Declared and proposed Environmental Protected areas– Central Environmental Authority (CEA)
- Other environmentally sensitive areas not yet declared – CEA Northern Provincial Office through their divisional environmental officers
- Mine cleared areas and areas to be cleared- National Mine Action Centre (NMAC)
- Existing high security zones- Ministry of Defense/Sri Lanka Army
- Existing and proposed Energy Development Areas (Solar and Wind Parks) – Sri Lanka Sustainable Energy Authority, Ceylon Electricity Board
- Existing Paddy areas- Department of Agrarian Development
- Existing and Proposed Fishery Harbors, Fishery landing sites and Anchorages - Department of Fisheries and Aquatic Resources
- Traditional fishery areas (to the extent possible) – Department of Fisheries and Aquatic Resources
- Population related information – Department of Census and Statistics
- Administrative Boundaries (Province, District, DSD, GND) – Survey department.
- Topography information (SRTM 1 Arc-second vertical accuracy Data) – United States Geological Survey (USGS)
- Landcover information - Land Use Policy Planning Department, USGS.
- Maritime Boundary and Bathymetry data – NARA, CC & CRMD
- Tourist Attractions/Coastal Tourism Development Zones in Northern Province – Tourism Bureau of Northern Provincial Council, Sri Lanka Tourism Development Authority
- Existing and proposed industrial zones in the Study area- Board of Investment, Ministry of industries, Industrial Development Board
- Disaster Prone areas- Disaster Management Center

- Places of historical, cultural and archeological value- Department of Archaeology
- Special Management Areas under the Coast Conservation Act- CC & CRMD

6.1.2 Data Processing (Validation, Filtration and Editing.)

Data processing will be done to bring the data to the appropriate level for need and analysis. When processing data to the required scale within the same coordinates, an understanding of data gaps is created. Accordingly, field data collection or other alternative source will be used to address the data shortage.

6.1.3 Data Updating and Storage.

GIS software will be used for desktop data processing, mobile applications and devices for field data collection. GIS Expert will create a GIS database using ArcGIS and QGIS software and will update the Geo-Database based on the data obtained during the SEA study. For the SEA study, an ArcGIS personal Geo-database (mdb), a common format designed to protect data that can also be opened by free or commercial software will be prepared. The data will be stored in the global coordinate system WGS84 and SLD99 the national standard coordinate system.

SEA team will also consider to develop web-based interactive maps using Arc GIS Online Software.

6.2 Establishing a Scoping matrix

The following scoping matrix illustrates the impacts of different species planned to be cultured in the Northern coastal and shallow marine areas. One of the major issues that will arise due to the scarcity of fresh water in the Northern province and the expansion of aquaculture projects could affect both the quantity and quality of fresh water. The other major issue will arise due to conflicts between the new developments and existing livelihoods in the project area including traditional fishery, agriculture etc.

The following scoping matrix illustrates the comparative significance of potential Physical, Ecological, Coastal/Ecological, Climate Change and Socio-Economic impacts of coastal aquaculture projects. Completed Matrix will be provided in the Draft SEA report.

Table 8: Scoping matrix for assessing impact significance

Project Activity	Physical					Ecological				Coastal/Hydrological						Climate Change					Socio Economic								
	Impacts on Surface Water	Impacts on Ground Water	Salinization/Acidification of Soils	Sedimentation	Impacts on air quality, Noise and Vibration	Impacts on Sensitive Marine Ecosystems	Impacts on Native Fauna and other wildlife	Impact on Natural Resource Dependence	Introduction of Invasive Alien Species	Impacts on the Coastal Morphological Stability	Dependance on Fresh water Resources	Impacts on the existing structures	Disturbance to the natural drainage pattern	Impacts on the rivers, streams, Thonas and their sea outlets	Impacts due to the coastal flooding	Emission of Green House Gases	Impacts from Sea level rise	Impacts due to increased sea surface temperature	Impacts from extreme weather events	Impacts from changes in ocean currents	Impacts on Land Use and Land Ownership	Impact on Fishing landing sites/Beach Seine	Pressure on Wild Fisheries	Impact of Fish Produce/Fish Migration	Impacts on agriculture	Impacts on Access Pathways and Roads	Impacts on tourism and other industries	Visual land and seascape modification	Impacts on Cultural Heritages and religious places
Seaweed Culture																													
Site selection and preparation of culture area																													
Culture operation and routine management																													
Harvesting and transportation																													
Sea cucumber culture																													
Site selection and preparation of area																													

Project Activity	Physical					Ecological				Coastal/Hydrological						Climate Change					Socio Economic								
	Impacts on Surface Water	Impacts on Ground Water	Salinization/Acidification of Soils	Sedimentation	Impacts on air quality, Noise and Vibration	Impacts on Sensitive Marine Ecosystems	Impacts on Native Fauna and other wildlife	Impact on Natural Resource Dependence	Introduction of Invasive Alien Species	Impacts on the Coastal Morphological Stability	Dependance on Fresh water Resources	Impacts on the existing structures	Disturbance to the natural drainage pattern	Impacts on the rivers, streams, Thonas and their sea outlets	Impacts due to the coastal flooding	Emission of Green House Gases	Impacts from Sea level rise	Impacts due to increased sea surface temperature	Impacts from extreme weather events	Impacts from changes in ocean currents	Impacts on Land Use and Land Ownership	Impact on Fishing landing sites/Beach Seine	Pressure on Wild Fisheries	Impact of Fish Produce/Fish Migration	Impacts on agriculture	Impacts on Access Pathways and Roads	Impacts on tourism and other industries	Visual land and seascape modification	Impacts on Cultural Heritages and religious places
Culture operation and harvesting																													
Fin fish cage culture																													
Siting & cage deploying																													
Culture operation and harvesting																													
Shrimp culture Pond culture Intensive																													
Site selection and Land acquisition																													
Clearing and preparation																													

Project Activity	Physical					Ecological				Coastal/Hydrological						Climate Change					Socio Economic								
	Impacts on Surface Water	Impacts on Ground Water	Salinization/Acidification of Soils	Sedimentation	Impacts on air quality, Noise and Vibration	Impacts on Sensitive Marine Ecosystems	Impacts on Native Fauna and other wildlife	Impact on Natural Resource Dependence	Introduction of Invasive Alien Species	Impacts on the Coastal Morphological Stability	Dependance on Fresh water Resources	Impacts on the existing structures	Disturbance to the natural drainage pattern	Impacts on the rivers, streams, Thonas and their sea outlets	Impacts due to the coastal flooding	Emission of Green House Gases	Impacts from Sea level rise	Impacts due to increased sea surface temperature	Impacts from extreme weather events	Impacts from changes in ocean currents	Impacts on Land Use and Land Ownership	Impact on Fishing landing sites/Beach Seine	Pressure on Wild Fisheries	Impact of Fish Produce/Fish Migration	Impacts on agriculture	Impacts on Access Pathways and Roads	Impacts on tourism and other industries	Visual land and seascape modification	Impacts on Cultural Heritages and religious places
Culture operation and harvesting																													
Shrimp culture RAS																													
Land acquisition																													
Site selection and preparation																													
Culture operation and harvesting																													

7 Description of key aspects to be addressed in the SEA

7.1 The key environmental and natural resources aspects that could potentially impinge on sector performance and are not adequately addressed in the NAQDA plan

Due to the sensitive nature in most of the coastal and marine areas in the northern region together with other limitations such as water availability, monsoon effects and extreme weather conditions as well as finding culturable lands etc., culture fisheries need to have thorough planning phase. Also, considering the sensitive nature in many coastal and marine habitats, it is extremely important to initiate with improving the production from underutilized resources to relatively environmentally friendly culture-based fisheries (CBF) in the lagoons to gradually increase the aquaculture to cope with the demand. Since CBF concentrate on stocking and recapture strategy, which grow on naturally produced food resources it is proven to be effective when communally managed. These concerns not clearly highlighted in the plan.

The development plan has suggested to establish a unit/ division within NAQDA for environmental assessments monitoring purposes. Although, there is some mention on establishing environmentally less perturbed coastal aquaculture systems, specific strategies to achieve such targets are not highlighted in the plan. How environmental considerations have been integrated into the plan is also not very clear in the development plan. Ecosystem Approach in Aquaculture (EAA) is identified as a growing concern by the Food and Agriculture Organization (FAO) and the United Nations. Though EAA seems far from reality from the situation of the Coastal aquaculture sector in the country, at least some elements of the concept need to be incorporated into policies as well as development plans, especially for a country where natural capital playing a key role in the economy.

However, implementing the EAA requires strengthening the institutions and associated management systems with an integrated approach. The adoption of an EAA will require a much tighter coupling of science, policy, and management and more importantly the EAA is included in aquaculture development policies, strategies and development plans.

Three scales/levels of EAA application have been identified, namely the farm, the water body and its watershed/aquaculture zone, and the global, market-trade scale.

The planning and implementation of an EAA strategy follows a very similar pathway to Ecosystem Approach to Fisheries, with the five steps (scoping, identifying and prioritizing issues, developing a management plan, implementing and enforcing). In some cases, a broader and more relevant exercise may be required, namely stating high level policy goals.

It is very important that the sites, the laws and regulations not interfere very much with the aquaculture development and these need to be clarified before the actual implementation of the project without going through several additional approval steps from number of different institutes, rather NAQDA having streamline process through a central channel within, which would make process simple for developers and attract more investments.

Another plan to maintain “insurance populations” of endangered fish species does not seems to go well with the objectives of the aquaculture development plan. Rather this may suggest as a Corporate Social Responsibility (CSR) or environmental conservation project.

Increased human activities in coastal and offshore waters have created complex conflicts between different sectors competing for space and between the use and conservation of ocean resources. Like other users, aquaculture proponents evaluate potential offshore sites based primarily on their biological suitability, technical feasibility, and cost considerations. Recently, Marine Spatial Planning (MSP) has been promoted as an approach for achieving more ecosystem-based marine management, with a focus on balancing multiple management objectives in a holistic way. Both industry-specific and multiple-use planners rely heavily on spatially referenced data, Geographic Information System (GIS)-based analytical tools, and Decision Support Systems (DSS) to explore a range of options and assess their costs and benefits. Although ecological factors can currently be assessed fairly comprehensively, better tools are needed to evaluate and incorporate the economic and social considerations that will also be critical in identifying potential sites and achieving successful marine plans.
Therefore, SEA needs to highlight/recommend the advances in GIS-based DSS in relation to their capability for aquaculture site selection and their integration into multiple-use MSP and multiple-use planning—the potential co-location of aquaculture with other players such as fisheries and offshore wind energy, etc. Marine spatial planning (MSP) should be a national plan at a broad strategic level. However, some regional/ local level MSP may consider in agreement with the other key stakeholders.

Sustainable practices such as energy efficient farming systems, seafood certification programs, feeds containing natural ingredients free from Genetically Modified Organism’s, use of feed from sustainable sources, etc. could be concerned in the plan.

Alternative approaches in the plan, sites, culture systems and links to other plans such as fisheries, etc., should have highlighted.

Under the section 5.3 of the NAQDA plan, it is suggested that the aquaculture can be contributed to the Sustainable Development Goals (SDGs) for ensuring sustainability and environment. The 2030 Agenda of SDGs is highly relevant for policy-making, planning and management for sustainable development of aquaculture. In particular, SDGs 1 (end poverty), 2 (end hunger), 5 (gender), 6 (water), 8 (growth, employment, decent work), 12 (production and consumption), 13 (climate change), 14 (marine resources & ecosystems) and 15 (biodiversity) have all significant bearing for aquaculture.

Also, it has been recommended to stick with Responsible planning, ecosystem protection, science-based approach in planning, licensing and regulation of the sector, compliance with licensing and National legislation in addition to industry best practices are the recommendations to be adopted in ensuring sustainability of the aquaculture industry.

The environmental impact of aquaculture is completely dependent upon the species being farmed, the intensity of production and the location of the farm. Additionally, new strategies and technologies have emerged and have proven that it is possible to have sustainable aquaculture.

7.2 Potential significant Impacts on Terrestrial and Marine Ecology

With regards to ecological environment, brief descriptions are given on terrestrial ecology (flora and fauna) as well as coastal and marine ecosystems in the ISEA.

Existing terrestrial, coastal and marine conservation areas in Northern Province are mapped in the ISEA-North report based on the data provided by various institutions between 2010-2013.

There are several terrestrial as well as coastal and marine ecosystems declared in Northern Province after the ISEA. SEA team will consult national, provincial and regional officials of Forest Department, DWC, CEA, CC & CRMD to obtain the details of those gazetted protected areas as well as other environmentally sensitive areas including the proposed protected areas.

7.2.1 Forest cover and protected areas

ISEA-North revealed that the forest resources in the Northern Province are ecologically remarkable and environmentally indispensable. Further, the total forest cover in Northern Province accounts 49% of the total land area, which is the highest percentage cover compared to other provinces. Some areas have increased forest cover due to natural regeneration due to minimal human disturbances. However, ISEA-North report also cautions of possible misinterpretations of agricultural lands and palmyra vegetations and forest areas.

There are some Forest Reserves declared in Northern Province after the ISEA. SEA team consulted Forest Department to obtain the details of those gazetted Forest Reserves as well as proposed Forest Reserves and an updated map was prepared, presented in section 9.1.4.2 below.

7.2.2 Fauna and Wildlife conservation areas

The ISEA has concern on the fauna including those migrating within the habitats in the northern region. A lot of gaps have been identified due to the hindered access to most areas in the Northern Province for decades. During the baseline phase of the ISEA, the Department of Wildlife Conservation (DWC) has carried out some rapid biodiversity surveys to fill in some of the data gaps and to get information on natural habitats, key ecosystems, and noteworthy and conservation needed fauna and flora. Most of data collections seems based on reconnaissance surveys. Further, existing and some proposed wildlife conservation areas have been illustrated.

There are some wildlife conservation areas such as nature reserves, sanctuaries and national parks declared in Northern Province after the ISEA. SEA team consulted DWC to obtain the details of those wildlife conservation areas and an updated map was prepared, presented in section 9.1.4.1 below.

7.2.3 Coastal and Marine Ecosystem

Coastal and marine environment of Northern Province encompasses a major share of Sri Lanka's coastal ecosystems, including mangroves, coral reefs, seagrass beds and brackish water lagoons and salt marshes, thona and inland water bodies. Both Palk Bay and Palk Strait are relatively shallow and are affected by both the southwest and northeast monsoons. To the south of Mannar Island, the continental shelf is also wide and shallow. Currents are also very strong at the Adams Bridge and Palk Strait's tiny passages, especially during the northeast monsoon.

These factors have created a setting unlike any other in the country for the northern coastal and marine ecosystem. Existing coastal and marine conservation areas in Northern Province are mapped in the ISEA-North report based on the data provided by the NARA in May 2010.

Coastal and Marine Biologist of the SEA team, with the assistance from GIS Expert will prepare an updated map based on the data that will be collected through stakeholder consultations and rapid biodiversity surveys.

7.2.3.1 Coral Reefs

Northern region is well known for rich coral reefs in the shallow coastal areas. Majority of these shallow coral ecosystems are found in south of Mannar to northern most areas of Jaffna Penninsula. The Jaffna Peninsula's coral reefs are mostly found near islands in Palk Bay and along the Palk Strait's northern coast: Sandstone reefs, and rocky (granite / gneiss) reefs (Rajasuriya et al. 2002). Sandstone reefs are the most extensive and form ridges parallel to the shore, and despite a low hard coral cover, they are high in fish diversity and biomass. Coral reefs are also found in the Gulf of Mannar.

As per the ISEA, 2014, Kankasanthurai has the most coral cover (57.5%), followed by Punkuduthivu reef and Eluvathivu reef. Punkuduthivu Island's reef differed structurally from the bordering reefs along the northern coast.

Coastal and Marine Ecologist of the SEA team carried out an underwater ecological survey in selected areas of the Marine study area of SEA to investigate the ecological sensitive areas on 12th ,13th and 14th February 2022.

Plate 21: Healthy and diverse reefs around Palaitivu Island-during the Underwater Ecological Surveys conducted by Marine Ecologist around Palaitivu Island- 12th February 2022

The SEA team has observed a healthy and diverse coral reef around Palativu island during the Underwater Ecological Surveys conducted on 12th February 2022.

NAQDA has identified 1000 acres extent for sea cucumber and seaweed culture around Palativu island. SEA team will prepare a GIS based map showing the extent of coral reef. SEA will recommend NAQDA to exclude those areas with healthy coral reefs for sea cucumber and sea weed farming.

Plate 22: Some Coral reefs around Vidathalativu-during the Underwater Ecological Surveys conducted by Marine Ecologist - 13th February 2022

7.2.3.2 Mangroves

Mangroves are key sensitive habitats found in the northern region and sparsely dispersed along the coastline especially in lagoons and riverine estuaries around the island and north of Mannar Island. Extensive areas of sea fronting mangroves are found in Kilinochchi district. However, exposed shorelines on the north coast are devoid of them.

Jaffna: Important mangrove habitats can be found at the west end of the Jaffna Peninsula (Kayts Island), Upparu lagoon, and Chalai lagoon. The largest mangrove patch is found near the Mandativu island.

Killinochchi: The distribution of mangroves in Kilinochchi district is highly scarce and also relatively small in stature.

Mullaitivu: In Nandikadal lagoon, large mangrove patches were discovered. The lagoons of Nayaru and Kokilai are surrounded by mangroves *Rhizophora mucronate.*

Mannar: Notable mangrove patches are found in the areas of Achchankulam, Narivillukulum, Vankalai, and north of Mannar town *Pemphis acidula*, a rare mangrove species formerly only seen in Puttalam lagoon, has been discovered at Achchankulam. The thorny woody tree *Prosopsis juliflora* has become invasive in most of Mannar's coastal areas.

7.2.3.3 Seagrass beds

The shallow coastal areas as well as the lagoons in the Northern Province are known to rich in seagrass beds. They are extensive around Palk Bay on the Jaffna Peninsula and in the Gulf of Mannar. Seagrass meadows in the Gulf of Mannar provide critical habitat for the threatened dugong (*Dungong dugon*), as well as other threatened species such as sea turtles and dolphins.

NAQDA has identified some potential areas for sea cucumber and seaweed culture around islands of Jaffna Peninsula and Palk Bay, where extensive sea grass beds are found.

Jaffna: The shallow coastal bays of Thondamaanar, Kurikadduwan, Punkudutivu, Mandaitivu, and the Jaffna lagoon have extensive sea grass beds. The most common species found are *Halophila ovalis, Cymodacea serulata,* and *C. rotundata.*

Killinochchi: In the Kiranchi at Nachchikuda, *Enhalus acaroids, C. rotundata, C. serulata, S. isotifolium,* and *H. ovalis* have been found.

Mullaitivu: Seagrasses *C. rotundata, C. serulata,* and *S. isotifolium* have been found along the Mullaitivu coast.

Mannar: *Enhalus acaroids* is the most abundant sea grass species found in the shallow coves of the Mannar Sea. *C. rotundata, C. serulata, Syringodium isotifolium, Halodule pinifolia, H. uninervis,* and *Halophila ovalis* are among the other species found in the area.

Plate 23: A large Eelgrass patch found in Vidataltivu- during the Underwater Ecological Surveys conducted by SEA Team - 13th February 2022

7.2.3.4 Seaweed

Gracilaria is often seen in association with seagrasses. *Turbinaria* and *Sargassum spp*., brown algae, dominated the Northern coast.

Killinochchi: *Gracilaria edulis, G. salicornia, G. corticata, Halimina spp., Codium spp., Sargassum spp., and Turbinaria spp*. are found in association with seagrass beds.

Tidal flats associated with estuaries, lagoons, salt marshes and mangroves are most extensively around and north to Mannar and Jaffna. These ecosystems support many invertebrates and fish species, and are a critical feeding ground for a large number of shore and wading birds (Miththapala 2013).

Salt marshes are found in association with tidal mud flats, as well as sheltered shorelines of coastlines, lagoons and estuaries, mainly along the coast of Mannar District.

Sand dunes are found along the north-east and east of the Jaffna peninsula, Palk Bay and the Pooneryn in Kilinochchi District.

7.2.4 Biodiversity

A list of threatened species and their locations in the Northern Province have been given in the ISEA. According to the Red List of Threatened Species published in 2007, twenty-two species of fauna have been recognized as threatened.

In the present SEA, key studies including ISEA for Northern region, other EIA/IEE reports, and other primary and secondary sources of information will be reviewed to obtain an overall picture on the ecologically significant coastal marine ecosystems, protected areas as well as areas with conservation needed species. Key stakeholders including CEA, DWC, CC & CRMD, MEPA, FD, and Academia will be consulted for additional information on planned conservation areas, national standards as well as expert view, considerations and recommendations on the coastal aquaculture development.

Based on the information obtained from the ISEA, other published sources, stakeholder consultations etc., existing maps showing key marine and coastal ecosystems will be updated and GIS-based new maps will be generated. These maps will be used to identify environmentally sensitive areas/legally protected areas and on endemic and threatened species (Flora and Fauna). Together with mapping of existing aquaculture facilities and potential aquaculture zones, sensitivity of the receiving environments, the proposed study area will be evaluated using map overlays.

Since the information available in the ISEA is based on the information available prior to 2014, and also some of the information is from reconnaissance surveys, it is very important that extensive literature be collected during SEA. Ministry of Environment is currently conducting the "Environmental Sensitive Areas Scaleup Project", where the Environmental Sensitive Areas in the country including Northern Province will be mapped. SEA team will coordinate with Ministry of Environment to obtain the relevant information for Northern Province.

Further, the data from already conducted surveys in the Northern Province by the Marine Ecologist of the SEA team will also be used for the SEA study. (Refer Figure 2 below.)

In addition, Rapid ecological assessment including under water surveys will be carried out to verify the data obtained from literature, stakeholder consultations etc.

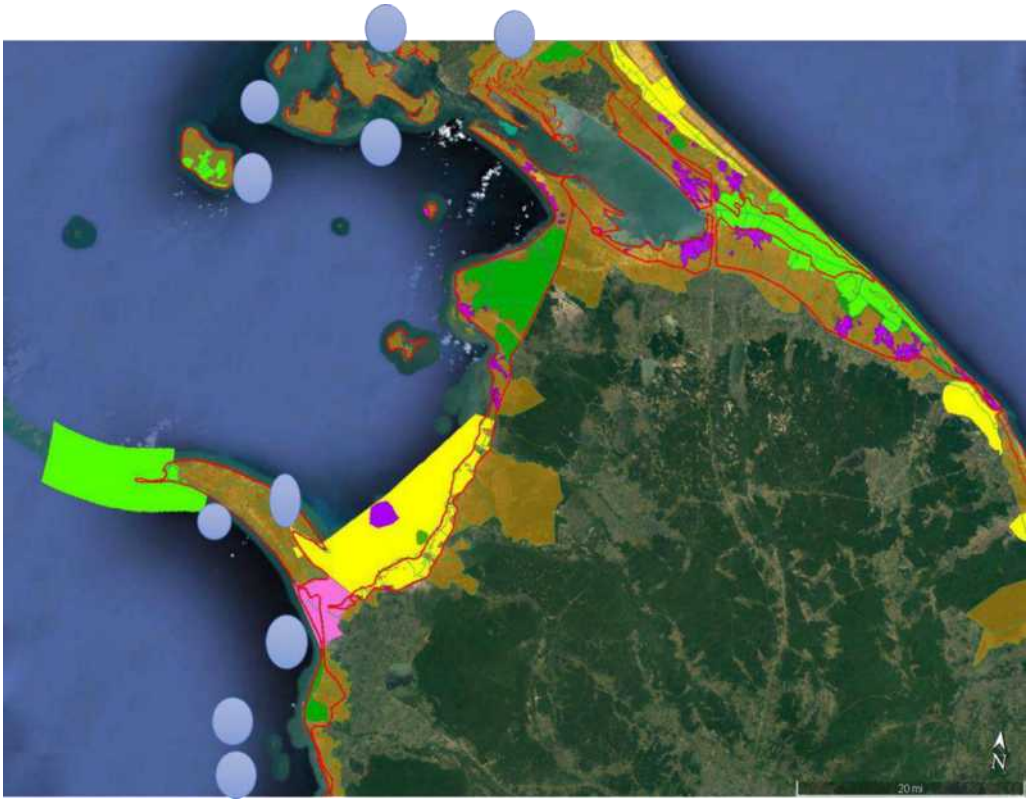


Figure 2: Areas (Blue Spheres) where under water ecological surveys have been carried out by the Marine Ecologist of the SEA team

7.2.5 Habitat loss

Habitat loss is one of the foremost impacts of aquaculture farming arising mainly due to the haphazard siting of aquaculture projects without due consideration of their impact on sensitive ecosystems. It is one of the major direct environmental impacts of aquaculture, and include habitat loss in critical ecosystems (e.g., mangroves, sea grasses, wetlands), effluent (nutrient) loading that contributes to poor water quality, the introduction of invasive species, and the spread of disease in the adjacent environment. Coastal wetlands such as mangrove swamps are amongst the most productive ecosystems sustaining the ecological integrity and productivity of adjacent coastal waters, and are important breeding and nursery grounds for many commercially exploited fish and shellfish species. These impacts can have severe consequences but can often be mitigated through proper and effective management of the aquaculture industry.

SEA team conducted an under-water survey in the existing sea cucumber farm in Ariyalai, Jaffna to investigate whether there is an impact from sea cucumber farming on sea grass beds.

Plate 24: Sea cucumber and seaweed farm - Ariyalai –
(Underwater Ecological Surveys conducted by SEA Team - 14th February 2022)

Plate 25: Fencing and other structures may impact movement of mobile fauna and also possibility of biofouling
(Underwater Ecological Surveys conducted by SEA Team - 14th February 2022)

Plate 26: Dense growth of seaweed would limit the light penetration to seagrass beds underneath-
(Underwater Ecological Surveys conducted by SEA Team - 14th February 2022)

7.3 Potential significant impacts on the coastal and marine environments (Pollution Impacts)

Aquaculture differ vastly from operation to operation. One of the main distinctions in aquaculture is closed versus open systems. Open aquaculture systems often involve a cage/pen/raft in water where fish are reared, fed, and then caught for processing. Closed aquaculture systems are systems that are land-based and utilize filtration and recirculation systems thereby removing the pollution risk of effluents being discharged into natural water bodies. However semi closed systems have the risk of releasing treated/non treated effluent to adjacent water bodies. Likewise comparison of alternatives such as intensive vs. extensive systems, monoculture vs polyculture and open water vs closed recirculating systems generate different levels of pollution risks.

Individual aquaculture farms compete with each other as well as with other users for shared resources. As such, siting and managing aquaculture at the farm level is not sufficient to mitigate the cumulative negative environmental impacts of all resource users, and often prove detrimental to aquaculture industries by creating user conflicts and failing to protect aquaculture from the impacts of other industries. Hence the SEA will address the cumulative impacts of the different aquaculture practices suggests in the NAQDA Plan and specifically provide strategic spatial guidance in terms of optimal spatial planning, select areas of low to medium sensitivity areas through the identification of strategic aquaculture focus areas. Further, it should be appreciated that the SEA process is conducted at a strategic level and cannot substitute the requirement for the site specific environmental assessment for aquaculture purposes.

Impacts of the main coastal aquaculture practices suggested in the NAQDA plan are described below.

7.3.1 Seaweed culture in the shallow coastal areas

Seaweeds are autotrophic organisms that are at the lowest trophic level of the aquatic ecosystem, tend to remove nutrients from the water and produce dissolved oxygen in the daytime and consume oxygen for respiratory purpose at night. Seaweed farming is carried out in Northern Province mainly in shallow nearshore waters using lines, nets which are either fixed to the bottom or attached to floating rafts and buoys. The main species cultured is *Kappphycus alvarezii.*

Plate 27: Stake net fisheries common in the shallow sea in the Northern coastal waters

Site selection & preparation of culture area, culture operation and routine management, harvesting and transportation are the main activities carried out during seaweed farming.

Site selection activities would negatively impact on habitats specially seagrass habitats in the shallow coastal waters and other water based activities such as artisanal fisheries activities in the area and navigation of small crafts. User conflicts could therefore arise during site selection.

Some of the potential negative environmental impacts envisaged include the reduction of light availability to the bottom dwellers or shading by profusely growing seaweed, attenuation of waves and water currents leading to sedimentation. The negative impact of reduction of primary productivity in the water column is significant in seaweed culture as a large surface area is required for a viable culture. As a consequence decline of zooplankton & benthos densities, displacement, or changes of community structure of organisms could occur. Sedimentation of organic matter from off-bottom culture units may also result in changes in benthic communities, particularly where water current velocity is decreased.

At the same time seaweed culture can impact positively on the environment.

Cultivation of seaweeds could contribute to mitigation of eutrophication in coastal waters through the significant uptake of dissolved Nitrogen (N) and Phosphorous (P) which contributes largely to eutrophication.

Carbon sequestration is another striking ecosystem service of seaweed culture practices.

7.3.2 Sea cucumber culture

The decline in sea cucumber fisheries has prompted an increase in sea cucumber aquaculture in Sri Lanka and one of the most valuable species in the NAQDA plan is culturing sea cucumber in shallow coastal areas in the Northern Province. The tropical sandfish (*Holothuria scabra*) has been reared and produced with mixed success. In Sri Lanka, commercial sea cucumber culture activities have been initiated recently but it has been conducted in the past by growing of wild collected *H. scabra* juveniles in sea pens to a marketable size. Artisanal Fishers in the Northern Province used to participate in the export fishery for sea cucumber as a source of income.

However, with a growing concern of depleted stocks regulations provoked for fishery management and lead to introduction of hatcheries to farm sandfish as a community livelihood and to replenish wild stocks is being promoted. The suitable sites have been already selected to establish the concept of sea cucumber villages and demarcated by NAQDA with the assistance of NARA. The areas inhabit shallow coastal waters and is commonly found in seagrass beds of Palk strait and Palk Bay. Out of these areas, most of the farms are to be located in the Palk Strait surrounding island habitats. The aquaculture commodity has been supplied as 'beche-de-mer', a luxury dried seafood, for centuries by the coastal communities in the Northern province. However, at present it has been found that overexploitation has devastated wild populations and as a result, hatcheries to produce juveniles for the purpose of culture and stock enhancement has been initiated.

The sea cucumber village concept may open community based management of sea cucumber farming in order to achieve sustainability with the holistic management of natural resources, human resources and environmental factors.

Sea cucumber plays an important role in bioremediation, as they feed on seabed detritus, which is broken down internally, removing pollutants and toxins in the process. Hence, they can assist in the process of cleaning the seabed.

There is also research evidence that sea cucumber aquaculture could positively impact seagrass meadows, increasing the growth rate of certain species. Sea cucumbers help oxygenate sediments and cycle nutrients between sediment layers on the seafloor. They ingest and excrete large amounts of sediment, enriching the surrounding areas with dissolved nutrients. These processes benefit seagrass by providing nutrients to support growth, and more below-surface space for root extension (Arnull et al 2021).

7.3.3 Shrimp culture

The ACBFSDP suggests the adoption of intensified shrimp production in existing farms, use of Best Management Practices (BMPs) and use of Specific Pathogen-Free (SPF) shrimp stocks. The terms SPF denote the health status of a shrimp stock while Specific Pathogen Resistant (SPR) and Specific Pathogen Tolerant (SPT) status of shrimps, define genetic characteristics of stocks with reference to pathogens and disease. The plan further suggests to seek the possibility of combining strategies such as SPF+SPR, SPF+SPT or SPF+SPR+SPT in order to help shrimp farmers prevent disease outbreaks in grow-out ponds.

The plan anticipates the highest production, export earnings and employment generation through coastal shrimp culture in comparison to other species proposed in coastal aquaculture.

With reference to the plan, the Culture of newly introduced *Litopenaeus vannamei* is preferred in place of conventional *Penaeus monodon* with higher anticipated economic, environmental and social benefits.

Most common potential impacts of unregulated and unplanned shrimp farming are described below;

Mangrove ecosystem losses has resulted in the loss of seagrass ecosystems in the lagoons as mangrove areas are interlinked with the seagrass ecosystems. As a result, it affects the fisheries in the associated lagoon systems, alteration of sedimentation patterns and land use configurations.

The uncontrolled expansion and inappropriate siting of shrimp farms in Sri Lanka has led to severe consequences such as overcrowding and destruction of mangrove habitats along the North Western coastal belt.

The problems related to the environment in the shrimp farming industry in Sri Lanka arose mainly due to over emphasis on higher production, economic viability, and lucrative foreign income generation without paying attention to the adverse environmental impacts caused due to over-crowding of farms. There was no proper zoning plan at the commencement of these farms, in order to facilitate development of an environmentally sound industry. As such the Northwestern and Western provincial coastal belts led to a myriad of social problems in addition to the loss of ecologically sensitive areas, such as mangroves and mud flats.

Individual sites were approved without considering the industry as a whole or the existing farms in the vicinity, leading to development of farms in a haphazard manner. This resulted in the outlets and inlets of individual farms to be located in close proximity to each other, leading to health management problems. The establishment of many small-scale farms without proper environmental

assessments led to the destruction of the required buffer zones between farms and between water fronts and farms. This also led to interference with irrigation and drainage systems, the latter causing annual flooding in the areas where shrimp farms were developed (Wijegoonawardena and Siriwardena, 1996).

Shrimp aquaculture ponds/farms had been developed in an ad-hoc manner, and management has largely focused on siting, licensing, and monitoring performance and impact at individual farm level. This perspective failed to recognize the fact that aquaculture industries are dependent on a common pool of resources viz. water and space which are strongly attached to the ecosystems. Hence a SEA covering the sustainable development of aquaculture in the Northern Province will assess cumulative issues through the assessment of the presence of environmentally sensitive areas as well as plans and programs of other government agencies.

It is also useful to distinguish between extensive, semi-intensive and intensive farming systems when considering environmental effects of a particular aquaculture operation. In extensive systems, cultured organisms are kept at low densities and may occasionally receive additional nutrition through fertilization. In semi-intensive aquaculture, cultured organisms are kept at higher densities than in extensive systems. The culture media are often fertilized and supplementary feed may be provided. In intensive aquaculture, cultured organisms are kept at high densities and feeding is regular, usually in the form of especially prepared/manufactured feeds.

Other than the above common impacts, following impacts could occur due to the introduction of Litopenaeus vannamei;

1. Ability to act as a carrier of various viral pathogens exotic to Asia,
2. As it is an exotic species there is a risk of escape to the natural environment where it could compete with native species or become a threat to the natural biodiversity
3. The greater intensification of *Litopenaeus vannamei* according to the NAQDA plan would result in less energy use per metric ton of shrimp yield than a less intensive culture of *P. monodon.* This is counted as a positive impact as the land availability for sustainable and ecosystem based shrimp culture is low.

7.3.4 Finfish cage culture

The plan envisages finfish, seabass and milk fish culture in coastal and shallow marine areas in the Northern coast. As the study is limited to the shallow coastal areas in the Northern coast, small to medium size cage culture to be considered in the impact assessment. Cage aquaculture involves the growing of fish in existing water resources while being enclosed in a net cage which allows the free flow of water. Farming of fish in an existing water body removes one of the biggest constraints of fish farming on land, i.e., the need for a constant flow of clean, oxygenated water. Cage farms are positioned in a such way as to utilize natural currents, which provide the fish with oxygen and other required conditions.

The potential impacts on water quality associated with cage culture includes dissolved Nitrogen and Phosphorus, turbidity, lipids, and dissolved oxygen fluxes.

The discharge of excess feed and fish waste from the farms, may alter the chemical processes of decomposition and nutrient assimilation in the bottom and create anaerobic conditions in the worst scenario in shallow water with less water flows. Site specific characteristics such as hydrodynamics,

trophic status of the water column benthic shear, sediment composition, water depth and nutrient loading will interact to determine which of these will be the scenario for any given farm site.

Cages may also provide shelter and foraging habitat for wild fish. These characteristics may be beneficial to the local and regional environment. Wild fish and other marine life often aggregate around fish cages and this may be considered a beneficial impact to marine life at some locations. As fish are attracted to farms, the potential for negative and positive interactions with fishermen may increase and farm management or regulatory steps should be considered to minimize conflicts.

Sensitive ecosystems such as corals, seagrass and mangroves may be vulnerable to nutrient enrichment and sedimentation due to farm effluents.

Taking into consideration all of the above facts, the environmental impacts of any farm should be considered in a holistic manner, taking into account the range of oceanographic, hydrological and ecological characteristics of the site and the structural, technological and production aspects of the farm.

7.4 Socio Economic impacts not adequately addressed in the NAQDA plan

Due to the abundant natural resources and consequent social and economic benefits, the coastal zone has experienced rapid development and urbanization over the decades. Approximately 11.3 million live in coastal districts, while 61.6% of all industries operate within the coastal region. Sri Lankan coastal and marine areas have considerable socio-economic significance since time immemorial. Coastal ocean resources are linked to public health, food security, and economic benefits, including traditional livestock and social benefits and cultural values. The level of poverty in the northern coastal area is significantly higher than that of the broader districts and the nation. The agriculture/fishing/livestock sector contributes considerably to livelihood in the province (39%, of which 83% is fisheries-related). The interaction of aquaculture with various socio-economic receptors in the project area could cause impacts to the people and their socio-economic wellbeing. The proposed aquaculture development plan should consider the socio-economic sensitivity of the sites. The proposed development plan of the NAQDA is primarily an in-depth elaboration of the production target and does not adequately address environmental and social impacts or their mitigation.

After having consultations with key stakeholders, it was revealed that the proposed plan could interact with several socio-economic receptors in the project area.

7.4.1 Impacts being perceived by the stakeholders and local community

7.4.1.1 Impacts on Natural Resource Dependence

The coastal area of the Northern Province is rich in natural resources such as lagoons, mangroves, salt marshes. The people in Northern Province were severely devastated by internal conflicts in several ways, such as loss of lives, multiple displacements, loss of properties and deprivation from economic activities, unemployment, and poverty. Hence, the Northern Province is the lowest contributor to the national GDP, according to the statistics department of the central bank. The region missed the opportunity for developing service and industry sectors due to the war. In Northern Province, around 81% of the population lives in rural areas. Their livelihood is highly dependent on natural resources like land, forest, and water (sea, lagoon, and freshwater tanks).

Impact on Capture Based Fishery

There were around 50,000 fishers (Marine fishery) households in the Northern Province by 2019 as per the fisheries statistics 2020. In 1980, Northern Province was the dominant contributor to the national fish production, i.e., 49%. The civil war, tsunami, and Indian poachers illegally entering the Sri Lankan maritime area for fishing have impacted the fishery sector. Fishermen in the Northern Province mainly depend on Outboard engine Fiberglass Reinforced Plastic boats (OFRP) as most of them are small scale fishermen. Since they lack sufficient capital for deep-sea fishing (Increased mechanization and investment in offshore fisheries, which is not affordable for small scale fishermen), appropriate knowledge and experience on using these multi-day boats and Storage systems, more than 90% of the fishermen are involved in the coastal fishery Sector.

The Jaffna lagoon is one of the important brackish water sources for capture-based fisheries and is being targeted by the culture-based fishery at the moment. A significant number of sea cucumber pen cultures were observed in this lagoon, and it can be considered as the best example for the coexistence of the capture-based and culture-based fishery in the province. A study (Ragavan et al.,2019) identified that 5340 fishers confined to 39 landing sites were actively engaged in fishing in Jaffna lagoon using 12 different fishing methods. Fyke nets (71%) followed by stake nets (10%), lagoon seines, and lagoon boat seines (6%) were the widely used fishing methods.

The consultation with the stakeholders and other secondary data reveals that aquaculture in the lagoon and other coastal water create conflicts with the capture-based fisheries in terms of space. The conflict with the capture-based fishery sector has forced the aquaculture farmer to construct more security structures (Fence and observation points) which has become an obstacle for fishermen to access their fishing grounds.

During the rainy season, mudflats of the lagoons and lowlands act as traditional fishing grounds for the coastal communities. Shrimps, crabs, milkfish, and mullet juveniles/fries migrate to waterlogged areas. This activity generates additional income during the rainy seasons especially for women. Construction of aquaculture farms in these areas will disturb such seasonal activities.

The structures and protective fences erected for marine based aquaculture farming may prevent access to the fishing grounds. Coastal land based aquaculture activities could also restrict access to traditional fishery landing sites.

Though the land-based aquaculture farms operate with a closed water system, in some cases people tend to discharge the pond effluent into natural ecosystems which may pollute the fishing grounds and cause the spread of diseases.

Aquaculture can create pressure on wild stock if the industry uses the wild-collected juveniles, brood stock, and other stages of aquatic life.

Same time, analysis of secondary data confirmed the increasing trend of fishing effort in the Jaffna lagoon, since 2009 but the total fish catch declined gradually after reporting a maximum value of 6958 Mt. in 2012. A rough estimate of the maximum sustainable yield of the fishery of the Jaffna lagoon was 6,694 Mt with the annual fishing effort (FMSY) of 1007 crafts. The current fishing effort is higher than the FMSY, and the most significant portion of the catch was contributed by the gears banned by the DFAR.

Aquaculture is a good alternative for the resource over exploitation which takes place during capture-based fisheries. Also, aquaculture will help in providing additional income opportunities for fishermen whose livelihood opportunities are associated with wild capture fisheries. Hence, the impact of distractive fishing methods and the impacts of the proposed aquaculture development plan should be evaluated carefully considering social and economic aspects.

7.4.1.2 Impacts on Access Pathways and Roads

Land based coastal aquaculture farms could disturb the access to the lagoon, coast etc. The rural road networks are highly fragile to bear heavily loaded vehicles that an aquaculture industry would use to transport their raw materials and farm produces. Such disturbances and damage caused to the access pathways and roads may affect the livelihood and welfare of the general public.

7.4.1.3 Impacts on Local Economy

The proposed plan may affect other economic activities in the project's influential area. Formal and non-formal agriculture and traditional fisheries sectors are more sensitive to aquaculture as they share the same space and resources. The impact of the proposed plan on small and medium-scale aquaculture activities in the project area is also a key factor to be considered.

Aquaculture needs products that come from Agriculture and Fishing to develop its production. The crab farm can use low-quality fish (trash fish) as feeding material. Therefore, aquaculture can appear to be a revaluation process that increases the value of fish production by changing it into another type of consumption. However, other value-added businesses and industries that rely on those inputs may be affected due to the increased demand for such raw materials. The development plan should consider the sectors of the economy which are already using the agricultural by-products for a balanced economy.

7.4.1.3.1 Substantial and Subsidiary income to local communities

While a few local level entrepreneurs invest in aquaculture to generate substantial income, it was observed that the capture-based fishermen have also shown interest in embarking on aquaculture. They consider it as an alternative method to earn a subsidiary income source. Investing an insignificant time on a seaweed farming daily will generate a subsidiary income to the family.

The proposed project is likely to generate direct and indirect employment opportunities for the local community. This creates an opportunity for locals to enroll in formal employment with connected social safety net provisions within their locality. The social and poverty surveys and analysis conducted as part of the PPTA for Northern Fisheries Development project of ADB showed that 14% of economically active persons in the coastal areas of the Northern Province are unemployed. The proposed development plan may contribute to employment opportunities in the study area. A substantial increase in aquaculture may positively affect the fishermen population, especially the younger generations. This would be a great advantage and opportunity for women too.

Additionally, this will create service providers to cater to the needs of in-migrant laborers such as restaurants/food stalls, owners of rental accommodation, transportation, etc.

7.4.1.3.2 Women and the vulnerable become active income generators

The women in a fisher families contribute capture-based fishing by Cleaning the fishing net, preparing the catch for dried fish processing, etc. Handling the fishing gear could be a difficult task for them.

But, aquaculture in shallow water, especially seaweed farming might be a promising income generation activity for women to become an independent income generation source for the family.

7.4.1.3.3 Risks and intolerable losses due to disease and natural disaster

Aquaculture, despite being a successful and profitable commercial activity, also involves the risk of crop loss due to diseases, parasites, oxygen depletion, freshwater kill, and more. Unlike ever before, the aquaculture farmer should energize with technological and innovative solutions, which could be beyond their skill and financial capacity.

7.4.1.3.4 Impact on capture-based fisher's income

As described earlier, the conflict between the aquaculture and capture-based fishery could affect those fishers' income. Loss of fishing grounds, loss of access to those fishing ground and landing sites, loss of harvest due to pollution, and exploitation of wild juveniles for aquaculture purpose would negatively affect the fish catch and traditional fisher's income.

7.4.1.3.5 Becoming dependent on private industries

The capture-based fishers are more or less independent of their economy. They independently sell the catch to a particular buyer or in open market. Aquaculture is mostly defined as a chain of economy, for a farmer that should rely on input suppliers and limited buyers. The seaweed farmers in the study area are bound to supply their harvest to a particular buyer due to the monopoly or a forward sale agreement they have entered with. This phenomena may create a situation where the independent local community would depend on other external entities for their economy.

7.4.2 Potential impacts that have not been perceived yet

In addition to the above discussed impacts the implementation of the NAQDA plan may lead to potential impacts, which are described below.

7.4.2.1 Impacts on other non-formal resource utilization

Conflicts can arise as a result of using natural biological resources common to Fishing, agro farming, livestock farming, and other non-formal livelihood activities. Grazing and collection of firewood in open scrub or wastelands are common in Sri Lanka, especially in the Northern Province. Animal husbandry is one of the major livelihood activity in the Northern province. Most of the herds are allowed for open grazing and the coastal area of the Northern Province has an abundance of such lands. Loss of such land may result in the economic displacement of individuals dependent on these lands. These impacts are likely to be at the individual level (for private landowners, agricultural land users, encroachers, and settlers) and community level (loss of grazing land and land used for firewood collection).

At the same time, the productive land is limited in the coastal area of the province due to the salty and sandy soil. These unproductive lands could be a beneficial intervention to the people if the lands can be utilized for aquaculture. Aquaculture development is beneficial for local communities to increase food security and associated livelihood and income generation opportunities.

7.4.2.2 Impacts on Land Use and Land Ownership

Most of the area along the Northern coastal region is already occupied by people. The land use and land titling in the Northern Province is highly complex due to the civil war that prevailed in the area.

Multiple land use patterns exist within the project area, and unplanned implementation will result in severe impacts.

Due to the civil war prevailed in the area, there are issues such as lost land titles, disputes on land rights, ongoing resettlement and rehabilitation of local community displaced during the war etc. Land titling process in the country is underway since 2007 under the "Bim Saviya Programme"; however, the process has newly been initiated in Northern Province. Ministry of Lands has implemented the "Accelerated Programme on Solving Post Conflict State Lands Issues in the Northern Province" in 2014.

The Northern province witnessed a mass internal displacement of people from their homes due to the 26-year long conflict. Approximately 294,000 people were displaced. As a result of this displacement, many families, lost key documents, included property deeds. The resettlement process was initiated in 2009. However, at the time the relevant government authorities were dysfunctional and many land records and details were deemed to be lost. Hence many people could not prove that they owned their land. In some cases, settlers have encroached on Forest reservations and coastal reservations without going through formal procedures and claim ownership over some of these lands.

These encroachers will be highly impacted if the proposed development plan requires such lands for its activities. It is also noted that many people have yet to claim ownership of their lands after the civil war. Though these land parcels are currently categorized as unknown or state land (based on land use), there is a possibility that the owners might claim the land at a later stage.

The proposed development plan has a potential physical and economic resettlement impact, and no management criteria have been proposed in the programme.

7.4.3 Impacts on agriculture

Competition may arise between aquaculture and agriculture in the area to use land, freshwater, and food by-products. The farmers used to cultivate paddy in the vicinity of the lagoons (Chundikulam lagoon etc.) because of the presence of saltwater barrier dykes. These dykes prevent saltwater intrusion and help to hold the storm water for cultivation and groundwater recharge. The proposed development plan could impact these cultivations closer to the lagoon areas.

The aquaculture industry uses freshwater to lower the salinity in the water used for aquaculture. Competition may occur as a result of using agricultural by-products for aquaculture. In case of intensive aquaculture, feeding requirements are based on fish meal, soya, etc., also used by the farming sector. Conflicts may also arise due to the side effects that these two activities have on their surrounding environment; water pollution due to agricultural pesticides and fertilizers and the increase in salinity of farmland surrounding aquaculture projects.

7.4.4 Impacts on Indigenous People

According to the information available, no indigenous people were reported within the Northern Province. The SEA team will further validate this fact during the study.

7.4.5 Labour Influx and Labour Welfare

As found in the initial stakeholder consultations there could be a gap in the experience and educational attainment of the local labor force to get involved in the aquaculture activities. In this case, the aquaculture industries may have to hire migrant workers. Skilled migrant workers from India are employed by the existing large-scale private aquaculture farms. The interaction between the local community and migrant laborers may create interpersonal and communal conflicts due to differences in cultures, beliefs, social practices, food habits, etc. These interactions can also lead to the spread of infectious diseases.

Furthermore, the influx of laborers in the short term will increase the demand for necessities and burden local resources, including water, food, electricity, etc. This may result in additional pressure on scarce resources such as water for the local community.

7.4.6 Impacts on tourism and other industries

Implementation of coastal aquaculture projects near tourist attractions could affect the aesthetic value of such locations and result in disturbance to the tourists. At the same time, the development of the aquaculture industry may attract specific groups of visitors such as the business crowd, academics, and researchers to the area.

7.4.7 Impacts on Cultural Heritages and religious places

It is common to see archaeological monuments and cultural, historical places along the coastal regions of Sri Lanka. A list of such archeological, cultural and historical places and Map showing the archaeological sites will be given in the Draft SEA report.

7.5 Other plans co-existing/conflicting with the proposed ACBFSDP (2021-2025) objectives

The following national/sub-national level plans and policies given in Table 9 below in relation to the Northern province have been identified by various institutions. These are key economic development and conservation plans that need to be considered in identifying risk level of the Northern Province in implementing ACBFSDP.

Table 9: Other key Plans, programmes and strategies that are relevant to implementation of ACBFSDP

Plan type (development/ conservation)	Key objective /expectations	Year of formulation	Potential conflicts with ACBFSDP	Opportunities for ACBFSDP
National Biodiversity Strategy and Action Plan (NBSAP) for 2016-2022	Mainstream biodiversity conservation concerns into sectorial and cross-sectorial polices, plans and programs.	2016	Target 11 related to enhancing resilience and adaptation in ecosystems such as forest, wetlands, mangroves and coral reefs through ecosystem-based adaptations.	Target 7 relates the strengthening sustainable use of biodiversity, it is proposed to achieve in part by community based resource management which could be integrated with ACBFSDP.
Physical plan for the Northern Province, volume one Ministry of Construction, Engineering services, Housing and Common amenities 2012 Extracted from Implication of National Physical Planning Policy and Plan Sri Lanka 2010-2030 by National Physical Planning Department	Strategies have been developed for economic, physical and environmental management and conservation. The Plan has been developed in accordance with the Town and Country Planning Amendment Act No. 49 and is aligned to and will deliver on the recently gazetted National Physical Plan. The Regional Plan is built around the vision that by 2030.	2012	Overlapping activities	
Economic Development Framework for a Northern Province Master Plan, A Report commissioned by the Central Bank of Sri Lanka August 2018	Framework is offered as a resource to support the creation of a master plan for economic development of the North. ; It takes a holistic macro view of the economy and provides direction for development over the medium to long-term (2030).	2018	Overlapping activities	A Framework to support such analysis has been developed and is structured around three inter-dependent pillars: the factors of production, the enabling environment, and the social foundations of development.

Plan type (development/ conservation)	Key objective /expectations	Year of formulation	Potential conflicts with ACBFSDP	Opportunities for ACBFSDP
Mannar Development Plan 2018-2030 Volume 1, Northern Province – Urban Development Authority	Goal 3: 1. The existing natural ecosystem will be conserved and preserved by 2030. 2. Archeological value of cultural and historical sites of Mannar will be enhanced by 2030 3. To attract 3000 tourists to boost the marine tourism by end of 2030	2018	Potential conflicts with Industrial zones, and Tourism development zones	
National Policy on Tourism- Ministry of Tourism (Currently at draft stage, Effective date subject to Cabinet Approval)	Strategy 2.2 – Sustainable use and conservation of natural, cultural and other tourism assets To ensure a long-term preservation of cultural and natural heritage, the national tourism policy recommends to upgrade rules & regulations for cultural sites and National Parks (marine and terrestrial). It is recommended to undertake a capacity assessment and set a threshold in terms of carrying capacity and minimum standards for noise and carbon emission levels.	2021(Currently at draft stage, Effective date subject to Cabinet Approval)	SLTDA in collaboration with Northern Province Tourism Bureau are currently working with other relevant stakeholders for the proper and sustainable development of tourism sector in Northern Province. Most of the identified tourism sites are located in coastal areas of Northern Province.	

8 Potential Risks on Coastal Aquaculture related to climate vulnerability and contribution of Aquaculture to Climate Change

8.1 Key Climate Change aspects that could potentially impinge on Coastal Aquaculture

Northern Province of Sri Lanka has been identified as a top hotspot for climate change (Mani et al., 2018). However, climate change impacts have not been adequately addressed in the NAQDA plan, which is one of the concerns of the stakeholders. The changes in monsoonal onset, duration, and intensity have affected the fishermen's livelihoods; fishers have been experiencing lower catch due to changes in ocean waters which could be attribute to changes in the surface ocean temperatures and monsoonal patterns. The fishermen in northern coastal areas have also been experiencing lowered numbers of fish landing sites due to shrinking shores. Thus, climate change has economically impacted the fishermen in the north. Lagoons and mangrove areas provide the best environments for Aquaculture. According to Angel (1998), Jaffna district has the second largest area under district wise mangrove forests (2276 ha) and it has the largest area of lagoons (45,525 ha) within it (Angell, 1998). Mangroves are distributed in 60 Grama Niladhari divisions in Jaffna district (Rajkumar et al., 2019).

If the sites selected for the proposed activities affect the carbon stocks in any of the existing coastal ecosystems, such activities should be carried out without affecting those ecosystems or alternative sites should be chosen. The practice of integrated mangrove-shrimp aquaculture (or Silvo aquaculture) is suggested for the new shrimp farming units, where mangrove trees are planted along the margins of the shrimp farms, allowing reestablishment of mangrove forests. This could be considered in establishing proposed hatcheries in Northern Province, based on the proposed plan.

Climate change impacts on aquaculture has been documented in several literature sources (e.g. Yazdi and Shakouri, 2010; Soto and Brugere, 2008; Hall, 2015; Jayasinghe et al., 2019). The potential climate change impacts for the aquaculture systems in the Northern Province are summarized in Figure 3 below. Potential options for strengthening climate change resilience and adaptation against the impacts including alternative livelihoods/income sources, etc., will also be identified through stakeholder consultation.

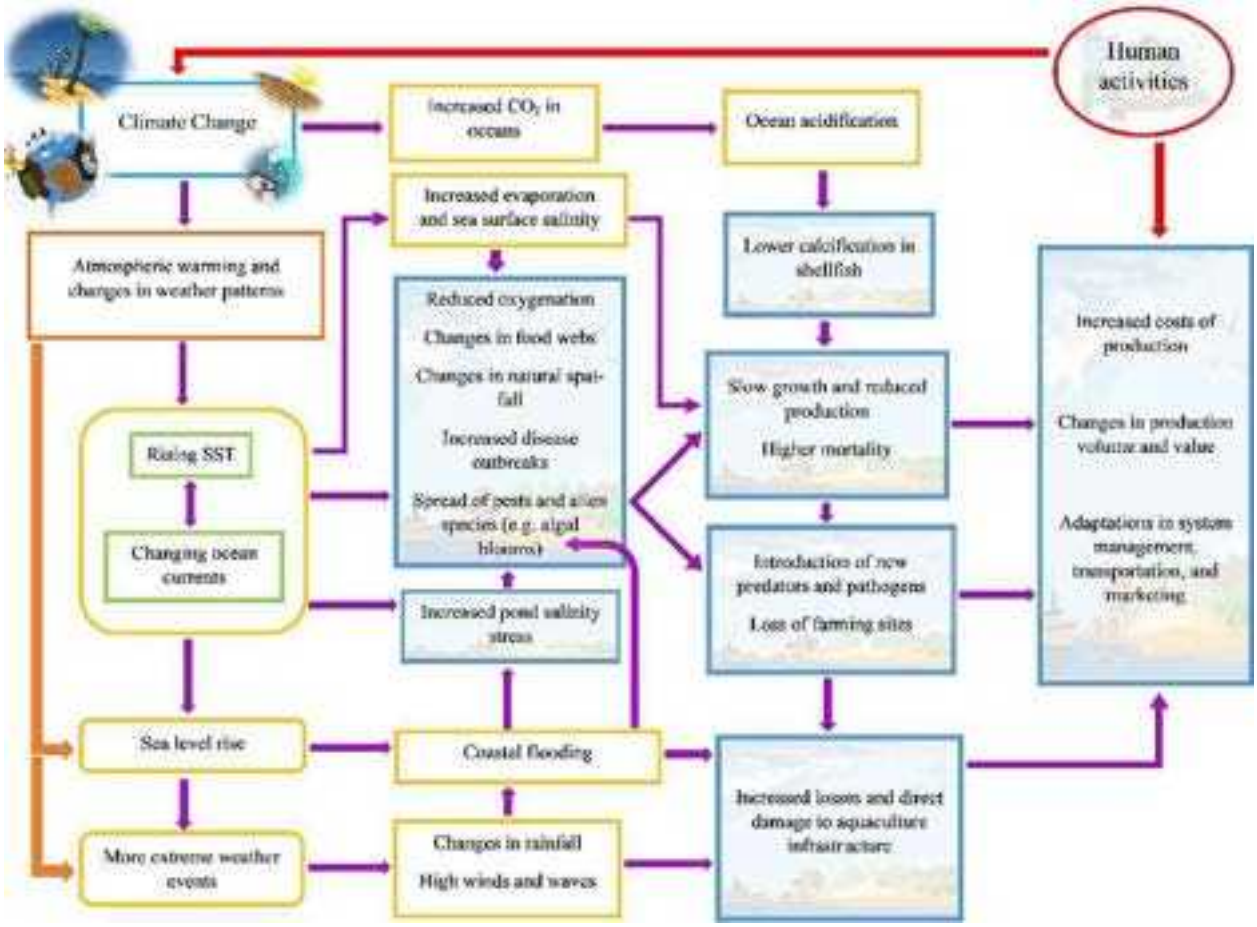


Figure 3: Potential climate change impacts on aquaculture systems

8.2 Risks related to climate vulnerability in the Northern Province

The Northern Province's tropical monsoon-driven climate is hot and dry in the dry season (February to September) and rainy in the wet season (October to January). The coolest month is January, while the warmest month is May. The relative humidity fluctuates from 70% during the day to 90% at night (Mallawatantri et al., 2014).

The Northern Region's annual average rainfall varies from year to year. The rainy months of November, December, and January account for 90% of the total rainfall. The province's eastern region receives highest rainfall, while the western region receives the least (Piratheeparajah, 2015).

As far as the adaption measures for the Northern Province are concerned, specific vulnerability risks based on any future climate impacts need to be taken into consideration. Certain anticipated changes/effects due to climate change are described below. The planned aquaculture projects might be directly and indirectly impacted due to sea level rise, increased sea surface temperatures, and extreme weather events (i.e. droughts, floods, storm surges, etc.) associated with climate change, and effective adaptation measures need to be taken.

Global warming due to climate change has caused increases in sea surface temperature over time. The appropriateness of species for a specific site may be affected by changes in water temperatures. Fishers in the Northern Province have already experienced increases in the sea surface water temperatures and spread of various pathogens/diseases, affecting the aquaculture

species (e.g. sea weeds, shrimp). Most heat-related issues due to increasing water temperature will also arise as a result of poor water quality, low oxygen levels, increased stress and illness, and poor feeding and development performance, etc. (Handisyde et al., 2014; Maulu et al., 2021). Changes in feed composition and feeding schedules may be used as adaptive techniques to cope with rising water temperatures.

Sea surface temperatures recorded for Colombo, based on satellite data provided by the National Oceanographic and Atmospheric Administration (NOAA; USA) are shown in Figure 4 ; no direct data are available for Jaffna peninsula.

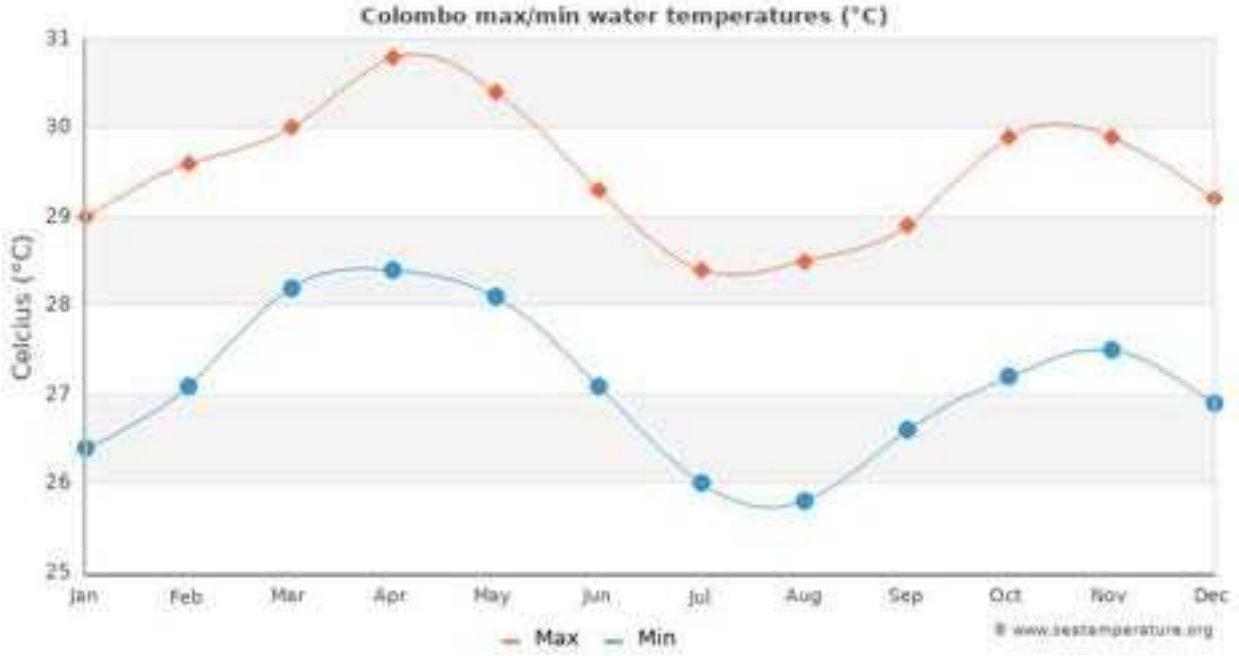


Figure 4: Monthly variation of sea surface temperatures based on historical data for Colombo (Source: https://www.seatemperature.org/asia/sri-lanka/colombo.htm)

Aquaculture activities might be limited only to certain suitable locations in the future, due to anticipated drought conditions (Figure 5). Drought conditions and sea level rise could increase the salinity intrusion, leading to unfavorable conditions, requiring more attention.

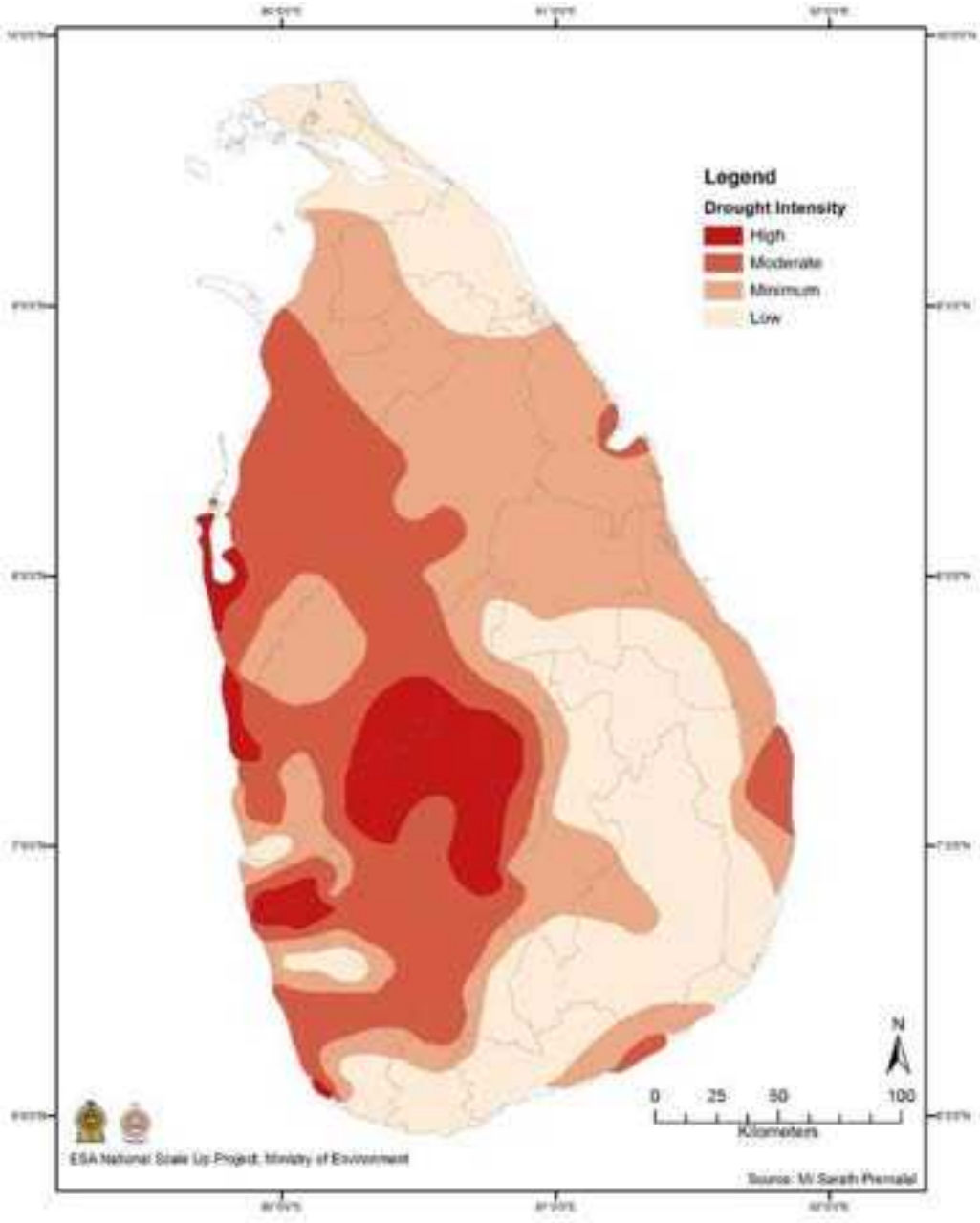


Figure 5: Drought map of Sri Lanka
(Source: ESA National Scaleup project, Ministry of Environment)

Droughts have become more frequent in Mannar district and Mullaitivu district (Rajendram, 2019). A potential increase in environmental temperature could occur in all five districts in the Northern Province. As mentioned in De Silva (2013) based on the outputs of the Hadley Centre for Climate Prediction and Research model (HadCM3), predictions of 1.93°C increase in temperature, 23% decrease in the rainfall from North-East Monsoon and 10% decrease in potential runoff have been estimated for the year 2050. The reduction in annual runoff will have a significant impact on the water storage capacity of existing community tanks, or " Kulam", which may affect the farming activities. Also, the continued increasing temperatures could highly impact the water availability, due to increased evaporation.

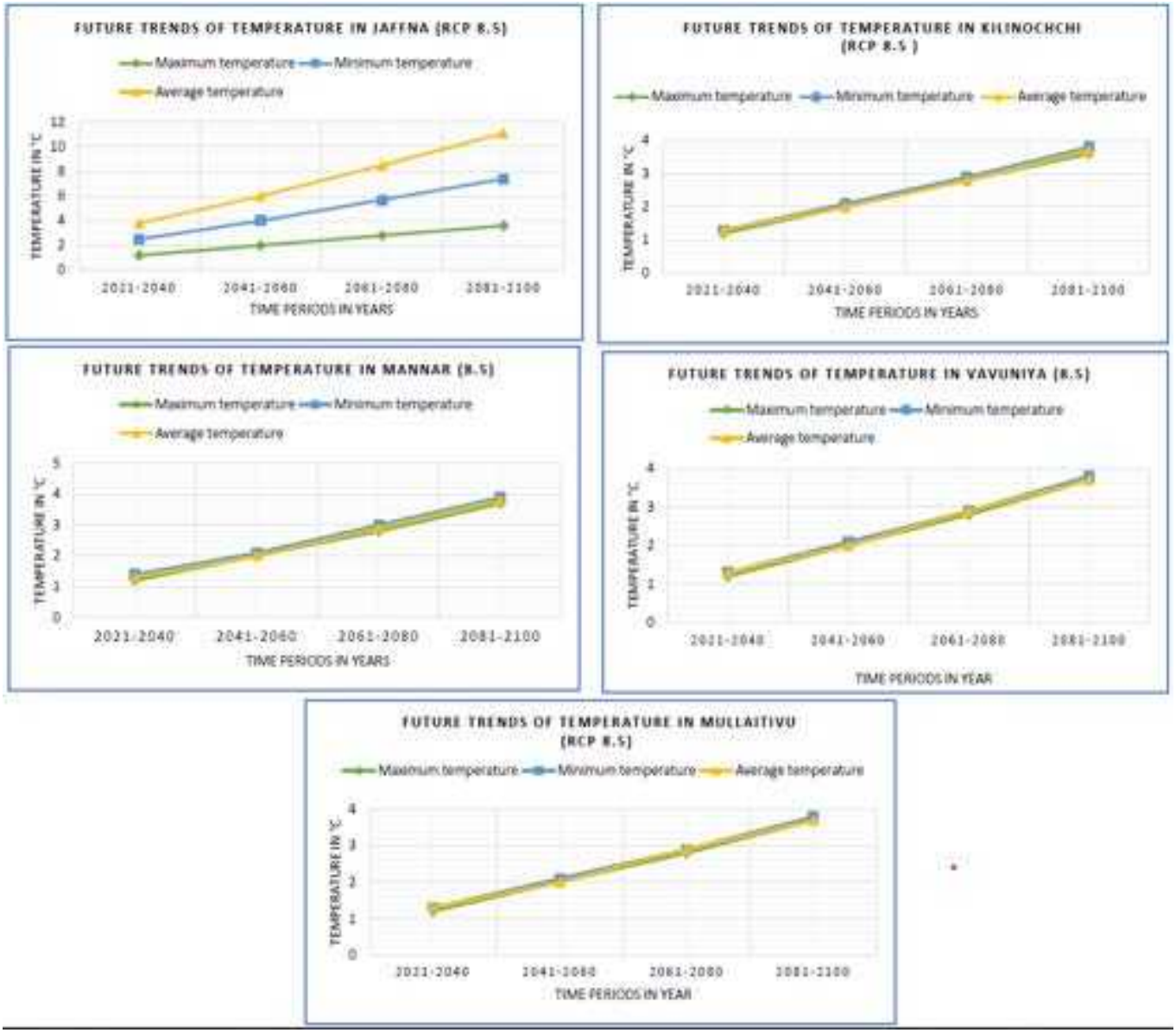


Figure 6: Future trends of maximum, minimum and average temperature in Jaffna, Kilinochchi Mannar, Vavuniya and Mullaitivu for the periods 2021-2040, 2041-2060, 2061-2080, 2081-2100 (Base period 1976-2005) with the greenhouse gas emission scenario under Representative Concentration Pathway (RCP) 8.5 defined by IPCC (IPCC, 2014)

During droughts, there will also be a competition with agriculture, industry, and household consumers, etc. for a restricted water supply (Handisyde et al., 2014). The lagoon areas are frequently affected by saltwater intrusion, affecting drinking water and paddy farming, with droughts and sea level rise. Therefore, if aquaculture activities lead to further increment of salinity intrusion, it will definitely affect crop agriculture and other livelihoods.

The sea level rise in the Northern Peninsula has been estimated at 2.9 mm/year (Oceanography Division, NARA, 2022), which is slightly lower compared to the sea level rise (i.e. 3.12 mm/year) observed in southern coast (Indika, 2022). Higher monsoon intensity due to climate change has been anticipated for several Asian locations (IPCC, 2001a), and the northern province of Sri Lanka

is no exception. Kilinochchi is one of the districts prone to flooding during the rainy season, which is influenced by the North-East monsoon. In some years, total annual rainfall exceeds 1800 mm, resulting in seasonal floods (Yushanthi & Nianthi, 2021). Flooding can occur because of increased precipitation, causing damage to infrastructure as well as marine ecosystems.

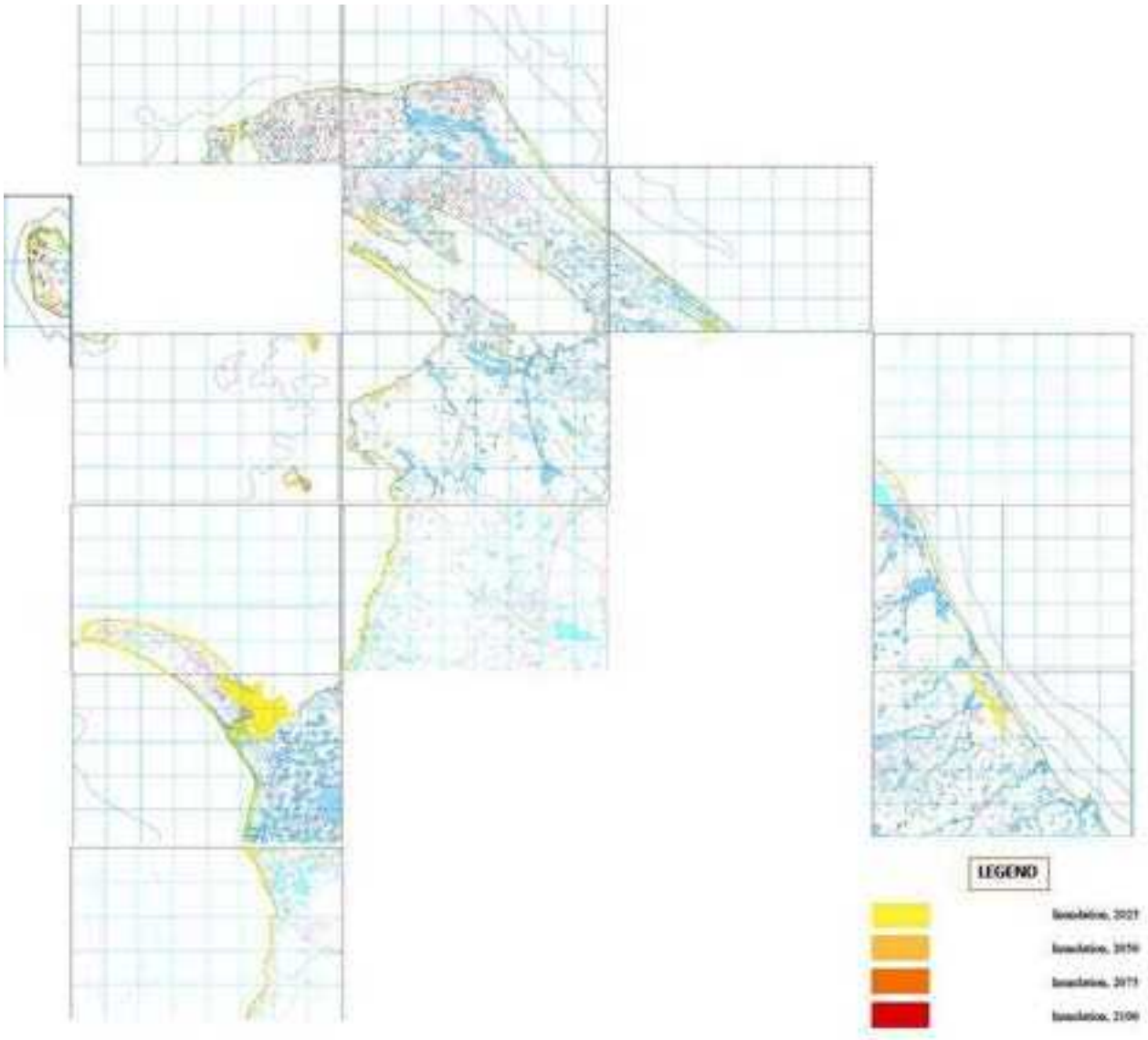
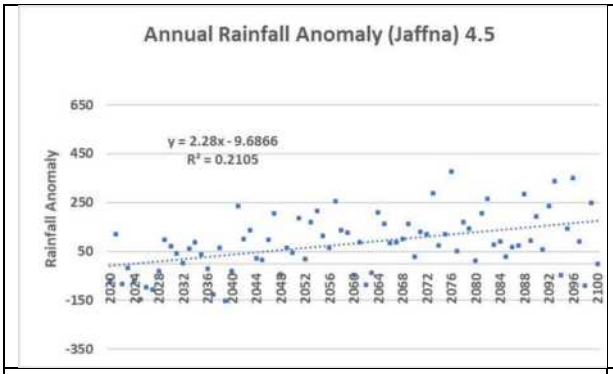


Figure 7: Inundation due to predicted sea level rise in 2025, 2050, 2075 and 2100 (Published by Coastal Research and Design, Coast Conservation and Coastal Resource Management with the assistance from Disaster Management Centre, Sri Lanka, May 2012)

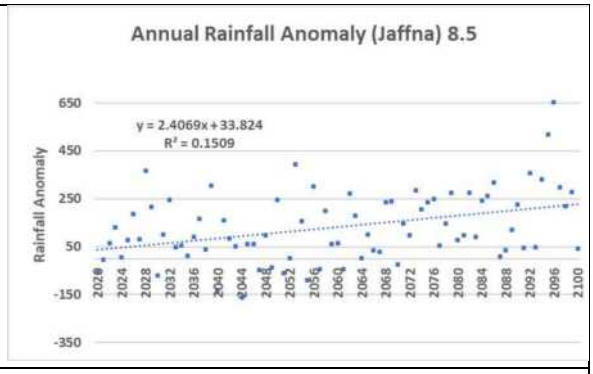
Changes in the onset of northeast monsoons, increased intensity of rainfall, increased occurrence of extreme events including coastal flooding, strong winds and high tides with wave height of ~2 ft have been observed especially in lagoon areas of Kilinochchi district. Increased high tides have moved sea water further landward, and it has affected fishing equipment and boats, etc., at times. (Mr. S.Kokularaja, District Disaster Management Center Unit, Kilinochchi ,2022)

However, under the greenhouse gas emission scenarios indicated by Representative Concentration Pathways (RCPs) 4.5 and 8.5 defined by the IPCC (IPCC, 2014), an increasing trend in the annual

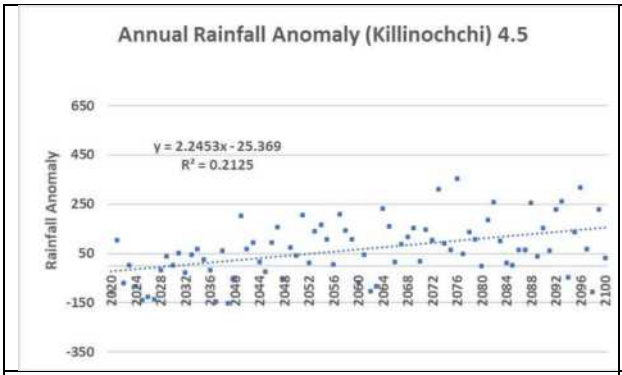
rainfall has been predicted for the districts of Jaffna, Kilinochchi, Mannar, Mullaitivu and Vavuniya, with moderate confidence (Figure 8a - 8j).



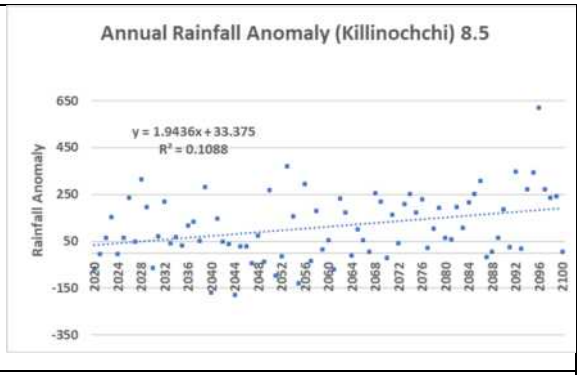
(a) Annual Rainfall anomaly (Jaffna) RCP 4.5



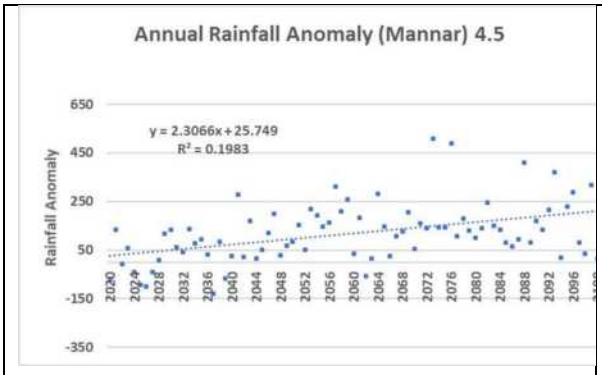
(b) Annual Rainfall anomaly (Jaffna) RCP 8.5



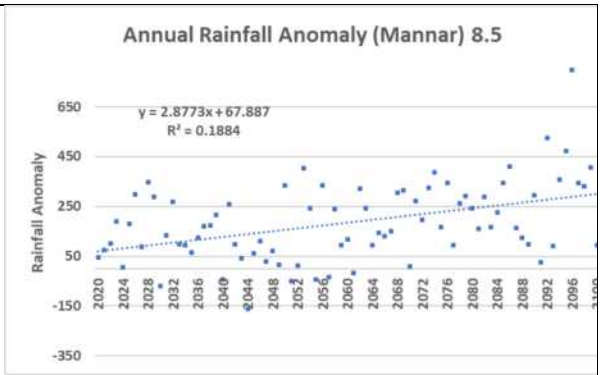
(c) Annual Rainfall anomaly (Kilinochchi) RCP 4.5



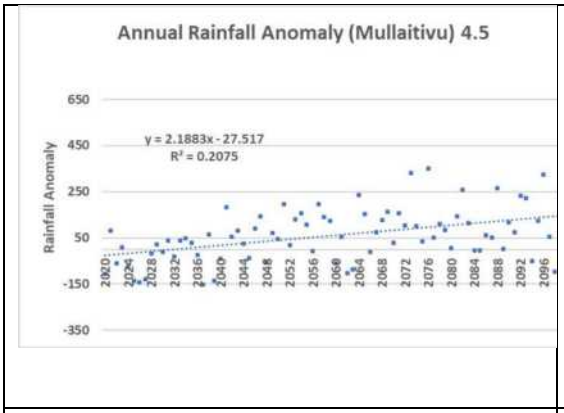
(d) Annual Rainfall anomaly (Kilinochchi) RCP 8.5



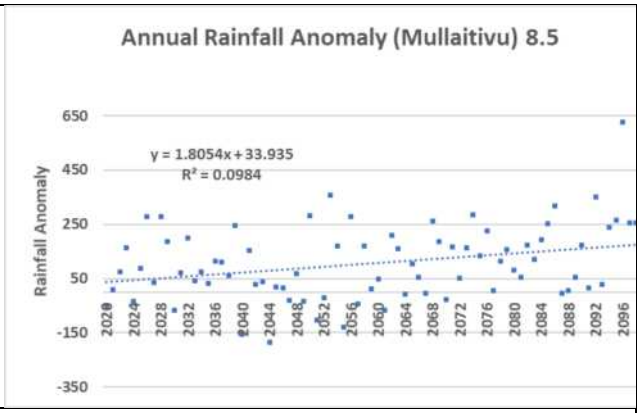
(e) Annual Rainfall anomaly (Mannar) RCP 4.5



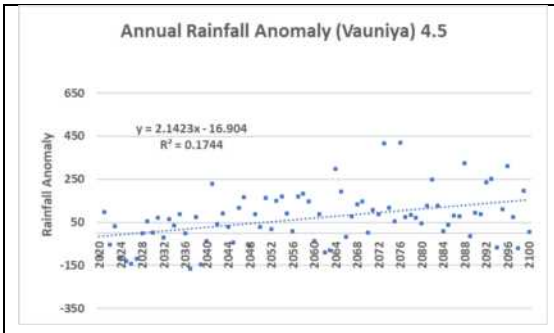
(f) Annual Rainfall anomaly (Mannar) RCP 8.5



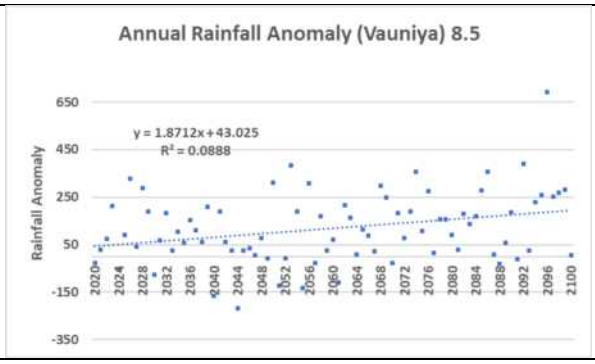
(g) Annual Rainfall anomaly (Mullaitivu) RCP 4.5



(h) Annual Rainfall anomaly (Mullaitivu) RCP 8.5



(i) Annual Rainfall anomaly (Vauniya) RCP 4.5



(j) Annual Rainfall anomaly (Vauniya) RCP 8.5

Figure 8: Annual rainfall anomalies in districts of Jaffna, Kilinochchi, Mannar, Mullaitivu and Vauniya under RCPs 4.5 and 8.5 (Data Source: S. Premalal, 2022)

Apart from droughts, seawater intrusion is common in Jaffna peninsula and Mannar (Climate Change Secretariat, 2010). Based on a range of sea level rise scenarios, the total land area of the Jaffna Peninsula directly inundated will be 6.8–13 % by 2050, rising to 10–35 % by 2100). The locations closest to the lagoons and nearby islands have been identified as the most vulnerable areas to sea level rise by Gopalakrishnan and Kumar (2020).

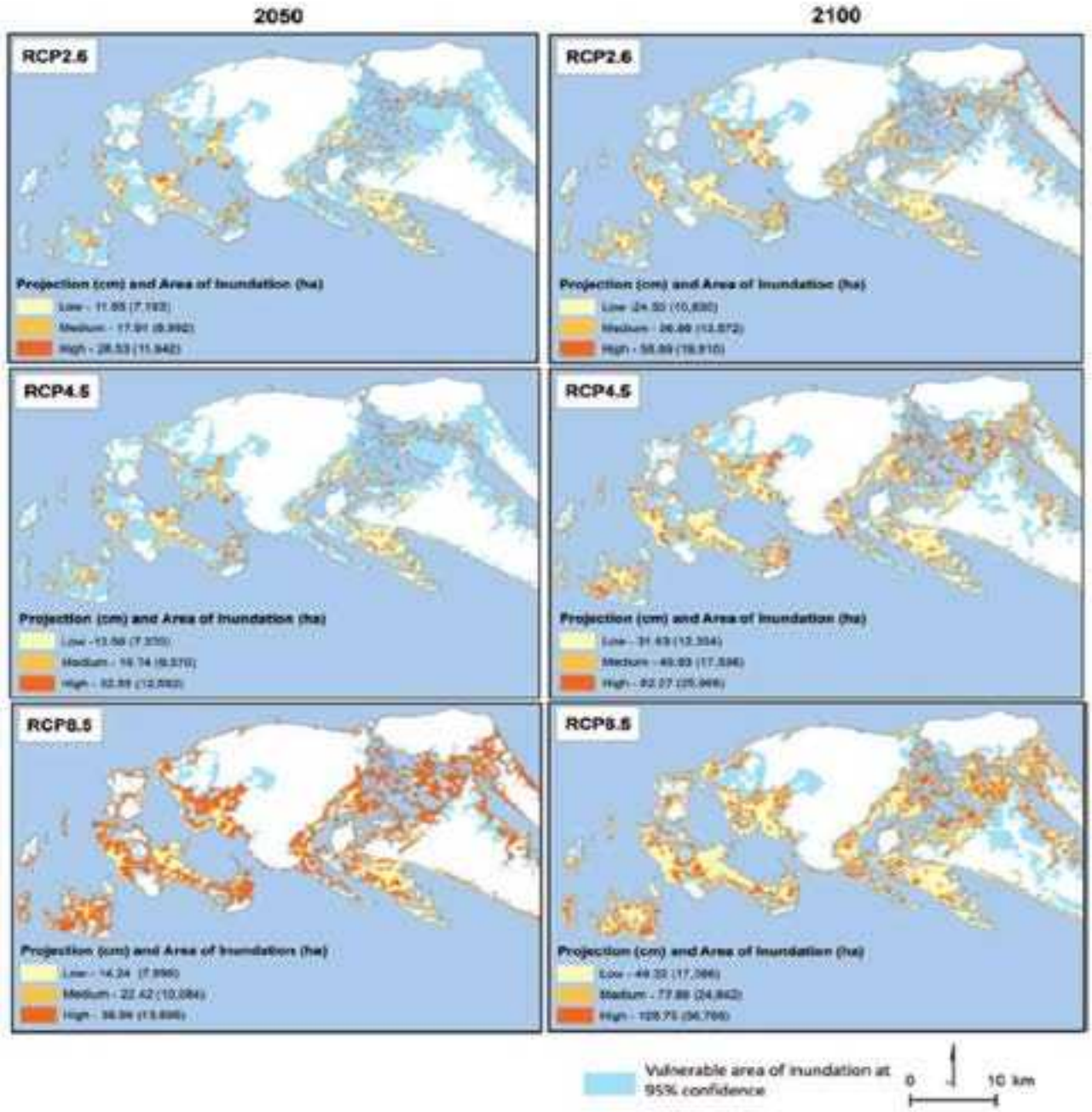


Figure 9: Potentially inundated areas due to sea-level rise under Representative Concentration Pathway (RCP) scenarios 2.6, 4.5, and 8.5, showing low, medium, and high projections by 2050 and 2100. Under medium projections, light blue denotes areas of uncertainty linked with delineations (source: Gopalakrishnan & Kumar, 2020).

Infiltration of seawater raises salinity levels in the surface, ground, and soil. Salinity levels in lagoons are rising, affecting marine fish breeding grounds and habitats, resulting in lower catch quantity and quality, as well as negative consequences for fishery livelihoods (Eeswaran, 2018). Saltwater intrusion and mixing with groundwater have been happening for a long period of time in the Jaffna Peninsula, affecting agriculture and other livelihoods of the inhabitants (Gopala and Kumar, 2020).

Frequent droughts and flooding could impact farming of sea cucumber and sea weed through resulting high temperature and shallow sea water due to evapotranspiration during droughts (Handisyde et al., 2014), and reduced salinity and unfavorable conditions due to flooding.

Owing to land loss due to floods and erosion, sea level rise will have a significant impact on fisheries and aquaculture. Mangroves and salt marshes may be lost with increasing sea levels (Kibria et al., 2017). It is possible that groundwater will get salinized, limiting the amount of freshwater available for aquaculture (Handisyde et al., 2014). Also, storm surges may become more powerful (Figure 10; more detailed maps could be found at http://www.dmc.gov.lk/images/hazard/hazard/Hazard%20Profile%20Maps%20-%20Low%20Resolution/Storm%20Surge/) as a result of rising sea levels and the loss of natural defenses such as mangroves and coral reefs. Structures used for shellfish production such as cages and platforms may be damaged by high winds and waves (Handisyde et al., 2014), which can cause serious financial consequences for aquaculture. Therefore, necessary adaptation measures need to be taken.

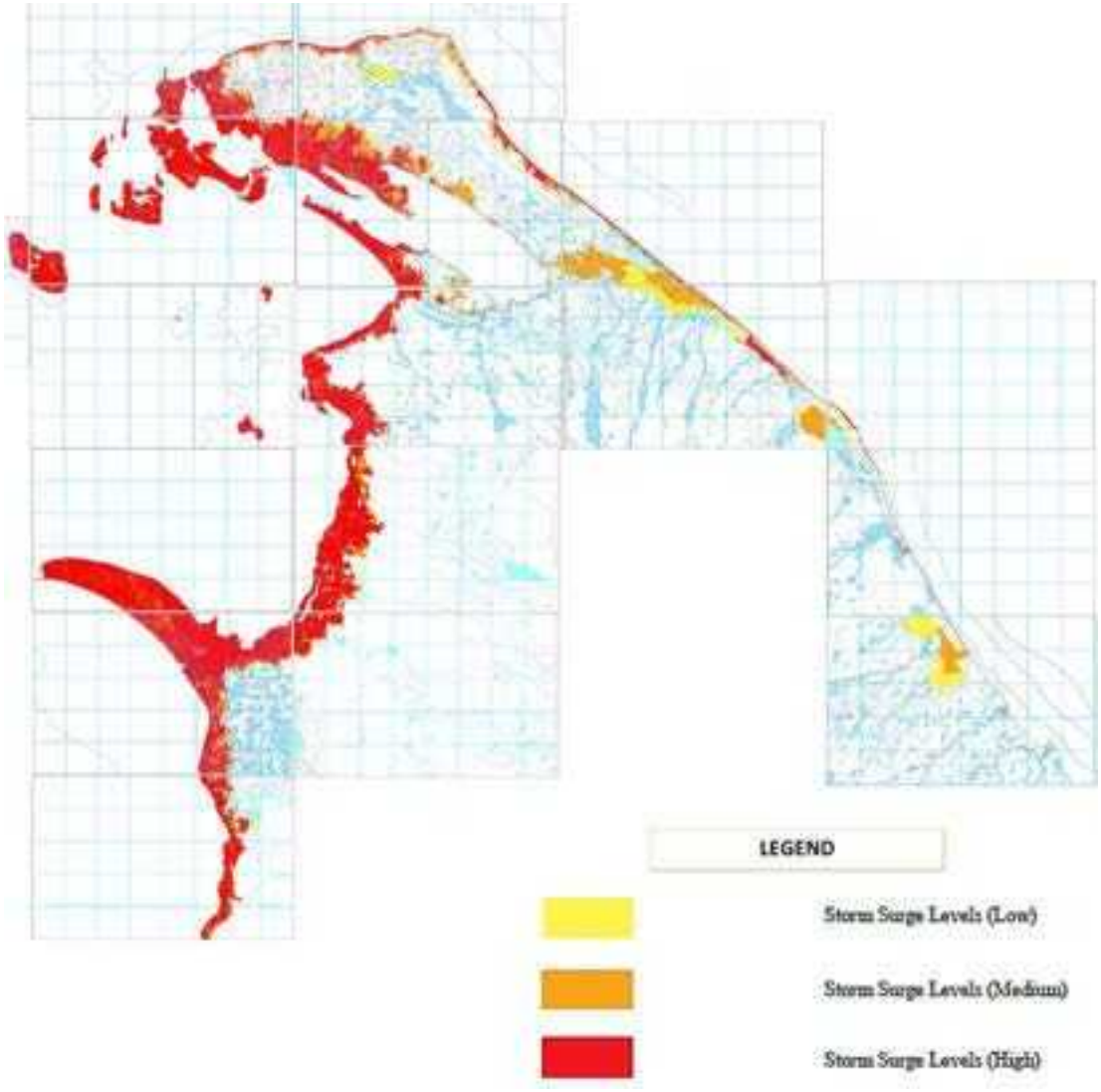


Figure 10: Storm surge inundation in Northern Province based on a static projection of storm surge levels near shoreline (Source: Maps of storm surges (wind speed = 270 km/h) published by Coastal Research and Design, Coast Conservation and Coastal Resource Management with the assistance from Disaster Management Centre, Sri Lanka, May 2012)

The human, natural, financial, social, and physical assets that make up the livelihood framework can be related to climate change consequences on aquaculture communities (Badjeck, 2004). The indirect effects of Climate change on aquaculture might be subtle, complicated, and difficult to detect or measure. Impacts can occur at different scales, from local to global, and community-level research will almost certainly be required to unravel the mechanisms involved (Handisyde et al., 2014).

Mitigation and adaptation may aid in preparing for climate change and dealing with it as effectively and efficiently as possible (Maulu et al., 2021). Producers and other stakeholders in aquaculture may be able to play a substantial role in mitigating the consequences of climate change by making appropriate modifications to production techniques targeting a reduction of GHG emissions. This includes techniques and technologies that are ecologically beneficial, such as solar energy and sustainable wastewater treatment (Barange et al., 2018; VGREEN, 2012), and silvo-aquaculture practices, etc. Because mitigation is a long-term strategy, it is recommended that it be used in tandem with adaptation measures for the best and most effective effects (IPCC, 2019).

Because the effects of climate change on aquaculture vary by region, adaptation is not a one-size-fits-all solution. According to the IPCC (2019), successful adaptation in a changing climate will be determined by the ability of producers in a specific country or region. Livelihood diversification (Bell et al., 2013; Zolnikov, 2019), shifting to less vulnerable or more resilient species and techniques (Sae-Lim et al., 2017; Dabbadie et al., 2018), enhancing the effective management of aquaculture farms and practices to deal with extreme weather conditions, utilization of local and indigenous knowledge (Makondo & Thomas, 2018), introduction and promotion of insurance schemes among the aquaculture farmers, especially small-scale farmers (Barange et al., 2018), are some globally used climate change adaptation solutions for aquaculture, which were also suggested by some stakeholders during the stakeholder meeting.

Developing general adaptive capacity to assist the impoverished aquaculture communities is crucial in dealing with new challenges and difficulties due to negative impacts of climate change on aquaculture. The methodology provided under 8.4 was useful in identifying and evaluating potential impacts on aquaculture in Northern provincial areas in line with the planned activities. The most potential direct and indirect impacts at site- level, farmers' adaptive capacity, and potential adaptive measures were determined in consultation with the farming community, aquaculture experts, and the officials from the relevant stakeholder organizations (DMC etc).

8.3 Potential contributions to greenhouse gas emissions

Aquaculture sector is a relatively low greenhouse gas emitting sector, and so far, no emissions have been estimated or specific mitigation action has been planned for this sector within the country. Globally, the aquaculture sector contributed 0.49 percent of anthropogenic greenhouse gas (GHG) emissions in 2017 (The World Fish Center, 2019). Managing impacts and greenhouse gas emissions leading to climate change should be given due consideration in the Plan. For instance, under drought conditions that cause high evapotranspiration and salinity intrusion, getting the required freshwater supply for shrimp farming, etc., could be costly and energy consuming, leading to increased levels of greenhouse gas emissions; appropriate adaptation measures with mitigation co-benefits are required in such cases.

Aquaculture feed production is also regarded as the sector's largest source of greenhouse gas emissions (VGREEN, 2012). The existing shrimp farms mostly use Recycling Aquaculture System (RAS) that does not require fish feed addition; however, if feed is required in the future, it should be carefully planned to minimize any emissions associated with feed utilization. The types of feed may vary based on the culture species, and according to VGREEN (2012), sinking food has a slightly lower global warming potential, compared to floating feed.

The existing coastal and marine ecosystems in the Northern Province have a high carbon density in their vegetation and soil. Any clearing of such important areas could lead to the release of stored carbon as carbon dioxide emissions, causing positive feedback on climate change. The potential emissions and mitigation action for any greenhouse gas emissions are dealt with under methodologies described below as well.

8.4 Methodology to Evaluate Climate Change related Impacts

As the first step, a preliminary scan was carried out by the team members during the scoping study. Existing literature on the Sri Lankan aquaculture industry (existing policies, laws, regulations and reports on institutional capacity) and the proposed NAQDA /Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP; 2021-2025) were critically reviewed. The proposed plan was specifically reviewed with a view to identifying the types/sectors of aquaculture and culture-based fisheries that are targeted and any potential emission of greenhouse gases and climate risks associated with any of the planned activities.

At the end of the preliminary scan, key stakeholders were identified. As the second step, stakeholders' views on identified key issues related to climate vulnerability and greenhouse gas emissions and their concerns regarding implementing the proposed plan were discussed. More national and provincial level stakeholders will be consulted during the SEA study.

Based on the information obtained through the first and second steps, potential climate risks of implementing the plan and potential emissions of greenhouse gases were documented. The flow diagram in Figure 11 was used to identify the direct and indirect potentials of greenhouse gas emissions.

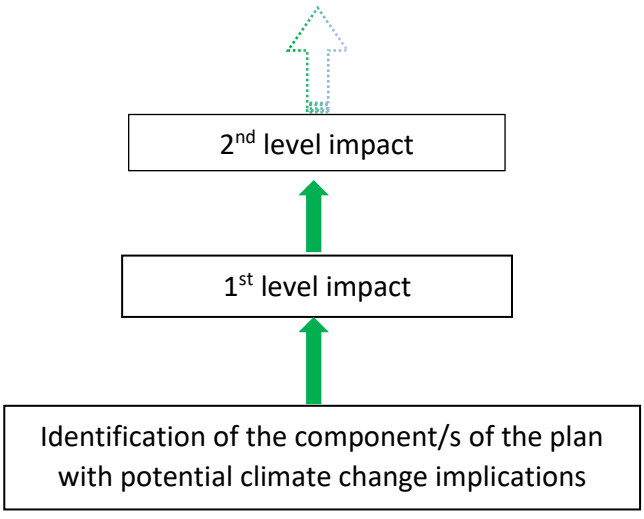


Figure 11: Flow Diagram for Prioritization of potential GHG emissions

Prioritization of the risks and identifying the most severe and immediate climate change consequences was done through survey methods of collecting opinions and discussing the listed potential climate risks at stakeholder meetings.

After prioritization of potential impacts of the plan on greenhouse gas emissions and potential climate risks in implementing the plan, solutions for major issues and challenges will be suggested after consulting the stakeholders who have the required background knowledge on climate mitigation and adaptation strategies. Also, the involvement of stakeholders who have an in-depth knowledge on institutional capacity is crucial as it should be considered at the point of implementing the recommendations and addressing the identified gaps (In deciding on the institutional capacity, SWOT analysis will be helpful).

The required information was obtained from the relevant stakeholders (DMC, CC&CRMD, Department of Meteorology etc.) during the scoping study. Further necessary inputs were added using the existing literature on aquaculture and climate risk management and climate action and identified major gaps are listed below.

- A proper database should be developed with consistent measurements and data on parameters such as sea surface temperature and sea level rise, etc., in evaluating the climate change impacts on implementation of the proposed plan, as currently such measurements are at a preliminary stage. The existing predictions for the future climate/s in the northern province (as described above) need to be further confirmed through more research and modeling activities.
- According to the consulted stakeholder agencies such as Coast Conservation and Coastal Resources Management Department (CC&CRMD) and NARA, no proper sea level recording has been done in the Northern province so far; currently sea level is monitored using automated tide gauges established by NARA in Trincomalee, Kirinda, Colombo and Mirissa to cover the entire country; the data from these stations are superimposed with satellite data in predicting the sea level rise. A tide station will be established soon in Point-Pedro by NARA, which is still under construction.
- Climate sensitive areas need to be well defined and demarcated considering the impacts from sea level rise, floods, and droughts so that extra precautionary measures can be taken in implementing developmental activities including those under the proposed plan
- Due to lack of data, the emission-related activities need to be further investigated during the implementation of the proposed plan as well
- Research on assessing the vulnerability and impact of climate change on estuaries and lagoons, coral reefs, and coastal wetlands is needed
- Further research on quantification of the carbon stocks in the coastal and marine ecosystems in the Northern Province is needed to evaluate their role in carbon sequestration and climate change mitigation

8.5 National Climate change policy objectives to be considered when implementing the proposed ACBFSDP (2021-2025)

Sri Lanka as a member country of the United Nations Framework Convention on Climate Change (UNFCCC), ratified the Paris Agreement in September 2016. In line with the commitment under

the Paris Agreement, the country updated and submitted its nationally determined contributions (NDCs; Ministry of Environment, 2021) to the UNFCCC Secretariat in July 2021.

The NDCs of Sri Lanka have been developed by the Climate Change Secretariat of the Ministry of Environment, with the involvement of sector-specific experts and stakeholders from the respective institutes. The NDC's highlight the country's plans for a low-carbon future, emphasizing on its commitment to increase the forest cover of the country to 32 percent by 2030 and reduce greenhouse emissions from electricity generation, Transport, Industry, Waste, Forestry, and Agriculture sectors by 14.5% during the period of 2021-2030.

NDC's detail on the country's sector-wise climate change mitigation commitments and adaptation needs, loss and damage, and means of implementation. The report on the NDC's provide details on the measures required for achieving the said low-carbon developmental targets and information on the institutional framework required for implementation, while stressing the need for having external support for finances, technology transfer, and capacity building. A summary of the NDC's in the Fisheries sector, including aquaculture, are provided in Table 10 below. A number of actions have been planned under each NDC (Ministry of Environment, 2021).

The current SEA will take the planned NDC's into consideration in developing its impact assessment and evaluation criteria. As long as due consideration is given to safeguard mangrove areas and other coastal areas with minimum destruction, it would aid successful implementation of the proposed plan.

Table 10: Nationally determined contributions in Fisheries sector
(Ministry of Environment, 2021)

NDC	Target year
Ecosystem-based Approach to Fisheries Management (EAFM) adopted in areas of high climate vulnerability to enhance resilience	2030
Expand aquaculture and culture-based fisheries to address food security issues relating to climate change	2025
Breeding of climate change resilient and commercially important aquatic resources	2025
Increase the production capabilities of fisheries, aquatic resources in 30 lagoons that are highly vulnerable to climate change	2030
Enhanced safety at sea against climate change influenced extreme conditions	2025
Diversification of livelihoods of fisher folk to build resilience to climate change	2025
Conduct fisheries and aquatic resources research to build resilience to climate change	2030

Promoting mangrove cultivation and seaweed farming mentioned under the proposed plan by NAQDA can be considered for Ecosystem-based Approach to Fisheries Management (EAFM) in the highly vulnerable areas, in line with the above NDC1. In line with the above NDC s, climate resilient infrastructure should be built in project sites that are more sensitive to climate change.

Such efforts will help avoid future economic losses due to unfavorable climate change as consequences of the intended activities, including those under the proposed plan.

The Aquaculture and Environment Unit/Division, which is planned to be established, could consider the above NDCs and take appropriate actions to minimize GHG emissions from the project activities while promoting climate adaptation strategies.

National adaptation plan for climate change impacts in Sri Lanka 2016-2025 to be implemented by the Climate Change Secretariat of the Ministry of Environment, incorporates strategies for adaptation in important vulnerable economic sectors; nine sectors including coastal and marine sector have been identified. Under the coastal and marine sector, the following have been considered as the priority actions: Implement a continuous programme for monitoring shoreline changes; Develop shoreline management plans including M&E programmes; Study impacts of sea level rise on costal habitats over short, medium, and long-term horizons: Identify, declare, collect information and prepare maps on vulnerable areas to extreme events and inundation; Conduct awareness programmes on sea level rise and extreme events to coastal communities to empower them for facing the risks of climate change.

The action plan for the coastal and marine sector includes a range of adaptation options including Initiation of research and a monitoring system relevant to sea level rise, strengthening the coastal protection and management, Participatory management of sensitive coastal habitats, and Improvement of disaster risk preparedness and management. When substantial attention is given on such effective climate adaptation and enhancing climate resilience, it will be possible to implement the planned aquaculture practices at suitable site/s chosen under the proposed plan by NAQDA.

8.6 Key opportunities for the NAQDA plan to make a significant contribution to environmental sustainability, climate resilience, low carbon development in the Northern Province

Availability of considerable aquatic resource base of freshwater, brackish water, maritime and coastal resources is required for aquaculture. According to the Northern ISEA the percent of “opportunity areas” between districts varied: Jaffna (74%), Kilinochchi and Vavuniya (approximately 46% each), Mannar (34%) and Mullaitivu (23%), indicating different levels of intensity for potential development of all sectors. Hence aquaculture zoning plan could be developed with environmental sustainability.

Aquaculture can contribute towards achieving several Sustainable Development Goals (SDGs).

Aquaculture itself presents significant opportunities for tourism (aqua-based tourism) hence the plan could be utilized for ensuring integrated development.

Availability of opportunities to develop organic aquaculture, certified and labelled aquaculture products.

The plan seeks to address both human and ecological well-being thus combining two concepts: that of conserving biodiversity, ecosystem structure and functioning, and that of fisheries management dealing with provision of food, income and livelihoods for humans.

According to the NAQDA plan, seaweed farming will be facilitated around Jaffna lagoon and islands. By absorbing carbon emissions, rebuilding marine ecosystems, producing biofuel and recyclable plastics, and providing marine protein, seaweed can play a significant role in combating climate change. According to Mashoreng et al. (2019), maricultural seaweed could sequester 57.64 tons CO_2/ha/year whereas pond-cultured seaweed could sequester 12.38 tons CO_2/ha/year. Establishing an environmental unit/center will be an advantage in order to closely monitor and quantifying project associated GHG emissions. It has been planned to increase production by establishing large farms, giving the opportunity for foreign and local investors. However, the consulted stakeholders had the opinion that the opportunity should be given to small scale and local farmers, as there is a tendency for having more migrant fishers from other areas. Seaweed farming can also provide habitats for fish and help mitigate local effects of ocean acidification, in addition to its role in sequestering Carbon. It is also beneficial in many other ways, as it does not depend on inputs such as fish feed or antibiotics that can have negative impacts on local ecosystems, as found with other forms of aquaculture.

Organic fertilizer production has been indicated under the key results given for the usage of sedimentation tanks in shrimp aquaculture (Table 24, ACBFSDP (2021-2025). This can be considered as one of the climate friendly activities, as Nitrogen fertilizers are not used. Nitrogen fertilizers release Nitrous Oxide which has a much higher global warming potential compared to Carbon Dioxide.

The proposed environmental unit can closely monitor and evaluate low carbon opportunities among the farmers. The overall greenhouse gas emissions at farm level can be calculated considering the Carbon Dioxide (CO_2) emissions in energy usage, including lighting, pumping water, and transportation (i.e. feed transportation and any other transportation) and any Carbon sequestration in any associated plants, including mangroves, and emissions associated with the use of organic fertilizer, need to be estimated in promoting low carbon measures.

9 Specific impact identification and evaluation methodologies to be used in the SEA study

9.1 Methodology to Evaluate Ecological Impacts

Impacts from Aquaculture include the effects on the ecosystems around the sites, effects on other ecosystem components as well as external drivers impact on aquaculture.

Ecological assessment can provide information on ecological issues related to the aquaculture process, considering inputs, resource use and outputs. Often these issues have a related social problem and hard to disintegrate and it is needed to look at impacts with holistic approach.

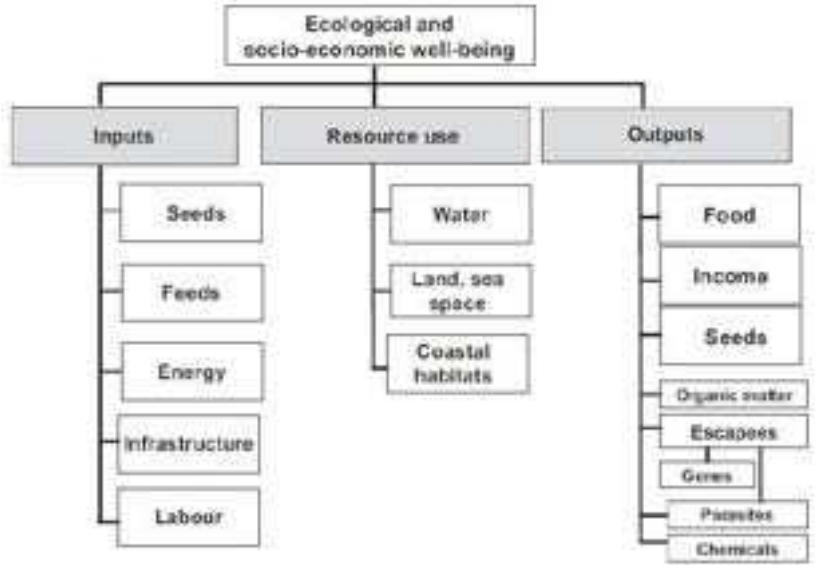


Figure 12: A flow chart to identify typical ecological and socio-economic issues related to different parts of the aquaculture production process (Source: FAO, 2010)

9.1.1 Known negative ecological impacts of aquaculture

Negative impacts may cause on ecological environment during the following activities associated with Coastal aquaculture farming.

- Alteration of coastal and inland habitats for aquaculture pond construction
- Release of chemicals used for water quality and disease control
- Enrichment of nutrient and organic matter and potential eutrophication of recipient waters
- Effects from escaped culture species on natural ecosystems
- Potential spread of non-native (exotic) species
- Biofouling on submerged structures
- Potential interaction with other livelihoods such as traditional fisheries, agriculture etc.
- Increase use of wild small pelagics for fish meal/oil for feed production
- Unsustainable demand for wild seed or juveniles for fattening crabs, sea cucumber etc.

9.1.2 Prioritizing the issues

Among the large number of issues known for aquaculture, their importance may vary greatly within local context as well as culture methods.

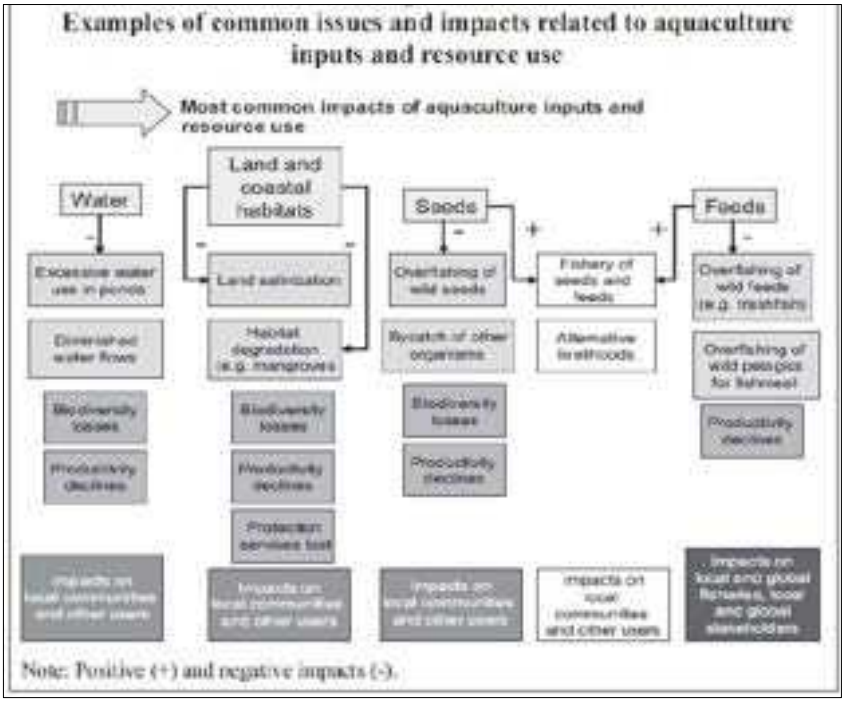


Figure 13: Most Common impacts of aquaculture inputs and resource use

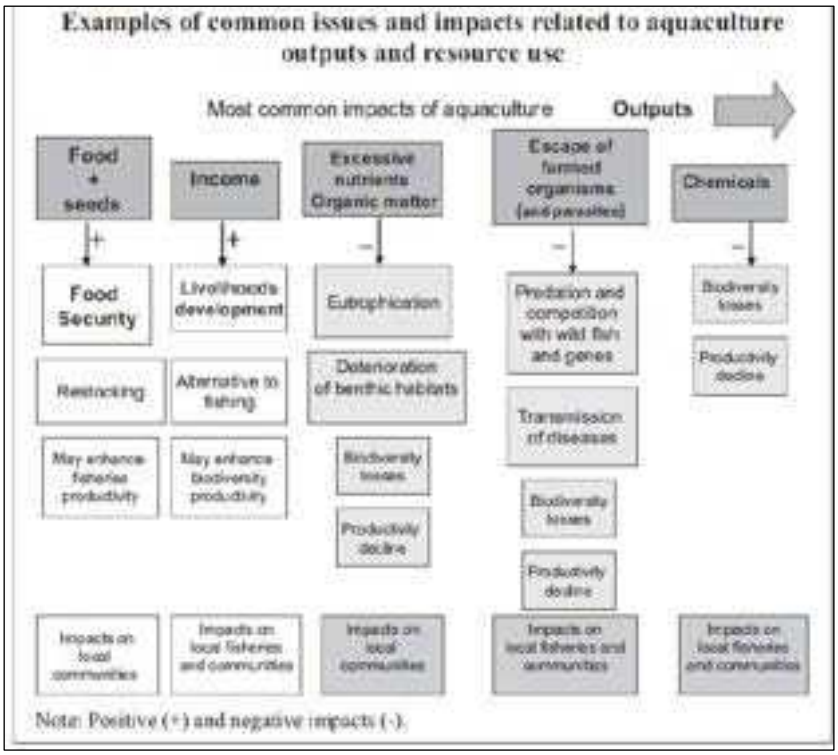


Figure 14: Most Commonly known impacts of aquaculture Outputs

Interactive matrices will be used to identify the significant impacts among all the potential impacts that would have from the proposed plan from the available information, expert discussions and stakeholder involvements.

In addition, some key elements that can be used for assessing the significance of impacts include:

- Measure of relative disturbance to ecological systems
- Scientific and professional judgments
- Level of public concern
- Existence of environmental standards; as well as international, national, and/or local agreements, etc.

9.1.3 Spatial assessment of interactions between aquaculture and environmentally sensitive areas

Environmentally sensitive area maps will be overlaid on the study area maps, allowing the SEA team to recognize the distribution of features within the study area. In order to accomplish this, GIS-based maps will be used.

Other important information such as present fisheries and aquaculture practices maps, etc., will also considered. In addition, linkages between major impacts/ pressures on each sensitive environments from each aquaculture production systems in the plan will be considered.

9.1.4 Initial identification/classification of ecologically sensitive habitats

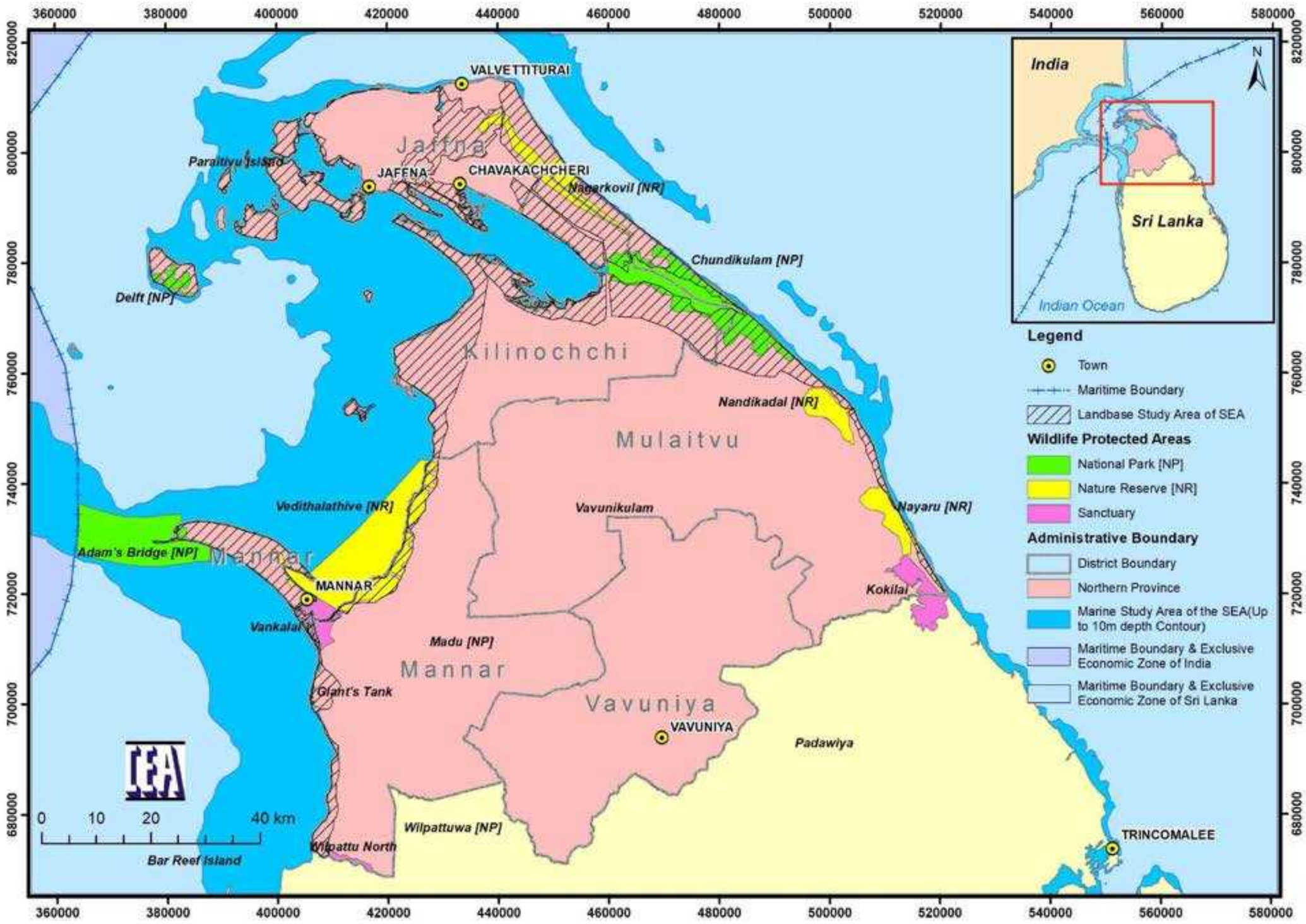
All the existing and proposed/planned coastal and marine habitats within the study area of the present development plan would be concerned for availability of any of the following ecologically sensitive ecosystems.

- Wild life Conservation areas (Sanctuaries, National Parks, Nature Reserves)
- Forest Reserves
- Reefs (Coral, sandstone and other reefs)
- Sea grass beds
- Mangroves
- Saltmarshes
- Sand dunes

9.1.4.1 Wild life Conservation areas

SEA team consulted DWC to obtain the details of wildlife conservation areas located within the SEA study area and an updated map was prepared.

A map showing the Wildlife Conservation Areas (Sanctuaries, Nature Reserves and National parks) declared by DWC located within the SEA Study Area is given below.



Map 03: Map showing the Wildlife Conservation Areas (Sanctuaries, Nature Reserves and National parks) declared by DWC located within the Study Area

National Parks, Reserves and Sanctuaries located within the SEA study area are given in Table 11 below;

Table 11: Declared Wildlife Protection Areas located within the SEA study area

No.	National Park/ Reserve/ Sanctuary	District	Area	Declared Year
National Parks				
01	Adam's Bridge Marine National Park	Mannar District	18,990 ha	2015
02	Chundikulam National Park	Kilinochchi District	19,565.33 ha	2015
03	Delft National Park	Jaffna District	1,846.28 ha	2015
Sanctuaries				
04	Vankalai Sanctuary (Vankellei)	Mannar district	4839 ha	2008
05	Kokilai Sanctuary	Mullaitivu District	1995 ha	1951
06	Wilpattu North Sanctuary	Mannar District	632 ha	1938
07	Paraitivu Island Sanctuary	Jaffna District	97.10 ha	1973
Nature Reserves				
08	Nayaru Nature Reserve	Mullaitivu District	4,464.35ha	2017
09	Nandikadal Nature Reserve	Mullaitivu District	4,141.67ha	2017
10	Vidattalitivu Nature Reserve	Mannar District	29,180ha	2016
11	Nagar kovil Nature Reserve	Jaffna District	7,882 ha	2016

(Source- Department of Wildlife Conservation,2021)

9.1.4.2 Forest Reserves

SEA team consulted Forest Department to obtain the details of gazetted Forest Reserves as well as proposed Forest Reserves and an updated map was prepared.

Declared/gazetted Forest reserves located within the SEA Study area are presented in the Table 12 below.

Table 12: Declared Forest reserves within the SEA Study area

No	Forest Reserve	District	Gazette No.	Gazetted date	Area (ha)
1	Kaudarimunai	Kilinochchi	2188/9	2020/08/10	75.69
2	Sarasale	Jaffna	2150/32	2019/11/20	1598.23
3	Chalai	Mulathivui	2150/28	2019/11/20	4559.25
4	Achcankulam	Mannar	2145/36	2019/10/16	1405.80
5	Thirukeshwaram	Mannar	2145/36	2019/10/16	328.02
6	Erukkulampiddi	Mannar	2145/36	2019/10/16	166.28
7	Munrampiddi	Mannar	2145/36	2019/10/16	517.42
8	Yakaraya	Jaffna	2145/35	2019/10/16	115.15
9	Pallikuda	Kilinochchi	2145/37	2019/10/16	239.88
10	Vedithalathivu	Mannar	1834/13	2013/10/28	501.92
11	Palakaimunai	Mannar	1834/13	2013/10/28	300.20
12	Mullikulam	Mannar	1757/2	2012/05/21	5283.77

No	Forest Reserve	District	Gazette No.	Gazetted date	Area (ha)
13	Ponnaveli	Kilinochchi	1757/2	2012/05/21	1638.14
14	Madduvilnadu	Kilinochchi	1757/2	2012/05/21	1765.22
15	Kumalamunai	Kilinochchi	No Data	No Data	1225.98
16	Kalaru Marichchikatti	Mannar	No Data	No Data	2480.10
17	Pirimandan aru	Kilinochchi	No Data	No Data	962.43
18	Mandakalr	Kilinochchi	No Data	No Data	8355.88
19	Nagapaduwan	Kilinochchi	No Data	No Data	4025.93
20	Pallai	Kilinochchi	No Data	No Data	424.86

(Source- Forest Department, 2021)

Proposed/To be gazetted Forest reserves located within the SEA Study area are presented in the Table 13 below.

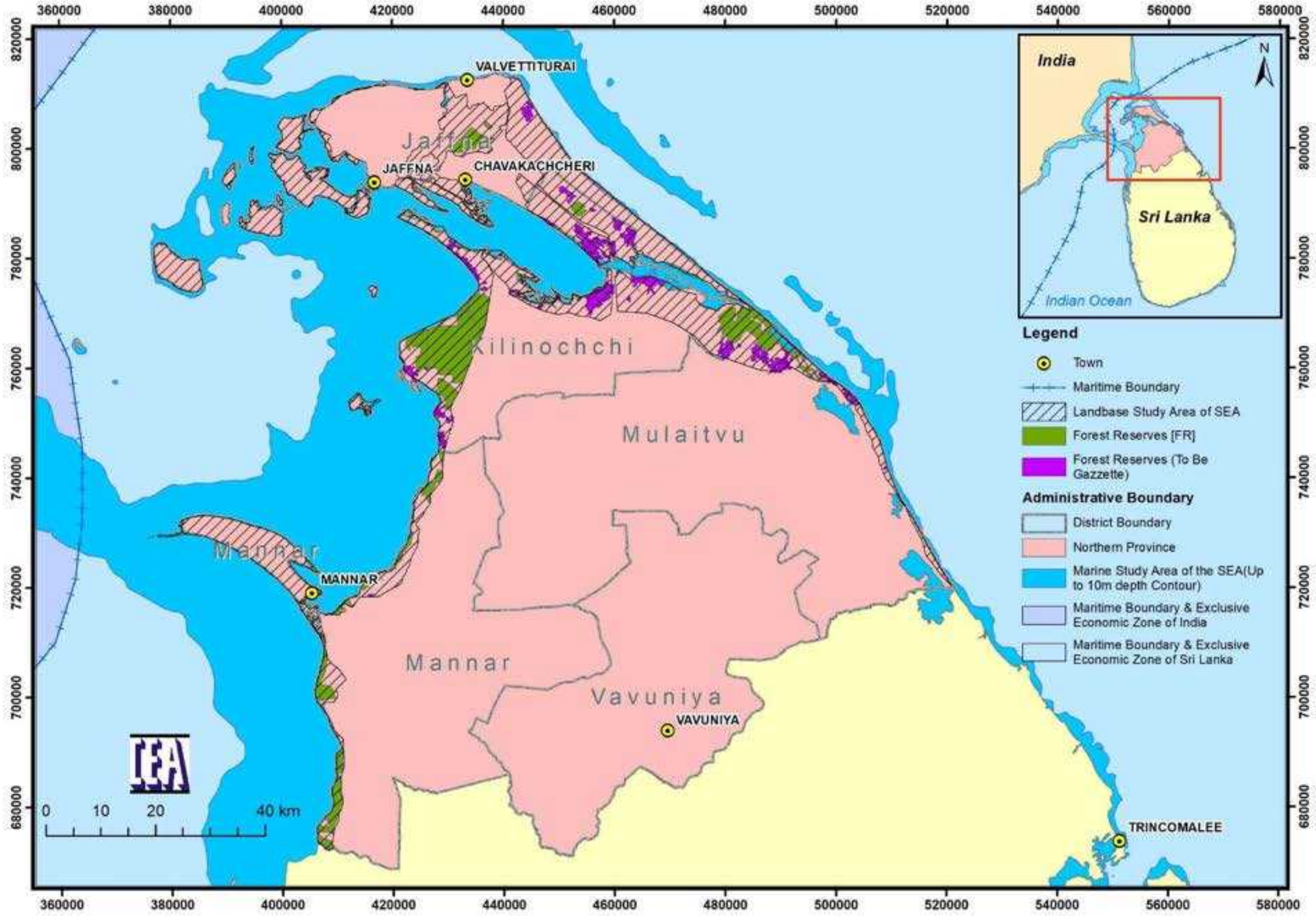
Table 13: Proposed Forest reserves (To be gazetted) within the SEA study area

No	Forest Reserve	District	Area (ha)
1	Kovilwayal	Killinochchi	1.707
2	Aiyaweli	Killinochchi	0.160
3	Veddukkadu	Killinochchi	1.401
4	Manalkadu	Killinochchi	0.624
5	Muhavil	Killinochchi	2.373
6	Aiyaweli	Killinochchi	0.536
7	Kiranchi	Killinochchi	0.299
8	Danduwannochchi	Killinochchi	0.270
9	Weerawandiyalmunai	Killinochchi	2.431
10	Nochchimunei	Killinochchi	2.008
11	Waleippadu	Killinochchi	0.232
12	Wadali Aru	Killinochchi	0.021
13	Murusamodei	Killinochchi	0.206
14	puwaliyam Wayalam	Killinochchi	0.918
15	Alimankada	Killinochchi	0.119
16	Maduvilnadu west	Killinochchi	3.624
17	Pninrakulam	Killinochchi	11.778
18	Pallikuda	Killinochchi	0.162
19	Weemanthelleithivu Reserve	Mannar	0.221
20	Arippu	Mannar	0.078
21	Widaththelleithivu	Mannar	0.012
22	Irattamadu	Mulathivu	0.141
23	Kewepuram pekulam	Mulathivu	1.988
24	Kewepuram A	Mulathivu	6.296
25	Keewepuram	Mulathivu	0.063
26	Iranapalei	Mulathivu	0.671
27	Thimbiliya	Mulathivu	0.096

No	Forest Reserve	District	Area (ha)
28	Akapilo	Mulathivu	0.184
29	Mongilaru North	Mulathivu	0.103
30	Irattamadu	Mulathivu	0.423
31	Pudumathalan	Mulathivu	1.360
32	Mulliwaikkal	Mulathivu	1.708
33	Almpil	Mulathivu	0.122
34	PiramandanAru	Mulathivu	0.051
35	Sundaranpuram	Mulathivu	6.759
36	Pudumathalan	Mulathivu	0.098
37	Almpil	Mulathivu	0.039
38	Ammalawonpokkanei	Mulathivu	0.174
39	Daduwalkoddi	Killinochchi	7.882
40	Mandalkadu	Killinochchi	3.932
41	To be named	Killinochchi	22.807
42	To be named	Mulathivu	0.170

(Source- Forest Department, 2021)

A map showing those gazetted Forest Reserves as well as proposed Forest Reserves within the SEA study area is given below.



Map 04: Map showing the declared and proposed (To be gazetted) Forest Reserves located within the Study Area

9.1.4.3 Special Management Areas declared by CC & CRMD

According to the Coastal Zone Management Plan(CZMP)(2018), areas within or adjacent to the coastal zone are declared as a "Special Management Area" in order to plan resource management within the area. Procedure for designation and institutionalization of Special Management Areas (SMA) are also given in CZMP(2018). The objective of this SMA plan was to ensure sustenance of the natural resources of the coastal ecosystem while optimizing the social wellbeing of the communities residing in the Special Management Area.

List of sites in the Northern Province to be declared as Special Management Areas under the legal provisions of the Coast Conservation & Coastal Resource Management Act are given in the table below.

Table 14: List of sites in the Northern Province to be declared as Special Management Areas

District	Special Management Area
Jaffna	Manalkadu Dunes
	Jaffna Estuary (town area)
	Thondaimanaru Lagoon
	Kankesanthurai and Keeramalai coastal area
	Mandativu, Delft, Nainativu Islands
	Karainagar (including Casuarina beach) coastal area
	Navali Coastal Area
Mullaitivu	Nanthikadal Lagoon
	Nai Aru Estuary
Mannar	Gulf of Mannar
	Thalaimannar coastal area
	Sillavathurai, Arippu and Aruvi Aru coastal area and Bay of Kondachchi
	Veditaltivu coral reef and associated ecosystem

(Source: Coastal Zone Management Plan, 2018)

However, these Special Management Areas are not yet mapped by CC & CRMD. SEA team will obtain the physical boundaries of these areas from CC & CRMD in order to prepare a GIS based map.

9.2 Methodology to Evaluate Coastal and Hydrology Impacts

9.2.1 Evaluation methodology for the coastal riverine hydrology

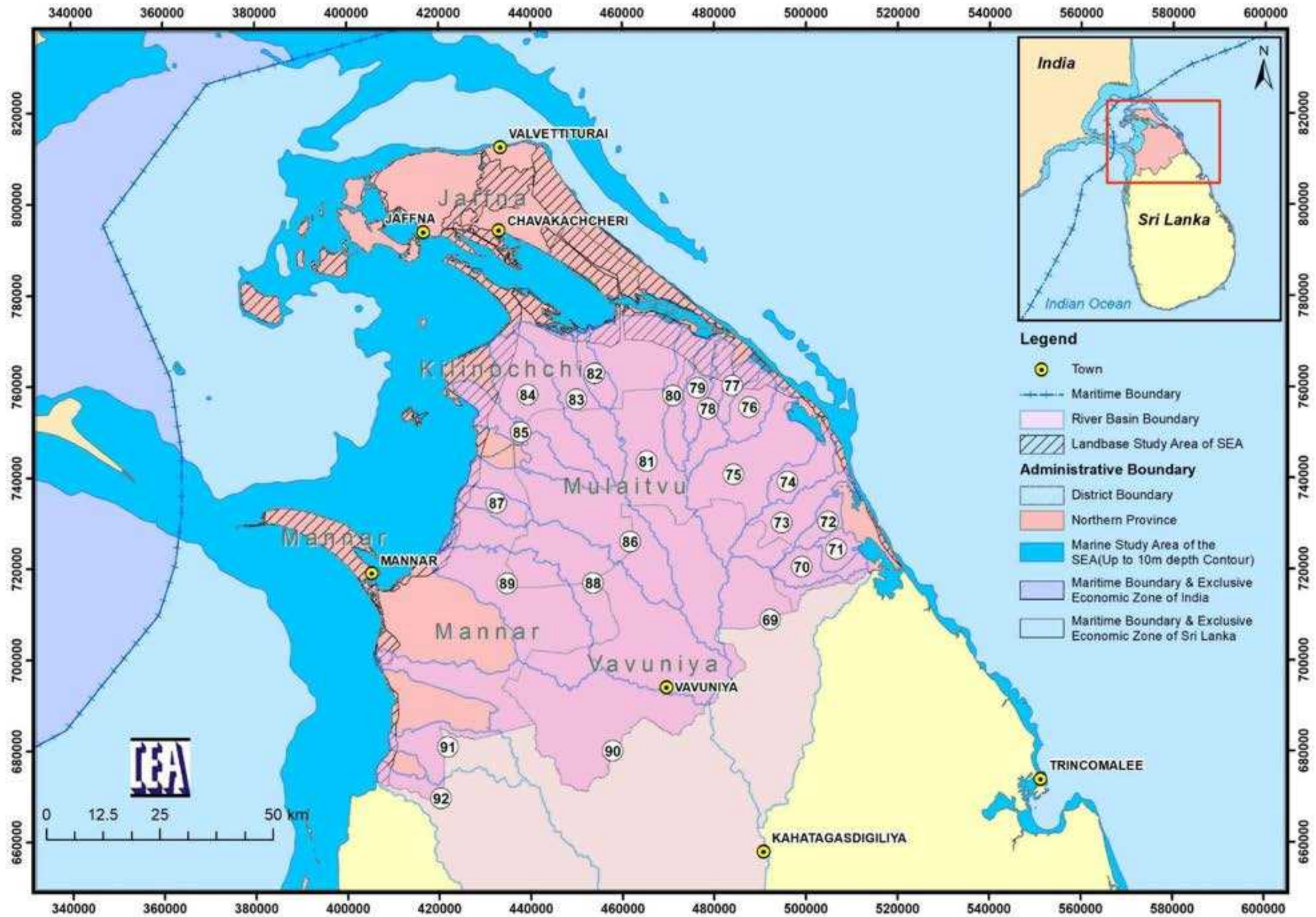
Freshwater flow of rivers into the coastal areas play a major role in coastal fisheries. There are 24 river basins in the Northern province. In addition, the Jaffna peninsula, Islands, and some coastal areas do not have streams but drain into the sea through many minor creeks (Thonas) and to a limited extent, man-made drains.

Details of river basins located within Northern Province are presented in Table 15 below.

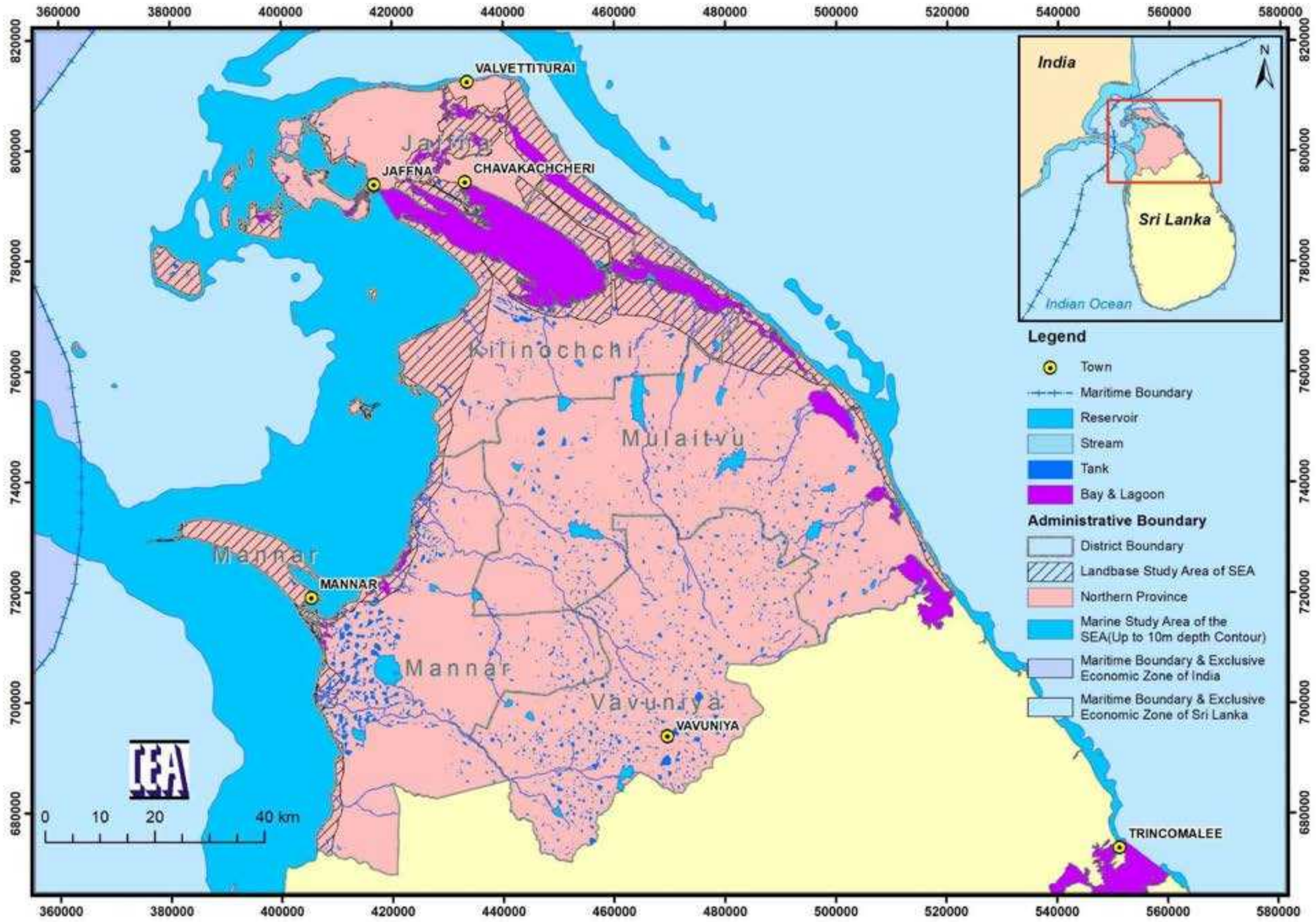
Table 15: Details of River basins in the Northern Province

No	Basin_ID	Name of the River Basin	Basin Area (in Sq.Km)	Area located within the SEA study area (in Sq.Km)	Intersection area as a percentage (%)
1	73	Nay Ara	209.93	2.04	0.97
2	81	Kanakarayan Ara	849.56	96.11	11.31
3	86	Pali Ara	483.56	13.23	2.74
4	88	Paranki Ara	850.10	14.42	1.70
5	89	Nay Ara	556.15	12.00	2.16
6	87	Chippi Ara & Punadi Ara	81.62	8.37	10.26
7	74	Kadalikkallu Ara	106.05	1.31	1.23
8	77	Maruthaiplly Ara	53.15	29.20	54.93
9	78	Theravil Ara	120.45	34.57	28.70
10	79	Peramantal Ara	93.32	29.57	31.69
11	80	Netheli Ara	133.35	31.50	23.62
12	83	Akkareyan Ara	265.57	11.03	4.15
13	82	Kalavalakku Ara	72.72	5.73	7.88
14	84	Mandekal Ara	332.45	46.58	14.01
15	85	Pullawanankadu Ara	170.25	45.50	26.73
16	90	Aruvi Ara	3187.05	9.18	0.29
17	91	Kal Ara	245.12	5.83	2.38
18	92	Modaragam Ara	1001.74	12.92	1.29
19	76	Pali Ara	106.32	16.23	15.26
20	75	Per Ara	461.33	3.99	0.87
21	69	Ma Oya	1032.95	0	0
22	70	Churiyan Ara	99.94	0	0
23	71	Chawar Ara	60.21	0	0
24	72	Paledi Ara	60.68	0	0

A map showing the river basins in Northern Province and a map showing the Lagoons, Streams, Rivers and other water bodies located within the Study Area are presented below.



Map 05: Map showing the river basins in Northern Province



Map 06: Map showing the Lagoons, Streams, Rivers and other water bodies located within the Northern Province and Study Area

Water balance for the two seasons; wet season - October to March and the dry season - April to September will be estimated to get an overview of the freshwater availability and its seasonal variability in each river basin. Seasonal average freshwater balance (inflow and outflow) in the river basins will be estimated using the long-term average seasonal rainfall data published by the Irrigation Department of Sri Lanka for different Agro-Ecological zones and the iso yield curves given in the Design of Irrigation Headworks for Small Catchments, Irrigation Department of Sri Lanka (Ponrajah A.J.P., 1984).

Long term trends in water availability in the river basins will be estimated by using monthly rainfall data over a long period at some selected rain gauges depending on the data availability. Representative rain gauges which are evenly spread out covering all the river basins will be selected for the analysis.

9.2.2 Evaluation methodology for the coastal morphological impacts

A qualitative analysis will be done on the morphological changes of the shoreline to identify the places where there is a potential for shoreline readjustment. Potential sediment transport rates will be read from the report of UNESCO-IHE and ADB, (2016); Comprehensive Modelling of Longshore Sediment Transport at Pesalai, Gurunagar, Point Pedro and Mullaitivu, Sri Lanka. In places where the sand transport rates are very high, potential for shoreline adjustments are high. However, to trigger a change in the sand movement, the beach or the nearshore area must be disturbed by a marine facility of the fish farms. At places where there is a potential for constructions on the beach will be identified through stakeholder consultations on the potential aquaculture development activities and the supporting facilities that require. Shoreline sections where there is a potential for irrecoverable changes will be flagged in the SEA which need to be avoided in future development activities.

9.2.3 Evaluation methodology for the impacts on the natural stormwater drainage

Constructions across the natural stormwater drainage paths, mainly the aquaculture ponds, pipelines, access roads, excavation material dumps etc. can block the flow passages and may lead to localized floods, water stagnation and water quality issues.

Possibilities of blocking the natural drainage paths need to be studied by overlaying the development plans on the natural drainage network using the maps and satellite images. However, it is learnt that the identification of potential aquaculture sites is still in progress and the site layout plans are not available. Therefore, through the maps, satellite images and stakeholder consultations, natural drainage paths within the SEA study area will be identified and the consequences of blocking them will be discussed and areas where there are no major drainage issues will be highlighted so that the proposed aquaculture sites can be planned.

9.3 Methodology to Evaluate Social and Cultural Impacts

The potential interaction of the proposed plan with the socio-economic sensitivities or receptors and the possible resulting impacts will be highlighted in the SEA report. The report also will prioritize those potential impacts in terms of their significance and provide key focus areas for

the specific sub-project level planning. The impact identification will consider all phases of the project; Project planning and land securing phase, Construction phase, and Operation Phase.

SEA study will adopt Impact-centered approaches for this SEA which is best fit to integrate social and environmental considerations in plans and programs where social and economic impacts and risks can be identified and predicted. The bulk of data will be derived from a review of the literature, including published and unpublished sources. Gaps identified during the literature review will be filled through field surveys. Semi-structured Interviews, expert group discussions, and community meetings will be conducted to solicit additional data while at the same time elucidating the secondary information. Also, the process will rely on a range of data and analysis techniques. The most crucial method will be to construct overlapping 'shape' files for each data set within the Geographic Information System (GIS). This will allow all data to be interrogated spatially to assess the performance of different land-use scenarios.

The critical social and cultural issues for the SEA to address are,

a. Impact on Capture Based Fishery
b. Impacts on Local Economy
c. Impacts on other non-formal resource utilization
d. Impacts on Land Use and Land Ownership
e. Impacts on agriculture
f. Labour Influx and Labour Welfare
g. Impacts on tourism and other industries
h. Impacts on Cultural Heritages and religious places
i. Impacts on Access Pathways and Roads

9.3.1 Establishing Socio-Economic Baseline of the study area

The latest "Resource Profile" reports of the Divisional Secretariats will be used to gather the primary socio-economic data of the Grama Niladari Divisions (GND) encountered within the study area. Special attention will be given to the data related to livelihood and income generation means and patterns, vulnerability, gender-related issues, living standards, inward and outward migration of people concerning aquaculture and fisheries, level of coastal resource exploitation and practice and presence of indigenous people.

9.3.2 Analyzing the socio-economic baseline data to predict the possible interaction/impacts of the development plan

A professional judgment about the sensitivity/vulnerability of the people toward the proposed plan will be made using these data. Demographic data including household characteristics, poverty indicators (Poverty head count index, No. of Samurdhi Beneficiaries etc.), key social groups (ethnicity, religious) will be analyzed to identify the social vulnerability of the population in the project area.

9.3.2.1 Impact on Capture based fishery

The GNDs with fishing as primary livelihood and significant fish catch is an indicator of the dependence of the people in capture-based fishing. The GNDs with fish landing sites and other infrastructure such as fish auction centres, and pre-processing or processing centres means a

greater extent of dependence on fishing. Inward migration of fishermen is also an important indicator to be considered.

The aquaculture should avoid the formal and non formal capture-based fishing ground to minimize the impact on capture based fishery. But such fishing grounds are yet to defined and mapped. Beach seine fishing, near shore fishing, marine fishing grounds, fishery landing sites and other fishery facilities have not been mapped. The SEA may see the possibility to undertake a mapping process with the support of the DFAR.

NAQDA has identified the aquaculture as an alternate source of livelihood for those capture based fishery to reduce the fishing effort and pressure. The initial site visits and consultation of the SEA team also identified the instances where the capture-based fisher carries out aquaculture within the fishing ground with the consent of their co-fishers. In this situation, a participatory mapping process would benefit all the stakeholders to identify suitable locations for aquaculture. The SEA will propose a guideline for a participatory mapping process to identity suitable locations in a way to reduce the impact on capture-based fishery.

9.3.3 Impacts on local economy

The positive and negative impacts of proposed plan over the local economy will be assessed through Focus Group Discussions and structured interviews with aquaculture farmers and capture-based fishers in the area.

The data on livelihood, employment, productivity and other industries will be used to predict the economic pattern of the area. The more the dependence of the economy on the resources which are sensitive to the proposed development plan would be considered as having more impacts.

9.3.4 Impacts on Land Use and Land Ownership

Data on land use and ownership in the resource profile will reveal the possible interaction of the proposed plan with land use and the vulnerability of the people in relevance to the land ownership, if the project requires acquiring land which is in use. The interaction of the proposed development plan with land use would be high in the areas with high population density.

The proposed development plan has a potential physical and economic resettlement impact, and no management criteria have been proposed in the Plan.

9.3.5 Impacts on agriculture

Similar to fishing, the resource profile data will be used for analyzing impacts on agriculture.

9.3.6 Impacts on Indigenous People

The demographic data of the divisional secretariats will reveal data on the presence of indigenous people in the area. According to the information available, no indigenous people were reported within the Northern Province. The SEA team will further validate this fact during the study.

9.3.7 Labour Influx and Labour Welfare

The data on major employment categories, un-employment, workable population, education level of the people to be obtained from "Resource Profile" reports of the Divisional Secretariats will indirectly reflect the possibility of engaging locals as labourers for construction and aquaculture activities or the requirement of inward migration of such labourers.

9.3.8 Impacts on tourism and other industries

The designated tourist attractions and activities within the Study area obtained from Tourism Bureau of Northern Provincial Council and presented in order to ensure that the proposed plan will not have any adverse impacts on tourist attractions.

9.3.9 Impacts on Cultural Heritages and religious places

Map of cultural heritages and religious places in the study area will be obtained from the Department of Archaeology and presented to ensure that the proposed plan will not have any adverse impacts on such sites.

9.3.10 Impacts on access pathways and Road networks

The impacts related to the access and road networks will be identified through the consultation with the communities hosting aquaculture farms.

9.3.11 Mapping of potential interaction with socio-economic environments of the study area

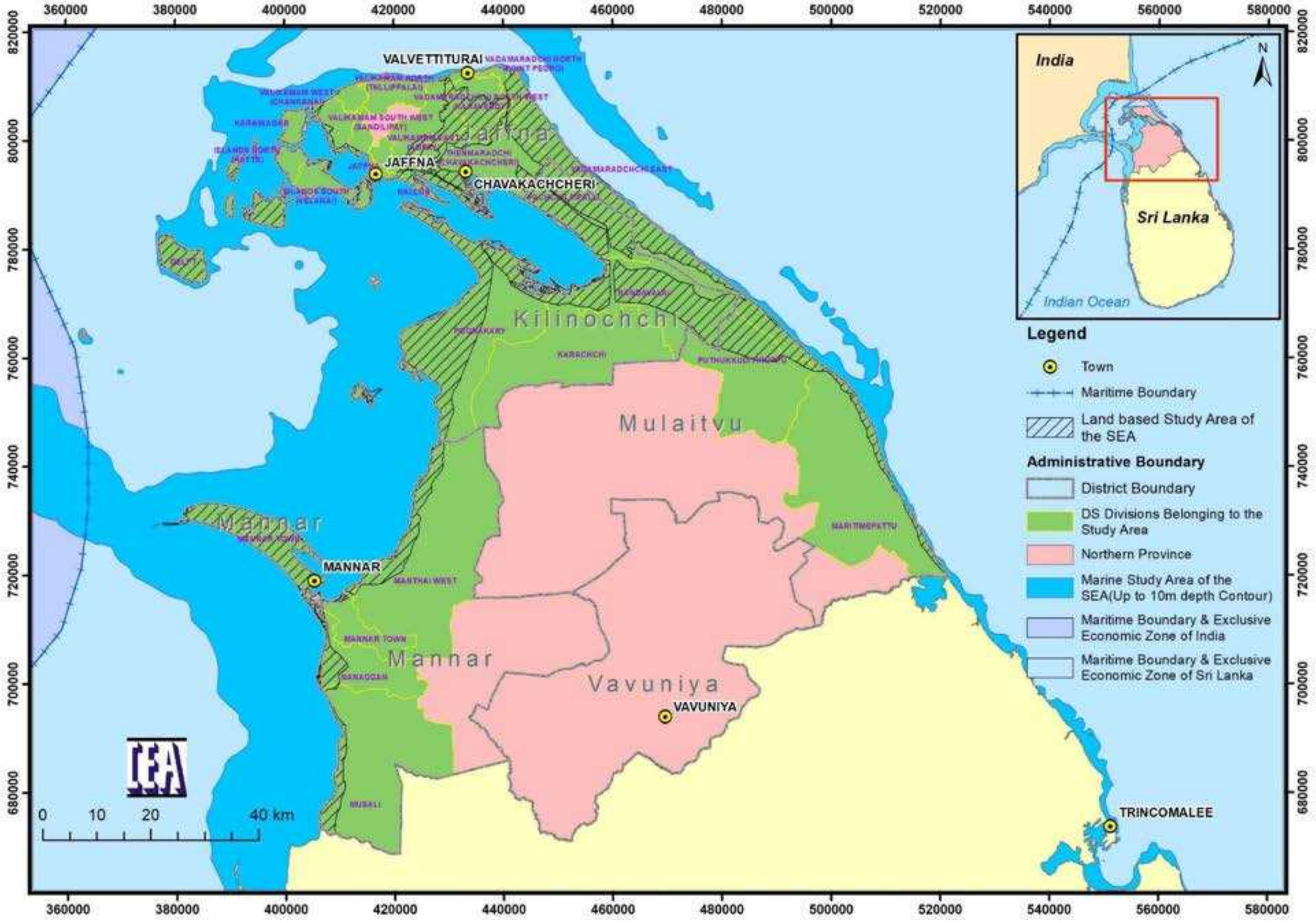
The stakeholders will be consulted in order to collect the maps of land and water resources utilization existing or in the pipeline within the study area. The maps available with the relevant stakeholders (GIS Shape files or Hard Copies) will be utilized for this purpose. Based on the consultation with the stakeholders, the SEA team may sketch the approximate location if such maps are not yet produced.

The maps related to the potential interaction with the socio-economic receptors will be prepared.

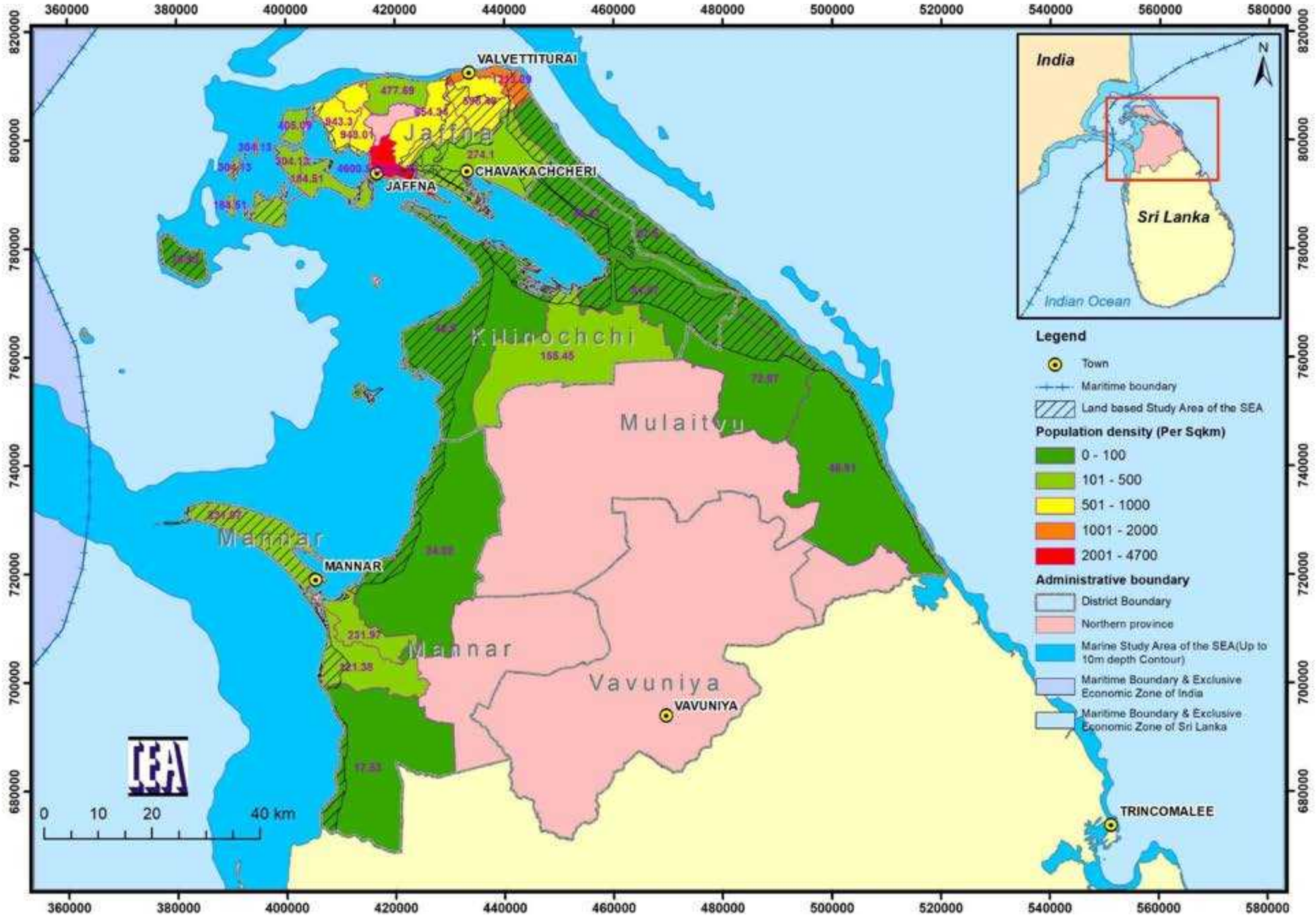
a) Maps depicting the population density within the study area
b) Maps depicting the high security zones
c) Maps depicting the Mine cleared areas and uncleared areas
d) Maps showing the fishing grounds/fishery Landing sites and connected structures
e) Maps depicting the Agricultural lands
f) Maps depicting the Archaeological sites/ religious and cultural sites
g) Maps depicting the tourist attractions and activities

Map showing the Administrative Boundaries of the Study Area (District and Divisional Secretariat divisions) is presented below.

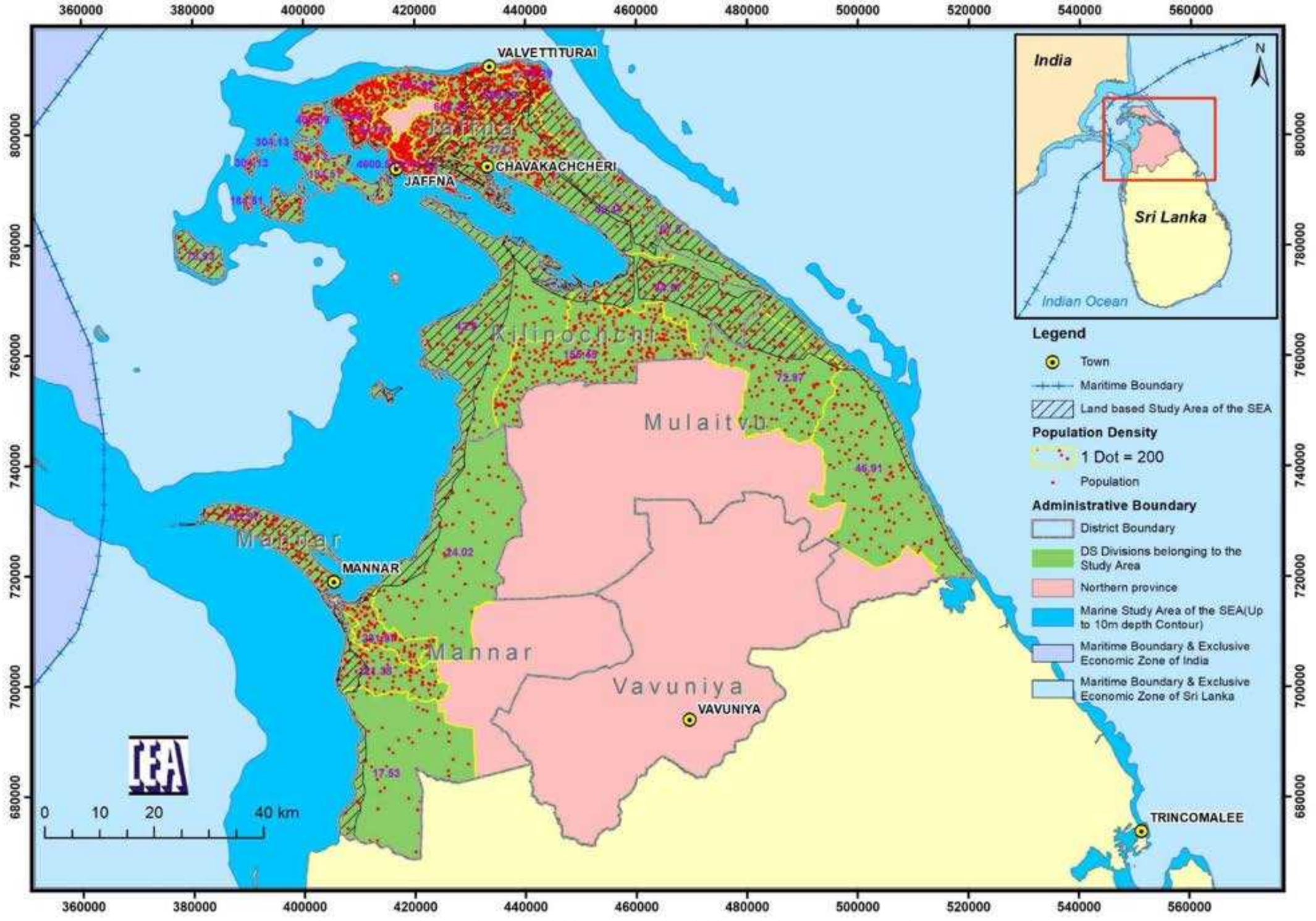
Maps showing the Population Density (Per Sq.km) of the Divisional Secretariat divisions within the Study Area are also presented below.



Map 07: Map showing the Administrative Boundaries of the Study Area (District and Divisional Secretariat divisions)



Map 08: Map showing the Population Density (Per Sq.km) of the Divisional Secretariat divisions within the Study Area



Map 09: Map showing the Population Density of the Divisional Secretariat divisions within the Study Area (Figures are Population per Sq.km)

9.3.12 Stakeholder's consultation

The study team will conduct stakeholder consultations to make aware and obtain the concerns and suggestions of the stakeholders related to the proposed development plan. Development plans which are already in the implementation stages and in the pipeline, information on best practices, data and maps related to the sensitive receptors related to each stakeholder will be gathered through the consultation process. The existing aquaculture industries will be consulted in order to assess information on labor availability and related constraints. The team will consolidate the outcomes of the consultation and tabulate or create a map as necessary to use with the SEA report. The stakeholder engagement plan (Section 4.3) has described this process further.

Annex 4- List of Prepares of the SEA Report

No.	Name	Expertise provided to the SEA Team
1	Mrs. Ramani Ellepola	Team Leader/Environmental Specialist
2	Dr. Kamal Ranathunga	Coastal and Marine Ecologist
3	Dr. Nimal Wijayarathna	Coastal Hydrologist
4	Dr. Erandathie Lokupitiya	Climate Change Specialist
5	Mr. T. Krishnaraja	Socio Economist
6	Dr. Vasantha Pahalawattaarachchi	Coastal Aquaculture Specialist
7	Mr. Prasanna Samarawickrama/ Mr. A.M.S.B.Adhikari	GIS Expert
8	Mr. Deshan Gamage	Civil/Environmental Engineer
9	Ms. Amila Gunarathna	Assistant Environmental Specialist

Annex 5 – Minutes of Provincial Level Stakeholder Meeting

Annex 5-A: Provincial Level Stakeholder Meeting 01

Held on the 11th of February 2022 from 9.00 a.m. to 1.00 p.m. at the Auditorium of the Jaffna District Secretariat.

Participants:

Organization	Name	Designation
NAQDA:	Mr. Nirooparaj Balachandran	Assistant Director-Northern Province (Coastal Aquaculture), NAQDA
	Mr. Sundaralingam Pradeepan	Aquaculturist- Kilinochchi District
	Mr. Subramanium Madanraj	Aquaculturist- Mannar District
	Mr. Baptist Amban Soosai	Aquaculturist- Jaffna District
World Bank:	Ms. Nadeera Rajapakse	Environmental Specialist (via Zoom)
Consultant Team for SEA (Consulting Engineers and Architects Associated (Pvt) Ltd)	Mrs. Ramani Ellepola	Team Leader (via Zoom)
	Dr. Kamal Ranathunga	Coastal and Marine Ecologist
	Dr. Nimal Wijayarathna	Coastal Hydrologist
	Mr. T. Krishnaraja	Socio Economist
	Dr. Vasantha Pahalawattaarachchi	Coastal Aquaculture Specialist
	Dr. Erandathie Lokupitiya	Climate Change Specialist (via Zoom)
	Mrs. Kamala Ranasinghe	Project Coordinator (Socio Economist)-CEA
	Mr. Asanka Rathnayaka	Project Coordinator-CEA
	Mr. Deshan Gamage	Project Coordinator-CEA (via Zoom)
	Ms. Amila Gunarathna	Environmental Officer-CEA (via Zoom)

Representatives of the Stakeholder Organizations (Participated)

Name	Designation and Organization
District Secretariats	
Mr. K. Mahesan	District Secretary, Jaffna District Secretariat
Mr.K.Shrimohanan	Additional District Secretary, Kilinochchi District Secretariat
Divisional Secretaries- Jaffna District	
Mr.F.C Sathiyasothi	Divisional Secretary, Delft Divisional Secretariat
Mr. K. Sivaharan	Divisional Secretary, Island South (Velanai) Divisional Secretariat
Mr. Mariyathasan Jegu	Divisional Secretary, Karainagar Divisional Secretariat
Mrs.J.Printhini	Assistant Director of Planning, Nallur Divisional Secretariat
Mr.S.R Sarventhiran	Assistant Director of Planning, Thenmarachchi (Chavakachcheri) Divisional Secretariat
Mr. Prabakaramoorthy	Divisional Secretary, Vadamarachchi East Divisional Secretariat
Mrs. J. Sivagini	Vadamarachchi North Divisional Secretariat
Mr.V.Sivakumar	Assistant Director of Planning, Vadamarachchi North Divisional Secretariat
Mr.S.Sriskantharaja	Vadamarachchi South-West Divisional Secretariat
Mrs.V.Krishnalini	Valikamam East (Kopay) Divisional Secretariat

Name	Designation and Organization
Mrs. Uthayakumar Yasotha	Divisional Secretary, Valikamam South-West Divisional Secretariat
Ms.V.Tharsini	Assistant Director of Planning, Valikamam West Divisional Secretariat
Divisional Secretaries-Kilinochchi District	
Mr.S.P Amalarasa	Assistant Director of Planning, Karachchi Divisional Secretariat
Mr.C.Krishnendran	Divisional Secretary, Pachchilaipalli Divisional Secretariat
Mr. Ahilan	Divisional Secretary, Poonakary Divisional Secretariat
Divisional Secretaries-Mannar District	
Mr. M. Piratheep	Divisional Secretary, Mannar Divisional Secretariat
Ms.T.Thivakary	Assistant Director of Planning, Nanattan Divisional Secretariat
Secretaries of Provincial Ministries	
Ms.B.Abiramy	Ministry of Local Government, Jaffna
Directors of Provincial Departments	
Mr.K.Sujeevan	Irrigation Engineer, Department of Irrigation
Engineer	Department of Local Government, Kaithady
Mr.A.Sothinathan	Commissioner of Land, Dept. of Provincial Land Commissioner, Jaffna
A.Judethadeva	Dept. of Rural Development, Jaffna
Mr.N.Pratheepan	District Officer, Department of Industries, Jaffna
Mr.N.Thivakaran	Provincial Department of agriculture
Central Environment Authority	
Mr.A.Regivathan	District Officer, Central Environmental Authority, Mannar
Ms.A.Sirisanmugapriya	Senior Environmental Officer Central Environmental Authority, Jaffna
Mr.N.Sanjeevan	Environmental Officer, Central Environmental Authority, Mullativu
Coast Conservation & Coastal Resources Management Department (CC & CRMD)	
Mr.N.Vishnuvarthran	CC & CRMD, Jaffna District Office
Mr.J.A Daniel	Coast Conservation Officer, CC & CRMD, District Office, Mannar
Mr.B.Steepan	Coast Conservation Officer, CC & CRMD, District Office, Kilinochchi
Department of Wildlife Conservation	
Mr. W.N.D.S Wickramasingha	Department of Wildlife Conservation (Vavuniya Regional Office)
P.Thevasanjeevan	Department of Wildlife Conservation (Kilinochchi Regional Office)
Forest Department	
Mr.Hakeem	Regional Deputy Conservator of Forest Office, Kilinochchi
Ms.M.M Priya	Forest Department, Divisional Forest Office, Mullativu
Mr.Upul	Forest Department, Divisional Forest Office, Mullativu
Mr.Kekalanduwa	Divisional Forest Officer, Divisional Forest Office, Mannar

Name	Designation and Organization	
Disaster Management Center		
Mr.S.Kokularaja	District Disaster Management Center Unit, Kilinochchi	
Mr.K.Thileepan	Assistant Director, District Disaster Management Center Unit, Mannar	
Mr.S.Lingeshwarakumar	Assistant Director, District Disaster Management Center Unit, Mullaitivu	
Other Provincial Institutions		
Eng. Myuran	Irrigation Department, Mannar	
Mr. Anton Jeyamanon	Senior Deputy Director, Board of Investment, Jaffna	
Mr. J. Sudagaran	Assistant Director, Department of Fisheries and Aquatic Resources, Jaffna District Office	
Mr.S.Thivviyan	Department of Fisheries and Aquatic Resources, Mannar District Office	
Mr. Andrew Ameo	Assistant Marine Environment Officer Marine Environment Protection Authority, Jaffna	
Mr.S.Vamatheepan	Department of Agrarian Development, Kilinochchi	
Mr.Anton	Agriculture Instructor Department of Agrarian Development, Mannar	
Ms.T.Puvithi	Assistant title investigation officer, Department of Land title Settlement	
Mr.P Satkuneshwaran	Regional Mine Action Centre,Kilinochchi.	
Mr.J.Nitharshan	Regional Mine Action Centre,Kilinochchi.	
Mr. Stanley Mascarenhas	Chairman, Tourism Bureau, Northern Province	
Security Forces		
Lt Cdr. K.A.C.H Abeyrathna	North Central Naval Command Headquarters, Thalaimannar.	
Lt Cdr. A.A.N Banda	Eastern Naval Command Headquarters, Mullativu	
Brig.Prasanna Gunaratne	Security Force Headquarters, Sri Lanka Army, Jaffna.	
Maj.Gen. Lasantha Rodrigo	Security Force Headquarters (Mullaittivu), Sri Lanka Army, Nanthikadal, Mullativu	
Academic Institutions/Universities		
Prof. (Mrs) S. Kuganathan	Head, Department of Fisheries Science, University of Jaffna	
Mr.S.S.Krishnalingam	Assistant Director, Regional Centre Jaffna,Ocean University Sri Lanka	
Local Authorities		
Engineer	Jaffna Municipal Council	
Mrs.S.Uruthirasampavan	Secretary, Karainagar Pradeshiya Sabha	
Mr.S.Sribaskaran	Secretary, Point Pedro Pradeshiya Sabha	
Mr. S.Sabesan	Secretary ,Maritimepattu Pradeshiya Sabha	
Technical Officer	Mannar Pradeshiya Sabha	
Secretary	Manthai West Pradeshiya Sabha	
Mr.S.Logeshwaran	Secretary	Nanaddan Pradeshiya Sabha
Mr.N.B Dias	Secretary	Musali Pradeshiya Sabha

Representatives of the Stakeholder Organizations (Invited and Not-Participated)

Name	Designation	Organization
District Secretariats		
Mrs. A. Stanley De Mel	District Secretary	Mannar District Secretariat
Mr. K. Vimalanathan	District Secretary	Mullaitivu District Secretariat
Northern Provincial Council		
Mr. S.M. Saman Bandulasena	Chief Secretary	Northern Provincial Council
Divisional Secretaries- Jaffna District		
Mrs. S. Manchuladevi	Divisional Secretary	Island North (Kayts) Divisional Secretariat
Mr. Sambasivam Sutharsan	Divisional Secretary	Jaffna Divisional Secretariat
Mr. Shanmugarasa Sivasri	Divisional Secretary	Valikamam North Divisional Secretariat
Divisional Secretaries-Kilinochchi District		
Mr. T. Pirunthakaran	Divisional Secretary	Kandavalai Divisional Secretariat
Divisional Secretaries-Mannar District		
Mr. D. C Aravintharaj	Divisional Secretary	Manthai West Divisional Secretariat
Mr. K. S Vasanthakumar	Divisional Secretary	Musalai Divisional Secretariat
Divisional Secretaries-Mullaitivu District		
Mrs. M. Umamagal	Divisional Secretary	Maritimepattu Divisional Secretariat
Mr. M. Piratheepan	Divisional Secretary	Puthukudiyiruppu Divisional Secretariat
Secretaries of Provincial Ministries		
Mr.A.Sivabalasundran	Secretary	Ministry of Agriculture, Jaffna
Mr.Rajaratnam Varatheeswaran	Secretary	Ministry of Education, Jaffna
Mrs.R.Varathalingam	Secretary	Ministry of Women Affairs
Directors of Provincial Departments		
Mrs. Sujievaa Sivathas	Assistant Director	Department of Cultural Affairs, Jaffna
Dr. S. Vaseeharan	Provincial Director	Department of Animal Production and Health
Regional Valuer		Valuation Department, Jaffna
Other Provincial Institutions		
Assistant Director		Regional Archaeological Office, Jaffna and Kilinochchi Districts
Mr. R.G. Jayathilaka	Assistant Director	Regional Archaeological Office, Museum, Vavuniya
Coast Conservation Officer		CC & CRMD, Mullaitivu
Mr. Niranjan Abeysinghe	Provincial Manager	Water Resources Board, Jaffna
Mr. V. Kaelistan	Assistant Director	Department of Fisheries and Aquatic Resources, Mullaitivu

Mr. K. Mohan Kumar	Assistant Director	Department of Fisheries and Aquatic Resources, Killinochchi
Mr. Sripathy	Assistant Manager	Marine Environment Protection Authority, Trincomalee
Mr. A Sasitharan	Assistant Marine Environment Officer	Marine Environment Protection Authority, Mannar
Mr. Murukaiyah Kesavan	Assistant Marine Environment Officer	Marine Environment Protection Authority, Kilinochchi
Mr.N.Sooriyarajah	Assistant Director	District Disaster Mgt Center Unit, District Secretariat, Jaffna
Mrs. Dewanayaki	Assistant Commissioner	Department of Agrarian Development, Jaffna
Mr. B. Thewadaran	Assistant Commissioner	Department of Agrarian Development, Mullaitivu
Director - Northern Province		Urban Development Authority, Jaffna
Mr. T. Trikkumarn	Harbour Manager	Ceylon Fishery Harbour Corporation, Jaffna
Security Forces		
Regional Director (Northern Region)		Sri Lanka Coast Guard, Kankasanthurei
Local Authorities		
Mr.A.Kurunatahn	Chief Engineer	Jaffna Municipal Council
Mr.M. Amirthakulasingam	Secretary	Kayts Pradeshiya Sabha
G.Ratnarajah	Secretary	Delft Pradeshiya Sabha
Mrs.G.Shanmugalingam	Secretary	Valikamam West Pradeshiya Sabha
Secretary		Poonakary Pradeshiya Sabha
Secretary		Maritimepattu Pradeshiya Sabha

Minutes of the Stakeholder meeting- SEA for the Aquaculture Development Program in Northern Province

Introduction

The stakeholder meeting for the Proposed Coastal Aquaculture Development Programme in the Northern Province was held on the 11th of February 2022 from 9.00 a.m to 1.00 p.m at the Auditorium of the Jaffna district Secretariat. The District Secretary of Jaffna chaired the meeting and delivered the opening remarks.

Presentations

After the welcome address, Mr. B. Nirooparaj (Assistant Director/Coastal Aquaculture-Northern Province, NAQDA) explained the Proposed Coastal Aquaculture Development Programme of NAQDA.

Dr. Kamal Ranathunga (Marine Ecologist/SEA Team) presented information regarding the Environmental Aspects of the Strategic Environmental Assessment. It was followed by the presentation of Mr. T. Krishnaraja (Socio Economist/SEA Team) on the social aspects of the Strategic Environmental Assessment which concluded the presentation session.

Discussion Session

The discussion session commenced at around 10.40 am after a 10-minute refreshment break following the presentations.

1) **Maj.Gen. Lasantha Rodrigo - Security Forces/Sri Lanka Army- Mullaittivu**

He thanked the presenters for the information provided and appreciated the organizers for networking all relevant departments involved in the project. He further stated that he sees a potential positive outcome from the project and that the presentation was efficient and descriptive.

2) **Brig.Prasanna Gunaratne - Security Forces/Sri Lanka Army-Jaffna**

Further thanked for the comprehensive presentations and appreciated the approach of getting the feedback and inputs of all the relevant stakeholders. He suggested analyzing the demands of the investors/ donors to avoid negative socio-economic impacts.

3) **Mr.S.Thivviyan- Representative of the Assistant Director/ Department of Fisheries and Aquatic Resources, Mannar**

He responded to the question raised by the presenters about the fishing grounds by stating that the fishing grounds have not been properly demarcated in the Northern Province and that the fishermen have selected the fishing grounds based on their experience. Most of the fishermen carried out their fishing activities in the coastal area. So, any projects in the coastal area should consult with the fishers to avoid conflicts.

Many attendees agreed with this suggestion during the course of the meeting and stressed on this point repeatedly. There are 208 beach seine areas in Mannar. Those beach seines have not been measured for many years and their locations also not defined well. So, new projects would cause conflict with such fishing activities, even in private land, when it disturbs the access. Since the fishermen have very little to no idea about land ownerships, it may leads to problems during the project implementation. He quoted a previous incident which happened in Pesalai, Mannar district where a fishing harbor was proposed but the project has been terminated due to the conflicts among the fishermen.

He also spoke about Sea Cucumber and Mud Crab farming where illegal fattening is done. He pointed out about the absence of proper channel complain about the grievances caused by aquaculture activities. The project activities should be planned in a way to benefit more people.

The present aquaculture serves a very minimum people when comparing with the fishing population. Some landing sites have been relocated due to the storm and security reason.

These issues to be solved before selecting land for farming. It is observed that the farmers are using wild collected sea cucumber fingerlings into their farms, which should be forbidden. It is same for crab fattening too.
The waste water management in land-based aquaculture is critical. Closed culture system should be real in operation. Who should monitor and how should monitor the aquaculture farms to be cleared.

4) Assistant Divisional Secretary, Vadamarachchi East DS division, Jaffna District

He stated about the previously used aquaculture ponds which have been abandoned now as the location been declared as Wildlife Nature Park recently. He pointed out that such suitable land and facilities to be made available for aquaculture farming purpose considering the livelihood. He enquired about the possibilities of de-gazette such areas, which was also acknowledged by other participants.

5) Assistant Director- Disaster Management Centre, Kilinochchi

He mentioned that the issues related to climate change was not given enough importance in the development plan. As he described, even though the North East Monsoon got activated in December, they never got any rainfall. He mentioned that in Northern Province, specifically Kilinochchi is suffering from seawater intrusions, sea surges and cyclonic events. He further mentioned that there were damages to aquaculture sites in various prior cases in Kilinochchi due to negligence of climate change issues such as the increased water salinity level. He stated that this was due to the damages caused to saltwater barriers/bunds and as a remedy those abandoned bunds should be conserved and reconstructed. Also, the investors should pay more attention to climatic conditions of the area. He also mentioned that the project should be implemented without any impact to the local fishing community and care should be taken to prevent domination of outsiders over the locals.

6) Mr.N.Vishnuvarthran- Department of Coast Conservation and Coastal Resource Management, Jaffna District Office

He appreciated the initiative for a strategic Environmental Assessment as this was not done in most of the previous projects and that it's helpful in analyzing potential issues. He mentioned that approvals have been given for more than 210 sea cucumber farms in the Jaffna district. But the issues arise when there is an inconsistency between the GPS coordinates provided by the relevant department carrying out the project and the actual location, making it difficult to track the farmland. There should be consistent approach to tackle such matters.
He further mentioned that they have observed gaps on practicing the NAQDA's regulations or requirements for aquaculture by the farmers. As he explained farmers use to erect additional structures, especially fences and observation points within the water due to the security concerns and these structures are not part of the approved project plans. Since the structures are established beyond the stated limits and fences are erected against the guidelines, it will affect the aquatic organisms. Therefore, a proper farming infrastructure facility should be finalized in a way to avoid these impacts. He suggested that the approval procedures should be followed strictly to avoid such problems in the future. The CC&CRMD possesses the authority to manage the coastal set back.
Mr. Nirooparaj mentioned that mapping was done with correct GPS coordinates in Kilinochchi but in Jaffna the process was delayed. He assured that in this project mapping will be done accurately. Dumping permit is necessary for farms to dispose effluent water into the sea. The Central Environmental Authority (CEA) has issued parameters that will be followed (i.e: salinity < 45, temperature < 37^0C, etc) and that the parameters will be checked thoroughly before approval is granted.

7) Representative of the Central Environmental Authority, Jaffna

He stated that the CEA has passed a new regulation that all the aquaculture activities should get the CEA's clearance (ER) in addition to other clearances used to obtain until now. Therefore, the CEA will be mandated to monitor those aquaculture farms in future.

8) Mr.S.Thivviyan- Representative of the Assistant Director/ Department of Fisheries and Aquatic Resources, Mannar

He mentioned that coastal areas and mangroves are mostly fish breeding sites and some fishermen have complained that effluent waters are arriving into the waters from farms although initially they assured that the waste water is treated well before being released. Further, the fishermen are stating that they have experienced allergies and itching due to this. He suggested that this is solely because of issuing permits without checking the treated wastewater quality.

Mr. Nirooparaj responded to this mentioning that any fishermen facing such an issue should immediately collect a sample of water and produce it to NAQDA to carry out necessary testing to check the water quality. He further stated that allergies could also occur due to sea planktons and other untreated chemicals.

9) Divisional Secretary, Mannar Divisional Secretariat

She shared similar opinions as that of the representative of the Coast Conservation department with regard to obtaining permission. She further mentioned that all Aquaculture hatcheries should obtain the proper license to operate and that the relevant department will issue the necessary guidelines to maintain the farm without any issues.

Monitoring of the farms should be well regulated. No one can witness the effluent water discharging if the farm discharges the effluent water during the night. At the same time, the impacts due to the aquaculture related industries including feed mills also to be considered.

There was an incident that the effluent of a feed mill in Mannar district affected the public criticized by the people in the area.

Therefore, the consequences of the aquaculture farming should be properly assessed and proper methodology should be identified to protect the environment and traditional fishery sector.

10) Mr.K.Thileepan , Assistant Director - Disaster Management Centre, Mannar

According to him, flooding was considered as one of the main threats to coastal aquaculture. He stated that Mannar is commonly affected by sea floods and flash floods hence affecting farmlands. He said that development should be carried out considering disaster risk resilience (DRR) since the natural parks in coastal areas are affected resulting in disasters.

He expressed his concerns about the destruction of mangroves by fishermen that may further result in erosion and saltwater intrusion. He further mentioned that traditional farmers should be encouraged to adapt to new technologies and those farmlands should be insured to minimize the loss of production in the case of disasters. He suggested the use of "risk transferring system" so that farmers could carry out their lives through different means even if their farmlands are affected during a disaster. The salt water barriers/bunds along the shore line are mostly in dilapidated condition which could affect the aquaculture and agriculture.

He mentioned that the most of the investors of the already functioning Sea cucumber farms tend to collect the juveniles from the wild and it will affect the natural wild catch and the similar situation is experiencing for the crab farming as well.

11) Mr.Nirooparaj- Assistant Director(Coastal Aquaculture-NP, NAQDA)

In response to that, Mr. Nirooparaj mentioned that there are policies on regulating the sea cucumber farming and it prevent farming of wild caught juveniles. He further mentioned that although initially there was no specific size grading required for importing, NAQDA has currently set regulations that the allowed weight is 80g and below 80 g in the wild cannot be stocked in the farms. Further, he stated that all farmers should submit their juvenile transport permits to NAQDA before the renewal of their license to cultivate and export sea cucumbers and a study should be performed regarding the minimum size of the sea cucumber that could be exported. He mentioned that the University of Sri Jayawardanapura, NARA, NAQDA and Department of Wildlife Conservation have teamed up to revise the regulations to suit current needs.

12) Divisional Secretary - Manthai West DS Division, Mannar District

Explained that the main reason for salt water intrusion is illegal sand mining carried out in the area. As per his explanation, some people get the license to carry out aquaculture in their land and excavate the sand justifying that they are constructing ponds. Such people use mostly paddy lands for illegal sand mining rather than cultivating.

It has been observed that the fishers used to object for sea cucumber farming as it was targeting their traditional fishing grounds. As he mentioned, there are potential lands within the wildlife conservation areas and other reserved areas which should be positively analyzed to allow them for aquaculture activities.

13) Representative of the Coastal Conservation and Coastal Resources Management Department, Mannar

Though the Mannar district has a lengthy coastal belt, the coastal area has been already occupied or reserved for several activities like wind farming, sand and mineral mining, nature reserves and for traditional fishing. Most of such development activities are decided and approved without the knowledge of divisional or district level administration. Therefore, proper mechanism should be established to avoid such development activities.

The annual renewal of aquaculture licenses would cause difficulties to farmers as they are costly and time consuming. Therefore, the renewal process should be re-assessed.

14) Assistant Director - Department of Fisheries and Aquatic Resources, Jaffna

He mentioned that he wanted to highlight on 3 main problems with regard to aquaculture:

(i) Problems among fishermen with regard to fishing grounds
(ii) Fishermen still need to follow traditional methods
(iii) lack of distance between two sea cucumber farms is lesser than the practiced distance in-between fyke nets.

As he mentioned, the locations for the aquaculture should be identified and defined with the inputs of traditional fishers to avoid any conflict.

15) Head of the Department – Department of Fisheries Science, University of Jaffna

She stated that taking into consideration the need of fish production, Aquaculture is necessary. However, local fishermen are adapted to local fisheries and they are reluctant to practice Aquaculture farming.

She further stated that they could not even travel by boat between Araly-Ponnalai- Pooneryn due to fyke net fishery and aquaculture farms. Therefore, the aquaculture practices should not be entertained in the areas where there are intense fishing sites, fish landing sites and river mouth regions.

She said that research is being done on potential fishery areas by a student of the University of Jaffna and mapping of sites where sea cucumber farms are available will be done. She suggested working with her undergraduates who carry out research studies based on the

allergic reactions due to effluent waters. Further, she stated that the allergy could also have been due to jellyfishes. She suggested that land-based wastewater treatment could be considered or can embark the waste water into deep sea.
The SEA team quarried about the capacity of the university to cater the emerging demand of skilled workers requirement for the industry. The Head of the Department stated that there were around 150 students currently pursuing education in Fisheries Studies and only around 30-35 students graduate with a degree in Fisheries Science out of which only around 8 students graduate with Honors. She also mentioned that most of the students work in NAQDA or NARA and almost all the students are employed.

16) Representative of the Ocean University, Jaffna

He elaborated about the offered courses of the Ocean university and pointed out the willingness and ability to cooperate with aquaculture industry to meet the requirements of the workforce.

17) Representative – Forest Department

He mentioned that the forest department has already mapped the declared areas and asked to get their feedback before finalizing the map.

18) Representative –Department of Wildlife

He mentioned that there are declared wildlife protected areas but no proposed areas within the project area.

19) Divisional Secretary - Manthai West DS Division, Mannar District

He stated that an aquaculture park is proposed to be establish within the wildlife protected areas and they are in the process of conducting a survey for the 400 acre land out of which 100 acres are private lands.

It was also mentioned that there was an incident where the Wildlife Department claimed one section of an Aquaculture Park as a wildlife conservation area while some fishermen claimed another section of the park as their seasonal fishing ground. Also, many fishermen were women who lost their spouses in the war and that they expressed their concerns of having their lands taken away as that was their only means of livelihood.

20) Other General comments of the participants for the clarifications made by the SEA Team

The size of the aquaculture farm may depend on several factors such as the presence of environmental sensitive areas. Since the northern province has very good fishing grounds, the traditional fishery is dominating in the area. As explained, traditional fishermen also invest in the aquaculture using bank loans and later they abandoned the farm due to the inability of management and technical knowledge. In this situation, small scale farms are suitable. The farming should target to empower the local community.
Public private partnership (PPP) could be advisable in medium and large scale farming which will provide investment, marketing and technical support to the locals. The fresh water prawn farming practiced in the province through this model resulted good outcomes. The employment opportunity for the locals also carefully planned. The community should be made aware about it.

The aquaculture projects were done targeting only the improvement in economy but the economic development should support the local fishermen too. He suggested that in PPP, the development should be based on local fishermen. He mentioned that instead of acquiring larger land plots for Aquaculture, small lands should be taken so that traditional fishing also could be done.

The licensing process for aquaculture farms should be re-assessed and regulated to speed up the process.
21) Summary and Vote of Thanks Mr.Nirooparaj summarized the presentations and the discussions held at the meeting. The meeting concluded at 1.00 pm with the vote of thanks delivered by the District Secretary of Jaffna.

Annex 5-B: Provincial Level Stakeholder Meeting 02

Held on the 26th of August 2022 from 9.00 a.m. to 1.00 p.m. at the Auditorium of the Jaffna District Secretariat.

Participants:

Organization	Name	Designation
Ministry of Fisheries	Mr. Douglas Devananda	Minister of Fisheries (Via Zoom)
NAQDA	Mr. Nirooparaj Balachandran	Assistant Director-Northern Province (Coastal Aquaculture), NAQDA
	Mr. S. Mathanaraj	Aquaculturist, NAQDA
	Mr. S. Thavsan	Development Officer, NAQDA
	Ms. Thadshajini	Trainee, NAQDA
	Mr. S. Kamalraj	Development Officer, NAQDA
	Mr. A. Berdinand	Extension Officer, NAQDA
	Mr. S Piratheepan	NAQDA
World Bank:	Ms. Nadeera Rajapakse	Environmental Specialist (Via Zoom)
Consultant Team for SEA (Consulting Engineers and Architects Associated (Pvt) Ltd)	Mrs. Ramani Ellepola	Team Leader
	Dr. Kamal Ranathunga	Coastal and Marine Ecologist
	Dr. Nimal Wijayarathna	Coastal Hydrologist
	Mr. T. Krishnaraja	Socio Economist
	Dr. Vasantha Pahalawattaarachchi	Coastal Aquaculture Specialist
	Dr. Erandi Lokupitiya	Climate Change Specialist
	Mr. Deshan Gamage	Project Coordinator-CEA
	Ms. Amila Gunarathna	Environmental Officer-CEA
	Mr. Asanka Rathnayaka	Project Coordinator-CEA

Representatives of the Stakeholder Organizations (Participated)

District Secretaries			
1	MR. K. Mahesan	District Secretary	Jaffna District Secretariat
2	Mrs. R. Ketheeswaran	District Secretary	Kilinochchi District Secretariat
3	Mr. K. Vimalanathan	District Secretary	Mullaitivu District Secretariat
4	Mr. Krishnarasa	Deputy Director/ Planning	Mannar District Secretariat
Northern Provincial Council			
5	Mr. R. Umakanthan	Deputy Chief Secretary	Northern Provincial Council
Divisional Secretaries			
6	Mr. F.C Sathiyasothi	Divisional Secretary	Delft Divisional Secretariat
7	Mrs. S. Manchuladevi	Divisional Secretary	Island North (Kayts) Divisional Secretariat
8	Mr. K. Sivaharan	Divisional Secretary	Velanai Divisional Secretariat
9	Mrs. B. Rajaga	Divisional Secretary	Jaffna Divisional Secretariat
10	Mr. N. Sarveswaran		Jaffna Divisional Secretariat

11	Mr. Mariyathasan Jegu	Divisional Secretary	Karainagar Divisional Secretariat
12	Ms. J. Pirinthini	ADP, DS	Nallur Divisional Secretariat
13	Mrs. Usha Subalingam	Divisional Secretary	Chavakachcheri Divisional Secretariat
14	Mr. Prabakaramoorthy	Divisional Secretary	Vadamarachchi East Divisional Secretariat, Maruthankerny
15	Mr. S. Subachchelvan	Deputy Director Planning	Vadamarachchi North Divisional Secretariat, Point Pedro
16	Mr. E. Thayarupan	Divisional Secretary	Vadamarachchi South-West Divisional Secretariat, Karaveddy
17	Mrs. Subajini Mathiyalagan	Divisional Secretary	Valikamam East (Kopay) Divisional Secretariat
18	Mr. Shanmugarasa Sivasri	Divisional Secretary	Valikamam North Divisional Secretariat, Tellipalai
19	Mr. S. Dupinson		Valikamam South-West Divisional Secretariat, Sandilipay
20	Mrs. Uthayakumar Yasotha	Divisional Secretary	Valikamam South-West Divisional Secretariat, Sandilipay
21	Mrs. P. Premini	Divisional Secretary	Valikamam West Divisional Secretariat, Chankanai
22	Mr. S. Thuvaraka	Assistant Divisional Secretary	Kandavalai Divisional Secretariat
23	Mr. S. Mathuge	Assistant Divisional Secretary	Karachchi Divisional Secretariat
24	Mr. C. Krishnendran	Divisional Secretary	Pachchilaipalli Divisional Secretariat
25	Mr. Ahilan	Divisional Secretary	Poonakary Divisional Secretariat
26	Mr. M. Piratheep	Divisional Secretary	Mannar Divisional Secretariat
27	Ms. M.S. Safeena	CO Land	Manthai West Divisional Secretariat
28	Mr. S. Rajeev	Divisional Secretary	Musalai Divisional Secretariat
29	Ms. S. Thusja	Assistant Divisional Secretary	Nanaddan Divisional Secretariat
30	Mrs. S. Sharmy	Assistant Divisional Secretary	Maritimepattu Divisional Secretariat
Secretaries of Provincial Ministries			
31	Mr. B. Abiramy	Director/ Inland Fisheries	Ministry of Agriculture, Jaffna
Directors of Provincial Departments			
32	Ms. S. Rajamalligai	Director	Department of cultural Affairs
33	Eng.V. Premakumar (Zoom)	Provincial Director of Irrigation	Irrigation Department
34	Mr. K. Sujeevan	Irrigation Engineer	Irrigation Department, NP
35	Eng. S. Vihirthan	Senior Irrigation Engineer	Irrigation Department, NP
36	Eng. S. Sarvaraja	Irrigation Engineer	Irrigation Department, NP
37	Mrs.S.Vanajaa	Deputy Director	Department of Industries, Jaffna
38	Mr. N. Thivakaran	AI	Provincial Department of Agriculture, Jaffna

Other Provincial Institutions			
39	Mr. N. Arulraja	Exploration Officer	Regional Archaeological Office
40	Ms. N. Sajeevan	District Environmental Officer	CEA, Mullativu
41	Mrs. S. Saseelan		CEA, Northern Province
42	Mr. N. Vishnuvarthan	Development Officer	CC&CRMD, Jaffna
43	Mr. B. Steepan	Development Officer	CC&CRMD, Kilinochchi
44	Mr. S. Mayoorathy		CC&CRMD, Mannar
45	Mr. P. Thevasanjeevan		DWC (Vavuniya Regional Office)
46	Mr. G.M. Saranga	Assistant Director	DWC (Kilinochchi Regional Office)
47	Divisional Forest Officer (Zoom)	Divisional Forest Officer	Forest Department, Mullaitivu
48	Eng. N. Yogarajah	Director of Irrigation	Irrigation Department, Mannar
49	Mr. M. Mayuran	Senior Irrigation Engineer	Irrigation Department
50	Mr. K. Karunanithy		Irrigation Department
51	Anton Jeyamanon	Senior Deputy Director	Board of Investment, Jaffna
52	Mr. J. Suthagaran	Assistant Director	DFAR, Jaffna
53	Mr. I M G S Chandranayake (Zoom)	Assistant Director	DFAR, Mannar
54	Mr. Murukaiyah Kesavan	Assistant Marine Environment Officer	MEPA, Kilinochchi
55	Mr. A Sasitharan	Assistant Marine Environment Officer	MEPA, Mannar
56	Mr. P. Satheeskumar	Assistant Marine Environment Officer (acting)	MEPA, Jaffna
57	Mr. R. Pirasan		MEPA
58	Mr.N.Sooriyarajah	Assistant Director	DMC, Jaffna
59	Mr. P. Sutharsanathan	Assistant Director	DMC, Mullaitivu
60	Mr.S.Ravi (Zoom)	Assistant Director	DMC, Kilinochchi
61	Mr. Kantha J.	Deputy Director	UDA, Northern Province
Academic Institutions/Universities			
62	Mr. N. Ragavan	Lecturer	University of Jaffna
63	Mr. Krishnalingam Sockalingam (Zoom)	Assistant Director	Ocean University Sri Lanka, Jaffna
Local Authorities			
64	Eng. R. Sureshkumar	Chief Engineer	Jaffna Municipal Council
65	Mr. S. Mayoorathas	Development Officer	Velanai Pradeshiya Sabha
66	Mr. A. Pratheepan	Secretary	Kayts Pradeshiya Sabha
67	Mr. K. Whijayaeshwaran	Secretary	Karainagar Pradeshiya Sabha
68	Mr.S.Sribasgaran	Secretary	Point Pedro Pradeshiya Sabha
69	Mr. S. Balaruban	Secretary	Valikamam West Pradeshiya Sabha
70	Ms. S. Niraya	Development Officer	Mannar Urban Council

71	Mr. S. Kajanbun	Technical Officer	Mannar Pradeshiya Sabha
72	Mr. G. Piranavan	Technical Officer	Musali Pradeshiya Sabha
73	Mr. A.Anburasa		Jaffna District Fishermen's Co-operative Society Unions' Federation
74	Mr. N. Warnakurasinghe		Jaffna District Fishermen's Co-operative Society Unions' Federation

Minutes of the Stakeholder meeting- SEA for the Aquaculture Development Program in Northern Province	
Item	**Description**
Commencement	The stakeholder meeting to present the SEA study findings of the Proposed Coastal Aquaculture Development Program in the Northern Province was held on the 26th of August 2022 from 9.30 a.m to 1.00 p.m. at the Auditorium of the Jaffna district Secretariat. The District Secretary of Jaffna chaired the meeting. **The District Secretaries of the Jaffna, Kilinochchi and Mullaitivu delivered the opening remarks**. **Minister of fisheries, Hon. Douglas Devananda joined the meeting via virtual platform and delivered his key note address**.
Presentations	**Mr. B. Nirooparaj (Assistant Director/Coastal Aquaculture-Northern Province, NAQDA)** explained the Proposed Coastal Aquaculture Development Programme of NAQDA . **Mrs. Ramani Ellepola (Team Leader/SEA)** presented the Scope of Work of the SEA, brief findings of the SEA Study and Key recommendations of the SEA. **Dr. Kamal Ranathunga (Marine Ecologist/SEA Team)** presented information regarding the Environmental related findings and recommendations of the SEA. It was followed by the presentation of Mr. **T. Krishnaraja (Socio Economist/SEA Team)** on the social related findings and recommendations of the SEA. **Dr.Nimal Wijayarathna (Coastal Hydrologist/SEA team)** presented the Climate Change and hydrology related findings and recommendations which concluded the presentation session.
Discussion session	The discussion on the SEA findings was commenced after the presentations. **Mr. B. Nirooparaj (Assistant Director/Coastal Aquaculture-Northern Province, NAQDA)** stated that the NAQDA is proposing an act to facilitate the implementation of the proposed development plan. The act has inbuilt structures of GRM and technical assessment committees that would handle most of the negative impacts identified by the SEA study.
Mrs. R. Ketheeswaran, the District Secretary of Kilinochchi mentioned that she has doubt about the implementation of the plan, since the SEA study revealed a lot of negative impacts that would result from the aquaculture projects. In response to that, the SEA team mentioned that the SEA is a strategic level assessment on the proposed development plan and it is not too specific. The SEA helps the authorities to avoid highly sensitive areas for the project implementation that would reduce the project's risk for a greater extent at the strategic level itself. The SEA study doesn't reflect that the aquaculture should be prohibited. She further mentioned that the recommendations of the SEA and specific studies should be followed during the project implementation to avoid the negative impacts.	
Mr. R. Umakanthan, the Deputy Chief Secretary (Planning) of the Northern Province stated that the province has many experiences with failures of well planned, highly beneficial project, since those projects were not supported or consented by the people at grass root level. As he stated, though there are several other reasons for such un-supportiveness, the lack of awareness of the people about the project is the major one. Therefore, he suggested that the	

NAQDA's proposed development plan should ensure the community acceptance and the participation for their projects.
Mr. K. Vimalanathan, the District Secretary of Mullaitivu queried whether the SEA study has identified the farming locations suitable for each and every species for the culture. SEA team responded that the scope of the SEA study doesn't cover the site identifications and site-specific studies for each and every species.
Eng. N. Yogarajah, Director of Irrigation, Mannar stated that the SEA study has categorized the river basins as low-risk areas for the aquaculture activities. But, most of those river basins are flood-prone, especially that are in the Mannar district. As he stated, the Irrigation department manages the flood along the Malwathu-Oya river basin in Mannar with great effort. Further, the Irrigation Department has proposed a large-scale fresh water storage scheme centering the Pali aru. Therefore, he requested to include the proposed projects under the Irrigation Department to the SEA Report, to avoid future conflicts. The SEA team responded that 100m buffer zone to both sides from river banks are categorized as High risk areas. Also, the Flood Prone areas are also categorized as Low risk areas, not all the river basin area is classified as high risk. Further, the site specific studies should be carried out during the project implementation period in this regard for careful demarcation of the area. The SEA team agreed to include the proposed Pali-aru project in the SEA report.
Representatives of the Jaffna District Fishermen's Co-operative Society Unions' Federation (Mr. A.Anburasa and Mr. N. Warnakurasinghe) expressed their concerns related to the ongoing aquaculture activities in their area. They listed out each and every incident that has affected those fishers. While they appreciated the efforts the SEA teams took during the study period to meet them and listen to their views and opinions about the aquaculture, they stated that their concerns are merely reported in the Presentation made by SEA team. They further stated about the gaps on 1. the effort the NAQDA and other authorities take to ensure the participation of the Fisheries Cooperative Societies on site selection and licensing process of the aquaculture 2. the effort on solving fishers' grievances in relation to the aquaculture farms in their vicinity 3. the effort to limit the number and extent of the aquaculture farm within or adjacent to their fishing ground 4. the effort to control the illegal fishing methods to ensure the sustainability of the capture-based fishery 5. the efforts to develop the deep-sea fishery 6. the efforts to develop capture-based fishery rather than developing the aquaculture to fill the declining fish catch 7. the efforts to ensure the local fishers are the benefiting by the aquaculture rather entrepreneurs from outside They also demanded the stakeholder agencies to ensure their safeguards by regulating the existing aquaculture farms as soon as possible. The SEA team responded that the outcomes of the consultation had with the fishers, fisheries societies and other stakeholders have been well reported and considered throughout the SEA report. The presentation is the narrative form of the report and the report uses the outcomes of the consultations rather than each and every incident the fishers and fisheries societies are

stating. All the concerns of the fishers have been considered in the study and recommendations have been prescribed. At the same time, the fishers should work with the relevant stakeholders to solve any grievances and manage the existing aquaculture farms. The study is covering the NAQDA's development plan, but not to give solution to the farms that are operating at the moments.	
Eng. R. Sureshkumar, Chief Engineer of the Jaffna Municipal Council stated that the council is developing a few tourism locations that could fall within the SEA study area. The SEA team stated that the relevant details were already gathered from the council and incorporated into the report.	
The representatives of the Central Environment Authority, Northern Province queried whether the IEE/EIA is not required for the aquaculture projects under the NAQDA's development plan because the NAQDA is preparing a SEA. The SEA team stated that the SEA doesn't overrule any other requirements of authorities. The team suggested that the IEE/EIA should be prepared as required by the approving authorities to implement individual projects.	
Ending	The District Secretary, Jaffna summarized the outcomes of the session and requested the SEA team to ensure the comments and suggestions are incorporated into the SEA report. The meeting concluded at 1.00 pm.

Annex 6 - Minutes of the Community Consultations

Annex 6-A: Minutes of the Community Consultation at St. Joseph Fisheries Cooperative Society (FCS) at Achchankulam, Mannar

Date: 08.01.2022

Site/Location: Achchankulam, Nananttan, Mannar

The site has been identified by the NAQDA for culturing crabs and shrimp. The SEA team visited the site along with the NAQDA's Aquaculturist for Mannar district, Mr. Subramanium Madanraj.

Observations:

1. The location demarked by the NAQDA is in the vicinity of the Achchankulam fish landing site. Part of the earmarked site gazetted as a forest reserve by Forest Department.
2. The land is open land with no structures and encumbrances.
3. No agricultural activities were observed in close proximity
4. Livestock grazing was observed in the vicinity of the identified land.
5. The study team had the opportunity to discuss with Mr. S. Vinoth (0740232489), the President of the St. Joseph Fisheries Cooperative Society (FCS) of the Achchankulam at the site.

No	Matters Discussed	Outcomes
01	The landing site is temporary, shifted from its original location as per the instruction of the Naval Forces of the area during the war period. The present landing site doesn't have enough facilities and land to serve all the fishermen.	During the identification of suitable lands for coastal aquaculture, the history of the land to be investigated for such temporary shifting of fisheries infrastructures and facilities.
02	The Fisheries Cooperative Society has approached relevant stakeholders (District Secretary, Divisional Secretary etc.) to re-establish the previous landing site. Also, the fishers have already started to use that landing site and have established an access path along with the earmarked land. The earmarked land can be used to develop the landing site and other connected facilities in the future as there are more than 180 fishers in the area. Hence, the proposed aquaculture development may disturb the access to the landing site and limit the development of the landing site in the future.	The land selection process should analyze previous land use and future land use plans and proposals to avoid conflict with other plans.
03	The identified land is a fishing ground for around 30 women of the village. They collect crabs, shrimps, and fish by handpicking without any gears. Therefore, converting this environment into a closed aquaculture system will affect the livelihood of those women.	A detailed social impact screening process should be carried out before commencing aquaculture activities in any area.

		Aquaculture development should be utilized as a livelihood development programme for the local women.
04	The villagers used this land to access the landing site and to collect fish with no restriction at the moment. The land ownership will be changed and restrictions on land use will be taken place for the villagers if the aquaculture is implemented. The number of people benefiting from this land will be limited and the future generation will lose the opportunity to enjoy the benefits of this land due to these ownership changes and restrictions.	A participatory mapping practice should be adopted to identify the lands for aquaculture projects to avoid conflict of land uses.

Photos:

Plate i: The earmarked Land for the aquaculture, Achchankulam,Mannar

Plate ii: Achchankulam Fishery Landing Site

Plate iii: Existing Livestock grazing in the land earmarked for Aquaculture

Plate iv: Footpath or bicycle path access to the landing site

Annex 6-B: Minutes of the Community Consultation with Annai Sea Food (Pvt) Ltd, Jaffna

Date: 11.02.2022

Site/Location: Annai Sea Food (Pvt) Ltd, Jaffna

SEA team discussed with Mr. Edison, Manager of the Annai Seafood at his office. Annai Sea Food (Pvt) Ltd is engaged in seafood processing and exporting for more than 50 years and they are in the process to start their own aquaculture farm.

Matters Discussed:

No	Matters Discussed
01	He mentioned that Annai seafood has a very good collection network targeting the catch of capture-based fisheries in the northern province. With more than 50 years of experience in the industry, they have identified a decline in the catch from the capture-based fishery. The present input from this fishery is inadequate for their business and they have decided to move into aquaculture to fill this gap.
02	Annai seafood will continue operating its collection of capture-based fisheries in the future too. Therefore, the decision of moving into aquaculture won't impact the fishers.
03	He pointed out that the fishers have already experienced sea cucumber farming in their surroundings. So, the aquaculture in the lagoon is not a strange phenomenon for them. The Annai Seafood is planning sea cucumber culturing in small scale ranging from 2-6 acres only. So, it will not affect the traditional fishers. The Annai seafood has got the consent of Fishery Organizations for this purpose.
04	The location for the land-based shrimp farm was also carefully selected to avoid any environmental and social impacts. The Annai Seafood will establish 144 acres of *L. vannamei* farm through four phases. The construction work for the first phase will be commenced by July 2022.
05	The business has already provided around 350 to 400 employment opportunities for locals. The proposed aquaculture will generate another 150 employment opportunities. The business will establish a new processing center to handle the producers of aquaculture and it will generate around 500 employment opportunities. Annai seafood prioritizes the locals for employment and they have the confidence that all the vacancies can be filled by the local community.
06	The supply through the capture-based fishery is inadequate to use proper technologies like individual quick freezing (IQF). So, it is necessary to move for aquaculture to have a successful business.
07	The company has learned and experienced the declining catch from the capture-based fishery and few orders have been discontinued due to the shortage. Ex: a forward sale order for medium size shrimp has been dropped.
08	The landing site price for the catches is showing an increasing trend due to the entry of many buyers targeting the export markets. It impacts the fishers positively. But, negatively affects the domestic consumers. The aquaculture will provide the company a cost advantage for each unit of raw material used for processing. The cost of the shrimp from aquaculture will be cheaper than that of the capture-based fishery. Therefore, aquaculture will solve the problem of higher demand, shortage in supplies,

	and high prices for fish and shrimp. In this scenario, running a seafood processing business with aquaculture is most economical.
09	The demand for the traditional/ capture-based fishery will persist in good condition even after a boom in aquaculture too. There is a demand for wild catch shrimp and other fish varieties. Also, industries targeting the export market will target the produce of aquaculture due to several reasons discussed earlier. So, aquaculture will not negatively impact the livelihood of fisher folks.
10	As an investor, Annai seafood adopts a phase-wise approach to develop its aquaculture activities. The investment capital, capacity to handle the large-scale business at once, limited experience in aquaculture are the major reasons for this approach.
11	The licensing process is a very troublesome, inconvenient, and a lengthy process. It has taken four years to obtain the approval for the proposed farm of Annai Seafood. The delays happen in all the steps of the licensing process. It seems that the institutions involved in the process do not clearly understand the process and their roles in the process. Obtaining approval of the local authority is very difficult, especially when the council doesn't have the majority. Rather than considering the facts behind the approval process, the willingness and unwillingness of the council members are the matter for the local authority's approval. This is where the lengthiest delay occurs. The local authorities don't worry about the approvals and recommendations given by other institutions for their approval process.

Annex 6-C: Minutes of the Community Consultation with a Sea cucumber farmer, Ariyalai, Jaffna

Date: 10.01.2022

Site/Location: Sea cucumber farm, Ariyalai, Jaffna

Observation:

The study team met Mr. Diva who is a sea cucumber farmer in Jaffna lagoon at Ariyalai, Jaffna. His farm was visited and he was happy to show his stocks.

Matters Discussed:

No	Matters Discussed
01	He was confident that sea cucumber farming will not affect the environment and the traditional fishery if well planned and carefully implemented. Using wild-caught juveniles as stocking material should be avoided.
02	He commented that the current licensing process is reasonable but, all the stakeholders should be made aware well about the aquaculture. Currently, NAQDA is the only institution that has a positive outlook on aquaculture which has to be changed.
03	He mentioned that he has done several CSR activities for the host community. By seeing his farm, the community is now willing to start the farms by themselves.
04	He is very much positive about the profit of aquaculture activities. The entire value/supply chain of the industry should be developed. From the hatchery to the value addition need to be improved to obtain a best yield.
05	The brood stocks have to be caught from the wild to produce their own, healthy juveniles.
06	Poaching of sea cucumber is a major issue that the farmers face.
07	He farms sea cucumber and seaweed. He provided employment for 8 full-time workers and 10 to 15 women workers seasonally.

Photos:

Plate v: Features of the Sea Cucumber farm

Annex 6-D: Minutes of the Community Consultation with St. Thomas Eluvaitivu Fisheries Society

Date: 09.01.2022

Site/Location: Community Centre, Eluvaitivu Island, Jaffna

The president (Mr. Patric) and the Treasurer of Eluvaitivu St.Thomas Fisheries society were visited. NAQDA has identified a potential area for sea weed farming together with the fisheries society without affecting the fishing.

Matters Discussed:

No	Matters Discussed	Outcomes
01	Fishing and Palmyrah cultivation are the only livelihood resource on this island. Goat rearing is also available but not the main livelihood due to the shortage of water during the dry season.	Non-fishers family and women should have opportunities to involve in other income generation avenue.
02	The crabs caught by the fishers are sold to a private company. The company transports the crab produce to Jaffna and export the value-added products. The ILO is assisting the fisheries society to establish a facility for the value addition process within the island which will increase the farmer income and provide employment opportunities.	Aquaculture with value addition can create additional income and would cover more beneficiaries through employment opportunities.
03	No commercial agricultural practices on the island. There are only few people who have completed university education. Villagers are spending more on hostel fees to educate their children. There is a small hospital on the island. But doctors are not willing to come.	
04	Fishers face difficulties to get fuel for their boats. Villagers have requested a Fuel Station. Cold room would also help the fishers to store their catches until it is sold to the buyer.	Proper sustainable investment and operational arrangements are necessary to solve the villager's requirements.
05	There are 185 families out of 195 families are engaged in fishing.	
06	There are 01 sea cucumber farmer and 14 seaweed farmers engaged in aquaculture farming with the assistance of NAQDA. All those 15 are fishers too. Fishers consider aquaculture as a part-time and additional income source.	
07	They don't want outsiders to come into the island to carry out aquaculture farming and Outsiders' involvement may affect their income. They don't have enough investment capacity to start aquaculture. The	

	assistance of any donor agency and banks are necessary for them.	
08	People have no issue with the location identified by the NAQDA for aquaculture development.	
09	Women use to support seaweed farming activities. It is a great opportunity for them to generate some income.	
10	Public-private partnerships also should ensure that there is no dominancy or threat to resource ownership in the future. Proper legal support is necessary for society to positively look at the PPP.	

Annex 6-E: Minutes of the Stakeholder Consultation with Eluvaitivu Women's Group

Date : 09.01.2022

Site/Location : Community Centre, Eluvaitivu, Jaffna

Observation:

Around 15 women between the age of 20 to 25 were attending a workshop conducted by ILO.

Matters Discussed:

No	Matters Discussed
01	The women have been chosen to absorb into the proposed crab processing factory. The factory will be constructed by the ILO. The ILO conducted a workshop to aware and prepare these women to work in the factory.
02	The women have a positive opinion about aquaculture since it provides additional income to the family. Even the elderly people and women also can involve in aquaculture as it is within the Island. Fishers also can involve in aquaculture during their spare time.
03	The women stated that they would be unemployed and spend their time unproductive If the proposed factory is not in the island.

Annex 6-F: Minutes of the Community Consultations with Operators of the Seaweed Farming Site at Kondachchi, Musali, Mannar

Date: 08.01.2022

Site/Location: Kondachchi, Musali, Mannar District

The SEA team visited an existing seaweed farming site along with the NAQDA's Aquaculturist for Mannar district, Mr. Subramanium Madanraj.

Observations:

1. The boat landing site of the Kondachchi area was at the close proximity from the seaweed farm.
2. The farm is conveniently away from the boating paths.
3. The shoreline and the beachfront are free of structures and activities. The beachfront is a jungle in nature.
4. The farm is operated by a private company and the study team had the opportunity to discuss with one of the staff who was supervising the activities.

No	Matters Discussed	Outcomes
1	The method of seaweed farm operation was discussed. It was understood that the farm has been established with the inputs of the company and four workers are looking after the farming requirements. The workers are got paid by the company on monthly basis. The workers were happy about the farming since they get a regular income with reasonable efforts.	The private investment in small-scale aquaculture farms using the local workforce is feasible.
2	Each monoline unit of the seaweed farm is 25x25m in the dimension that yield 2000Kg of fresh seaweed every 40 days. The dry weight of this harvest is around 40Kg which would generate Rs. 3600 of income. Around Rs. 15,000 is required to establish such a unit of monoline and it can be used for several cycles of culture.	Monoline is an easy and convenient way to cultivate seaweed.
3	The fishing boats can't access the rocky shallow water in the area. Therefore, the area can be utilized for farming without conflict with fishing.	

Photos:

Plate vi: Monoline units of Seaweeds Farm

Plate vii: Seaweed varieties cultivated in the Farming Site

Annex 6-G: Minutes of the Stakeholder Consultation with Kala Jothi Fisheries Cooperative Society at Iruppity, Punkuduthivu, Jaffna

Date: 10.01.2022

Site/Location: Iruppity, Punkuduthivu, Jaffna

Observation:

The study team met few fishers of the "Kala Jothi Fisheries Cooperative Society" who are also the beneficiaries of the proposed integrated sea cucumber, Seaweed and sea bass culture in the area. The participants for the discussion were; Mr.Nageswararajah, K.Thilieepan, Kajenthiran, N.Sivarajah, R.Kugatheepan, S.Sayanthan, V.Ajanthan, S.Thinesh, Kulanthai Progash, and V.Nishanthan.

Matters Discussed:

No	Matters Discussed
01	Fishers mentioned that they are very much positive about aquaculture. They trust that the aquaculture won't harm the environment.
02	18 beneficiaries have been selected for this purpose and around 36 acres of the area (One Acre Plots) have been already identified and mapped by NARA. They mentioned that the area was selected consulting with the fishers and the Fisheries Cooperative Society. Therefore, it is not going to interfere with the fishing activities. These 36 acres are for farms and buffer zone.
03	"Yarkottu" is their current fishing method and they are not satisfied with the income due to the reduced fish catch. They said that aquaculture will be profitable since the sea cucumber is very expensive.
04	They said that women in the village also used to support their families on fishing. Some women own "Yarkottu" too. There are women in the selected group who carry out aquaculture too. Some of them have been selected for aquaculture farming.
05	They trust that the sea cucumber farming in the Allaipiddi area is the reason for abundant sea cucumber juveniles found in the Punkudutivu area last year.
06	They are not happy about the aquaculture licensing process. They commented as "Time consuming and unnecessary" about the current process. The proponent of an aquaculture farm should get the consent of fishers (On culture area), FCS, NAQDA (Technical feasibility), DFAR, Divisional Secretary, CCD, NAQDA, and Pradeshiya Sabha (PS). They said that the time taken to get the approval from Divisional Secretariat was the lengthiest one. The main reason for the delay would be the inadequate human resources with the stakeholders. Though the agriculture practices don't require approval (trade license), the PS wants the aquaculture farmer to get a trade license. They think this is unnecessary.
07	Although they are very much positive about aquaculture and there are enough space for farming, their investment capital is very limited to start a farm. Bank loans are very hard to access. Banks issue personnel loans for aquaculture. The fishers need to arrange two government officers as guarantors for this purpose. It is difficult for them to fulfill the above requirement.
08	Inadequate capital and facilities are the major reason hindering them to access the deep sea.

09	The sea around the Punkuditivu island is deeper enough to carry out sea bass cage culture. Therefore, integrated farming of sea cucumber, seaweed, and sea bass have been proposed. They trust the technical feasibility conducted by the NAQDA and they want the NAQDA to be with them throughout the culture cycle to ensure that the aquaculture is a success.

Photos:

Plate viii: Discussion with the fishers of Kala Jothi Fisheries Cooperative Society

Annex 6-H: Minutes of the Stakeholder Consultation with Fisheries Cooperative Society (FCS) at Madathuveli, Punkudutivu, Jaffna

Date: 10.01.2022

Site/Location: Fish Landing Site, Madathuveli, Punkudutivu, Jaffna

Observation:

On the way to the Punkudutivu, the team observed abundance of fyke net/Yarkottu and other fishing activities. The discussion with the fishermen and the representatives of the Fisheries Cooperative Society (FCS) was taken place at their landing site. Most of the participants are the recipients of the proposed sea cucumber farms. The NAQDA has identified 35 acres of shallow marine area for this purpose and 35 fishermen will get 1 acre per each. Mr.Nirmalan (President of the FCS), Mr. Chandrakumar (a member of the FCS), and other participants were very happy to share their opinion and suggestions about aquaculture.

Matters Discussed:

No	Matters Discussed	Outcomes
01	The fishers were very much positive and welcomed the proposed sea cucumber farming. They knew that the "yarkottu" fishing method needed to be given up and the aquaculture could be an alternate livelihood for them.	Fishers should be made aware of the aquaculture activities, the benefits and other impacts.
02	Fishermen said that they realize that the fishery resources is depleting; causing low income for them. They further said that aquaculture could be a promising secondary livelihood option.	A transitional plan to move the traditional fishery to sustainable aquaculture should be developed with the collaboration of NAQDA and DFAR to reduce the pressure on fishery resources.
03	The Aquaculture won't yield substantial income at the beginning.	Fishing and farming should go parallel until a substantial and a continuous income is gained.
04	More than one village shares the sea area for fishing. The aquaculture practices would create conflict with such resources usage unless a participatory mechanism is utilized to identify the location for aquaculture.	NAQDA and DFAR can carry out a participatory mapping practice in this regard.
05	A middleman, who is also from the same village purchase the catch of the capture base fishery and transport it to Jaffna (mainland).	

Photos:

Plate ix: Yarkottu fishing

Plate x: Fish auctioning point- Madathuveli, Punkudutivu, Jaffna

Annex 6-I: Minutes of the Stakeholder Consultation with Sea cucumber farm at Jaffna Lagoon, Ariyalai, Jaffna

Date: 11.02.2022

Site/Location: Sea cucumber farm, Jaffna Lagoon, Ariyalai, Jaffna.

Met Mr. Diva (President of the association) and a member of the association at their sea cucumber farms in Ariyalai area. The farms are located in the Jaffna lagoon. The study team observed fences and observation points within the lagoon which were part of the aquaculture farms.

Matters Discussed:

No	Matters Discussed
01	Mr. Diva introduced himself as a full-time aquaculture farmer. He was very positive about farming and considered this as most economical and environmentally friendly industry.
02	Other Member is a capture-based fisherman and sea cucumber farming is his part-time profession. He owns fishing boats as well. He stated that most of the fishers are interested in aquaculture and a considerable number of them are already involved in sea cucumber farming.
03	The Jaffna lagoon is suitable for sea cucumber farming. But, the freshwater intake during the monsoon affects seaweed farming.
04	They pointed out that, the capture-based fishery is intensively happening in the lagoon. Fyke net and stake net fishing are the major fishing methods. Each of these net units spread over 300m and there should be a 100m buffer zone in between. So, each fishing units cover a huge area. Within this area, two farmers can successfully carry out sea cucumber farming. Also, the seaweed can be grown within the sea cucumber farms. In this way, the sea cucumber farming can yield more income and cover comparatively more beneficiaries.
05	They mentioned that the sea cucumber farming using hatchery-based juveniles helps to increase the wild sea cucumber and shrimp which supports the capture-based fishery too. Also, they said that they have understood the benefit of farming. If the aquaculture will negatively impact on capture-based fishing, they wouldn't have been involved in aquaculture.
06	Around 10 full-time employments and 20 seasonal employments have been generated by 10 acres of a sea cucumber farm.
07	They mentioned that more fishers are looking for opportunities to get into aquaculture. The financial constraint is the major challenge they face.
08	The licensing process was not an issue for them. They were able to get the license within 6 months.
09	They stated that most of the fishermen have more than one fyke net. Few of them roam more than 10km on their boats to cast this fyke net or stake net. This illegal fishing cannot be simply considered as a means of livelihood. Aquaculture is economically and environmentally beneficial than those destructive fishing methods and can cover more beneficiaries in a unit area.

10	In a few instances, the fisherman who had several fyke nets/stake nets have replaced a few of those nets with sea cucumber farms. They have the understanding about farming and they earn income from both capture-based fishery and aquaculture.
11	They think that almost all the fishers are willing to involve in aquaculture. However, since they don't have enough capacity or capital to start it, they tend to object aquaculture to secure their fishing area.
12	Aquaculture doesn't require the full-time involvement of a farmer. Therefore, they can continue their capture-based fishery while involving in aquaculture which will enhance the regular family income.

Photo:

Plate xi: Sea Cucumber Pen Culture

Annex 6-J: Minutes of the Consultations with Suganth International (Pvt) Ltd, Jaffna

Date: 11.02.2022

Site/Location: Suganth International (Pvt) Ltd, Jaffna

SEA team had a discussion with Mr.Steapan, in charge of Suganth International at his office in Jaffna. Suganth International (Pvt) Ltd has been involved in the seafood industry, especially the sea cucumber processing and exporting business for several years and they are involved in sea cucumber farming as well.

Matters Discussed:

No	Matters Discussed
01	The company operates two farm units in Jaffna lagoon (Kakkaitivu) and Iranaitivu. The Kakkaitivu is not a perfect location for the purpose due to the higher turbidity and freshwater intake during the monsoon period. It has taken a year to harvest the sea cucumber. The farm in Iranaitivu is a Business-Community Partnership with the fishers. The company has a farm of 10 acres with another 10 acres of the nursery. At the same time, the company has supported 80 farmers to establish farms in 80 acres and the stocking material is supplied by the company. The fishers will manage the farm and the company will purchase back the harvest for a reasonable market price.
02	The company has identified a location closer to Kowtharimunai for a new sea cucumber farm and a sea cucumber hatchery is about to start in Mannar.
03	The company supports the fishers to involve in aquaculture without conflicting with the traditional fishery.
04	The Business-Community Partnership of Iranaitivu also has some drawbacks. Few fishers failed to sell the harvest to the company. It is a burden or loss for the company. NAQDA may interfere in such situations as per the agreement with the fishers.
05	The company has understood that the fishers are not fully willing to accommodate aquaculture in their area. So, implementing the NAQDA's plan might be a challenge.
06	The company in Jaffna has generated 20 employment opportunities.
07	Inadequate space for establishing the farm is the limiting factor for expansion. Iranaitivu and Pallikkuda are the highly suitable areas for sea cucumber farming. Though the location is suitable, the fishers of those areas don't want others to enter into their area for aquaculture farming.
08	The company experienced loss on the first few culture cycles due to the monsoon. Therefore, site selection is highly critical as a risk reduction strategy.
09	There is a difference between capture-based and culture-Based Sea cucumber farming. The shrinkage during the processing is very high in the culture-based sea cucumber farming.
10	Sea cucumber farming cannot be done in the same area for a long time. The location needs to be changed (rotation) for optimum yield.

Annex 6-K: Minutes of the Consultations with the members of the Erukkalampitty "Kaddu valai" fisheries rural association

Date: 13.02.2022

Site/Location: FCS building, Erukkalampity, Mannar.

The consultation was conducted with the members of the Erukkalampitty "Kaddu valai" fisheries rural association, which is the CBO representing the fishers of the Erukkalampitty where a large-scale Shrimp farm is being established. The representatives of the DFAR who attended the provincial level stakeholder consultation session stated that they received several complaints from the villagers regarding this farm and this consultation was organized to understand the issues of the fishermen.

Matters Discussed:

No	Matters Discussed	Outcomes
01	There are around 92 Kadduvalai fishers under this rural fisheries association. The association has been registered under DFAR, Mannar.	The marketing networks should be strengthened for the success of aquaculture. When Aquaculture is practiced as a secondary livehood of fishers, it should match with the seasonal variations of the capture-based fishery. Aquaculture farms should be resistant to seasonal fluctuations. A social impact assessment should be conducted to ascertain the social impacts of
02	The Kadduvalai fishing is practiced with 5m height poles. This fishing method targets fish, shrimp, and squid fish and can be practiced throughout the year.	
03	The participants mentioned that the NAQDA assisted a few of their villagers in carryingout seaweed farming in their area under a forward sale agreement. Although the seaweeds are successfully cultivated, buyers do not tent to purchase the harvest.The sea bass culture has been affected due to the "Burevi" cyclone. The assistance for aquaculture was given by the NAQDA in a phased approach. The gaps between the phases were too much, thus most of the farms have failed. In addition to this, the assistance has not compatible with the seasonal patterns of the fishing activities. The fishermen were not able to concentrate on the aquaculture activities when the assistance was reached during the peak seasons of their fishing activities. Because of this, they lost confidence in for aquaculture.	
04	They further stated that marine-based aquaculture is highly vulnerable to seasonal climatic changes. So, it can't be considered a sustainable livelihood. But, the land-based aquaculture would withstand such seasonal variations as wind, salinity variation, and wave actions. They have enough suitable lands in their area for this purpose. Though such farming cannot accommodate all the fishers of the area, it will benefit a considerable number of them.	
05	According to the agreement, the shrimp farm should not discharge effluents outside the farm; the farm didn't abide by the agreement and discharging effluents into their fishing ground which affects around 50 members of their society. They mentioned that the farm agreed with all the demands made by the villagers earlier, but the	

	farm doesn't bother about the agreement now as the farm is running successfully.	the farms before implementation. Proper awareness creation about the aquaculture needs to be made in rural areas, before the implementation. A participatory monitoring structure to be established and maintained for a socially responsible farming industry.
06	The fishers stated that the authorities are not requesting the consent or the opinion of the fishers when the farm is land-based, especially when it is situated on private land. The villagers get to know about such developments only when the actual implementation is started at the site. The authorities should understand that the land-based aquaculture can also impact the host community and they should listen to their concerns.	
07	They further stated that the heavy vehicles are deployed to the farm during the night to avoid inconvenience to the villagers. But, the rural road networks are heavily damaged due to this heavy vehicle movement. The roads have not been designed to tolerate such heavy vehicles. Further, they said that the access paths used by the fishers to reach their fishing ground have been interrupted by the farm and the fishers are using a bypass road with some difficulties.	
08	They also mentioned that their members are concerned about the power generator the farm uses. The fisher hears the humming sound of the generator even under the water. They are worried that this sound could impact the fishmovements.	
09	They mentioned that they will not oppose an aquaculture venture if it is designed and implemented in a way not to harm the capture-based fishery and other livelihoods of the villagers. Same time, they expect that a well-structured participatory monitoring mechanism should be established to ensure the farm is practicing best practices to avoid impacts on the surrounding community and the environment.	

Participants:

S.No	Name	Sex
01	Mr.N.L.Nasmin	Male
02	Mr.F.Shafan	Male
03	Mr.A.M.Aamkan	Male
04	Mr.AP.Ameen	Male
05	Mr.A.R.Sabutulla	Male
06	Mr.M.M.Rizwan	Male
07	Mr.F.Zarfan	Male

Annex 6-L: Minutes of the Consultations with a Fisherman affected by Sea Cucumber Farming

Date: 19.05.2022

Site/Location: Anthoniyarpuram, Iluppaikadavai, Mannar.

Mr.Robin, a fisherman in Anthoniyarpuram , Mannar district was consulted in his village. He was engaged in fishing along the seashore where several sea cucumber growing pen structures are installed at the moment.

Matters Discussed:

Matters Discussed	Outcomes
Mr.Robin was an active fishermen in Anthoniyarpuram. He is a father of three children. One of his daughters is working in crab processing centre in his village and another one is working as a Nurse. His son has joined with him for fishing. He used to catch shrimp, fish and sea cucumber near the shore of Iluppaikadavai. He observed a continuing decline of fish catch due to the increased fishing effort by more fishermen with more fishing gears. However, he was able to feed his family with the income from fishing. His fishing ground was later fenced for sea cucumber farming by another fisherman of his village. Mr.Robin lost his livelihood since he had to find an alternate option. He sold his fishing gears and purchased some new gears that can be used in deeper sea. He started catching fish, and squids in deeper sea, and managed to bring back his income to the previous level. He believes that the sea cucumber farming doesn't affect the fishers livelihood. According to his opinion, the fishers should understand that the aquaculture is also a good option for livelihood development. He suggested that the fishers should adopt their fishing methods while leaving enough space for aquaculture along the shallow coastline to balance the declining income from the fishing. He considers that the inadequate financial capacity is the major issue of fishers not to engage in aquaculture. He finds his village as a potential area for both the land based and marine based aquaculture.	There are options for the fishers to modify their fishing methods, to accommodate aquaculture.

Annex 6-M: Minutes of the Consultations with a Sea Cucumber Farmer converted his traditional "Sirakuvalai" fishing ground for sea cucumber farming

Date: 20.05.2022

Site/Location: Gurunagar, Jaffna.

Mr.Gunasingam who is operating a sea cucumber pen culture in Mandaitivu area shared his experience of converting his traditional fishing ground for a sea cucumber farming.

Matters Discussed:

Mr.Kunasingam is a 41 years old fishermen of Gurunagar area in Jaffna. He is the head of his four-member family and the only income generator. Mr.Kunasingam's family had four units of Sirakuvalai (kalnkaddi) sites in Mandiativu area, passing through their ancestors as the customary territorial rights. Those four units of Sirakuvalai were operated by him along with his brother. He was enjoying a considerable catch from this fishery till ten years back. Later, his catch was declined due to increasing number of Sirakuvalai fishers and gears. The fishers in this area used two types of Sirakuvaial gears for shallow water and for little deeper water.

Mr.Kunasingam negotiated with his brother to convert one of their Sirakulvalai fishing site into a sea cucumber pen culture farm. His brother only agreed to take care one out of the four sirakuvalai because he can't manage more than that. Though he knew that he could construct four acres of sea cucumber pen within the area accommodated by three units of his sirakuvalai, he invested around 6.5 Million rupees from his savings and money lent from a local financier (Village man) to cover the pen construction, stocking, and for all other working capital of a 2 acre sea cucumber farm. His limited investment capital and the fear of investing at once prevented him to go for a four-acre sea cucumber farm. He provided five full time employment in the farm. At the end of the culture cycle, the farm generated 11 Million rupees as income. His total profit was around 4.5 Million Rupees. He never had such profit from the sirakuvalai fishing ever. He was very happy that his farming was a success, and it changed his life at all.

He used to spend most of his time on sirakuvalai fishing earlier. He had to dive under water to fix the sirakuvalai net at the bottom of the sea without proper safety arrangements. Now, he has five employees to assist him on securing the farm and he got enough time to spend with his family. He is satisfied because no more risk is involved in his career. He is also an entrepreneur in his village, other than a fisherman.

He used both the fingerlings obtained from the NAQDA's nursery and the juveniles caught from wild. The juveniles he stocked, reached to the marketable size within five months of the culture cycle and the Fingerlings from NAQDA's nursery took around 9 month to harvest. Because of the wild caught juveniles, his farm generated income from sixth month of the culture. He understood that the wild caught juveniles are expensive as well. He left around 200 sea cucumbers in his pen un-harvested, expecting those sea cucumbers will lay eggs and will help him to find Juveniles for next culture cycle. He feels that facilities should be available to grow the NAQDA's fingerlings into the juveniles to reduce the lead time for the income generation.

He considers the poaching or stealing of sea cucumber from the pen as a major issue in the farming. But he also knew that the stealing is not something unfamiliar in fishing. His fish catches have been stolen by other fishers from his Sirakuvalai earlier.

He found that the CC&CRMD clearance for the farm licencing was a very tough and a time-consuming process. Local Authority (Pradeshiya Sabha), CC&CRMD, CEA, NAQDA and DFAR were visited the site for licensing purpose and NAQDA is visiting the site more frequently throughout the culture cycle.

He is now considering about stocking fish along with Sea cucumber to test the feasibility to earn additional income. As per his estimates, a fishermen will need to invest around 2.5Million rupees if he wants to move the sirakuvalai units to a deeper area to spare some space in the shallow water for pen culture.

Annex 6-N: Minutes of the Consultations with a Fisherman who lost his "Sirakuvalai" traditional fishing ground due to an installation of Sea Cucumber pen culture

Date: 20.05.2022

Site/Location: Gurunagar, Jaffna.

Mr.Jesurajah Raymon is a Sirakuvalai Fisher in Jaffna lagoon and he lost part of his fishery ground due to the installation of a sea cucumber pen culture.

Matters Discussed
55 years old Mr.Raymon lives in his own, permanent house in the Gurunagar area of Jaffna. He is the head of a five-member family. His wife is a not employed and two (25 and 23 years old) of his sons have completed GCE A/L and the other son (18 years old) is following GCE A/L now. The elder son is economically active, and he owns six units of Sirakuvalai for fishing. He owns two fishing boats for Sirakuvalai (15hp) and Saalai valai (8hp) fishing. Mr.Raymon was a traditional Sirakuvalai fisherman, and he moved into "Saalai valai" fishing six years ago. He had 10 units of Sirakuvalai which earned him an average monthly net profit of Rs. 30,000. His sirakuvalai fishing was shallowand uses timber poles to erect the nets. Previously, he experienced a 90% reduction in fish catch because of the intensive sirakuvalai fishing in the lagoon. He believed that the fish migration and reproduction have been disturbed due to the intensed sirakuvalai fishing and sea cucumber pen culture. He also understood that the use of nets with smaller mesh size for the Sirakuvalai and other fishing methods is highly destructive and significantly contributes to the decline of fish stock in the area. He mentioned that the number of boats were increased after the resettlement and development organizations issued boats to fishers to lift their livelihood. But it has resulted in the increasing of fishing effort. Each unit of the Sirakuvalai can be used for fishing for around 22 days per month. So, he was using his net units rotationally to ensure a regular income throughout the month. However, he lost the space of four "sirakuvalai" units since a sea cucumber pen was installed in that area. His monthly income of Rs. 30,000.00 reduced to Rs. 20,000.00 because of this. Though he is managing the regular expenses of his family through the income from his "Saalai Valai" fishing and the income of "Sirakuvalai" operated by his son, he is more vulnerable to unexpected expenses and other social obligations. He used to get loans from others to manage such obligations. He is unable to involve in aquaculture because of its financial requirements. He wants to continue his livelihood in the capture-based fishery. One of his sons got an opportunity to enroll in a government university. But, he refused to enter the university to continue fishing. He expects a well-regulated capture-based fisheries sector to avoid destructive fishing methods.

Annex 6-O: Minutes of the Consultations with women group engaged in collecting sea cucumber by hand picking (Anthoniyarpuram women fishers group)

Date: 19.05.2022

Site/Location: Anthoniyarpuram, Iluppaikadavai, Mannar.

A woman who is involved in collecting sea cucumber from the sea was consulted to identify her socioeconomic status and the impacts of aquaculture farms in her area.

Matters Discussed:

Matters Discussed	Outcomes
Mrs.P.Elizabeth, who is 55 years old, is the breadwinner of her three-membered family . Her husband was a fisherman until he got paralyzed. Her daughter has completed her GCE A/L examination and has got the admission to university of Jaffna. Mrs.Elizabeth has started to collect wild sea cucumbers and shrimp by hand picking when she was 15 years old. The sea cucumbers were sold to private buyers for processing. She used to catch shrimp from October to January and the sea cucumber from January to October period. She had to struggle with low income because of the low catch and the low price for matured sea cucumber. Because she is well experienced in catching shrimp and sea cucumber, she was able to catch around 15kg of shrimp per day during the peak season earlier. She formed the "Anthoniyarpuram women fishers group" along with another 30 women of the same profession in her area. It has been expanded with the resettlement after the civil war in 2009. Currently, there are around 51 members in her group and around 50% of them are the breadwinners of their families. She had an opportunity to catch wild sea cucumber Juveniles from February onward of this year. She was not interested in sea cucumber juveniles because of the absence of a proper market for it earlier. However, with the recent development in sea cucumber pen culture in her area, she identified that the sea cucumber juveniles can be sold to those farms for culturing. Other members of her womens' group also joined her and started to catch sea cucumber juveniles in addition to the matured sea cucumber. Because of her 40 years of experience in sea cucumber fishing, she manage to collect 40 to 50 juveniles per day. Most interestingly, she has collected around 130 pieces of juveniles on the day that the SEA team met her. She was getting 50 rupees for each Juvenile earlier and the price has increased up to Rs. 130 now because of the demand. She earns a minimum of Rs. 5,000 daily income from this Sea cucumber Juveniles collection at the moment. A few of her colleagues who joined sea cucumber collection only after the war, find it difficult to catch such a number of sea cucumbers because of their inadequate skill and experience.	Sea cucumber pen culture has created a demand for undersized sea cucumbers. Women and the vulnerable are finding a source of income because of this developing industry.

Other fishermen of her village accommodates her and other members of her group in their boats to the fishing ground. They prefer nighttime to collect sea cucumber though it is prohibited. She has to stay in the water at the level of neck height from 8.00 pm to 5.00 am if it is a night time fishing, and 5.00 am to 01.00 pm if it is day time fishing. She believes that the recently started sea cucumber pen culture could be the reason for the abundant number of sea cucumber juveniles she found in her area for the last two years consecutively. She stated that she was able to find sea cucumber juveniles once in every five years until the sea cucumber pen culture is started in her area. She is happy as she was able to find juveniles throughout the year and she could catch all the sizes of the sea cucumber she encounters because they can be sold to the farms if they are undersized for the processing industry. The major problem she encountered in this fishery was the conflicts with other fishers who use shrimp cages and nets on the same fishing ground. When there are damages caused or fish are stolen from other fishers' nets, conflicts aroused between those fishers and the women groups Mrs.Elizabeth belongs to. However, the proper communication with other fishers and coordination with the DFAR and Police, she is managing such conflicts well. She is leading her women group toward establishing and operating a sea cucumber pen farm for themselves. She has motivated the group members to save some money to invest on the farm and she expects some external financial assistance for this purpose.	

Annex 6-P: Minutes of the Consultations with the employees of Taprobane Sea Food Group's Shrimp Farm, Erukkalampity, Mannar

Date: 13.02.2022

Site/Location: Taprobane Sea Food Group's Shrimp Farm, Erukkalampity, Mannar.

The consultation was conducted with the five farm employees who are members of the host community of the Shrimp Farm.

Matters Discussed:

No	Matters Discussed	Outcomes
01	Mr. Mahroof (71 years old) is working in the shrimp farm for the last three years as a farm worker. He mentioned that there were objections from the villagers during the establishment of this farm. He was also one among those who objected to the farm. He thought the farm would harm the community impacting the environment and the fishery. But later he understood that the farm doesn't create such impacts and decided to join the farm as a worker. He is fully aware of the daily routines of the farm, and he is very much sure of his knowledge that there are no major impacts to the external environment and fishery. He further said that he was looking after his coconut lands before joining the farm. Now, he does look after his coconut land and works as a farm worker. He is happy that his regular income has been secured.	The aquaculture farms in the locality could employ vulnerable and part-timers who can't access other formal employment in towns. Proper awareness creation about the aquaculture needs to be made in rural areas. A participatory monitoring structure to be established and operated for a socially responsible farming industry. The measures each farm takes regarding social and environmental safeguards should be well disseminated to
02	Ms. Riyana (43 years old), working as the Store In-charge of the farm stated that she is the president of the Women Society of the village. She said that she supported the farm since its establishment. She had to face the objections from her co-villagers. They thought that the farm will harm their social and environmental well-being. She further mentioned that the lack of awareness and the influence of a negatively motivated group of people could be the reason for their objections. According to her, around 50% of the village population has understood the reality and might have changed their negative perceptions about the farm. Her relationships with the villagers are still healthy and she face no hardships from them. According to her knowledge, she engaged in the farm for the last three years and observed the farm is well secured and no effluents are discharged from the farm. Many people including the FCS of her village visited the farm to witness the farm activities. She stated that all those who visited the farm were satisfied with the farm's procedure and no impacts were identified. Around 20 workers of this farm are from her village and around 30 more are working in the crab processing center in Pesalai operated	

	by the same company. So, people consider this recent development as a good opportunity for them to get some employment. She said that the members of the Women's society re-nominated her as the president of the society last year. She understands that the society members didn't discriminate against her as she is working in a company which was considered as an impact for their wellbeing.	the general public promptly. The aquaculture farms should employ villagers as trainers so that the host community can acquire the skills and qualifications necessary to capture those job opportunities in long run.
03	M.N.F. Rizla (23 years old, female), who belongs to the Muslim Community said that she didn't consider getting employed in a company away from her village because of cultural considerations and transport issues. Because the farm is operating within the village, and the farm provides meal facilities, it is very much convenient and safe for her to work. Unless she would be unemployed by now.	
04	K.N.Kan, a 25 years old Male, said that he was practicing on-the-job training in Colombo as he was following a hotel management course in NAITA, Mannar. His training was disturbed by the current COVID situation, and he had to come back to his village. He was struggling to find a temporary job but got an opportunity to work on the farm as a farm worker. The farm has recognized his skill and he is working as a plumber in the farm now.	
05	Mrs. Moosina(56 years old) stated that she joined the farm since the establishment of the farm. She was a daily wage agro farm worker before joining this shrimp farm. She said that she feels safe because of this formal employment.	
06	The participants said that the farm management has given necessary facilities and freedom to maintain their religious and cultural norms and requirements. They said that there are no discriminations they face in their village because they are working in a multi-ethnic working environment. The farm management practices a "gate pass" system for the workers to go out to the farms for their essential needs. Unnecessary movements of the farm workers to the village are highly managed. Same time, there is no issue for farm workers in the village to access the shops and other services whether they are of the same village or from outside. There are no complaints from the village about inappropriate activities of any of the farm workers until now.	
07	The landowner of the farmland and the Manager of the farm are the key focal points for any external grievances. The farm makes sure that all the grievances are solved at the village level promptly.	
08	The monthly salary the farm pays is comparatively less than that of a daily basis salary. The participants feel that the raise in salary level may be necessary to enjoy the full benefit of the farm.	
09	They further said that the villagers don't aware of the jobs the farm has created, and the skills and qualifications necessary for those jobs.	

Participants:

S.No	Name	Age (in Years)	Sex
01	M.N.F.Rizla	23	Female
02	Y.RIyana	43	Female
03	K.N.Kan	25	Male
04	S.H.Mahroof	71	Male
05	M.Moosina	56	Female

Annex 6-Q: Minutes of the Consultations with the representatives of Fisheries Cooperative Societies(FCSs) in Jaffna District

Date: 19.05.2022

Site/Location: District office, Department of Fisheries and Aquatic Resources (DFAR), Jaffna.

The Assistant Director of the DFAR and his staff in the Jaffna district were consulted along with representatives of Fisheries Cooperative Societies (FCSs) of the Jaffna district.

Matters Discussed:

No	Matters Discussed
1	There are 113 Fishery landing sites in the Jaffna district. There are 136 beach seine net fisheries in operation along the eastern coast of Jaffna district from Chundikkulam to Katkovalam. There are no beach seine net fisheries along the western coastline of the district. Nearly 80% of those are owned by the locals and the rest are belongs to the fishers from the Chillaw area. An intense Sirakuvalai fishery is observed in the Jaffna lagoon. There are 3,300 registered sirakuvalai units are in operation in the lagoon. There are around 20 multi-day boats in the district, and they are operating from Point Pedro and Mayilitty fishery harbors. There are around 22,624 active fishers belonging to around 22,031 fishing families.
2	The DFAR office record and forward the grievances to NAQDA, they received from fishermen related to aquaculture farms especially sea cucumber farms.
3	The representative of the Jaffna District Fishermen's Co-operative Society Unions' Federation stated that the sustainability of the capture-based fishery should also considered when expanding the Aquaculture. According to him, most of the time aquaculture is only affordable for wealthy people who have investment capacity.
4	The aquaculture in coastal water affects the fish migration paths and the patterns which negatively impact the fisher's livelihood.
5	The aquaculture forces the capture-based fishers to equip themselves with expensive fishing gears and crafts to exploit deep-sea resources. Not all fishers can afford such a transition.
6	The aquaculture in the shallow marine areas also changes the rights of resource usage. Aquaculture farms are mostly owned by outsiders who have no link to the community in the area and fishing since aquaculture requires more investment capital that is not affordable to small-scale capture-based fishers. The aquaculture license authorizes an external party to own the resources which have been exploited by small-scale fishers for a generation. It creates a conflict of ownership rights over the resources.

7	The productivity of the coastal areas and the consequences of the aquaculture development in the coastal environment should be well studied. A methodology to practice culture and capture-based fishery parallel could be the best arrangement. The efficiency of the farm's practices as agreed by the project proponents and the efficiency of the farm monitoring by regulatory authorities are highly questionable.
8	The fishers are not objecting all the aquaculture projects. But, they seek some additional consideration in implementing aquaculture. Same time, the feasibility of deep-sea aquaculture also should be studied to safeguard the small-scale coastal fishers.
9	The fishers believe that the authorities are give preference to external entrepreneurs in issuing aquaculture licenses but not the local fishers. The complaint is that the Authorities take more time to issue the license for local fishers.
10	The sea cucumber pen culture operators are erecting several fences around their farms and accusing the fishers as they are stealing sea cucumbers from the pen. Such situations are unfavorable and heavily affect the livelihood of the fishers.

Participants:

No:	Full Name	Designation and Organization
1	J. Suthagaran	Assistant Director, DFAR, Jaffna District Office
2	N. Maheswaran	District Fisheries Officer, DFAR, Jaffna District Office
3	A. Jeyandran	Department of Fisheries
4	Mr.Subramanium Madanraj	Aquaculturist, NAQDA
5	Mr.Baptist Amban Soosai	Aquaculturist, NAQDA
6	N. Varnakulasingam	Vadamarachchi Fisheries Cooperative Society
7	K. Rajachandran	Karainagar Fisheries Cooperative Society
8	A. Anburasa	Jaffna District Fishermen's Co-operative Society Union's Federation
9	S. Anton Sebarasa	Velanai Fisheries Society
10	T. Prabakaran	Fisheries Cooperative Society
11	Y. Wijithie	Paashayur Fisheries Cooperative Society
12	C.E Stevenson	Gurunagar Fisheries Development Society
13	S. Rongalidas	Gurunagar Fisheries Development Society
14	S. Antonydas	Gurunagar Fisheries Development Society
15	S. Sathyaseharan	Gurunagar Shrimp Association

Annex 6-R: Minutes of the Consultations with the representatives of Fisheries Cooperative Societies(FCSs) in Kilinochchi District

Date: 19.05.2022

Site/Location: Office of the Federation of Fisheries Cooperative Societies (FCSs) in Poonakary, Mulankavil, Kilinochchi.

The consultation was taken place with the representatives of FCSs of the Poonakary DS division in the Kilinochchi district and a few of the aquaculture farmers in the division.

Matters Discussed:

No	Matters expressed by the participants	Outcomes
1	The participants stated that the fishing grounds can't be mapped because the fishing is in place throughout the Continental Shelf, according to the season and the type of fishing. They assisted the SEA team in locating the fishery landing sites on a google map.	A map was prepared with the fishery landing sites in Kilinochchi district. The improperly located sea cucumber farms could result in the decline of fish catch. Small-sized sea cucumber farms with the involvement of the FCS can be encouraged with out conflicts with capture based fishery. The fishers should be the owners of the aquatic farms. Engaging
2	One of the participants representing the FCS stated that the large-scale aquaculture could affect the land and other resources. So, the possibility of running a small-scale backyard-type aquaculture farm should be studied and promoted. It could save resources and benefit most people since it doesn't require large investment capital.	
3	Beach seine fishing was not a prominent activity after the 1980s because of the war. There is no beach seine fishing active along the western coastline of the district though there are places gazette under Madal Regulations.	
4	The recent development of the sea cucumber pen culture, that are located within the shallow sea and the river mouth, has affected fish reproduction. The "Nallayan FCS" of Poonakary has around 120 fisher members and their livelihood is affected by the installation of sea cucumber pen culture.	
5	The fishers expressed their dissatisfaction with the licensing process. They said that the authorities are satisfied with the consent of an FCS though the location is being utilized by the members of several FCSs. Also, there are sea cucumber pen cultures that are established without licenses. The fishers proposed that the sea cucumber pen of small size (1 acre) can be encouraged. The poor and vulnerable should be given priority in selecting beneficiaries for aquaculture farms. There is enough space available for water and land-based aquaculture. The FCS should be considered as the focal point for these aquaculture farming. FCSs can involve in beneficiary selection too.	
6	The fishermen in "Kiranchi" area are engaged in sea cucumber farming in their fishing ground. Capital availability is the major limiting factor for them to engage in aquaculture. They stated that the wild-caught sea cucumber juveniles are better and fast-growing.	
7	Currently, it is difficult to continue capture based fishery in the "Nallur" and "Nagathevan thurai" areas due to the very shallow, muddy, and high	

	saline fishing ground. There are possibilities to establish land-based aquaculture in those areas.	them as the labours to those farm won't bring much beneficiaries
8	DFAR recommended that the four units of sirakuvalai can be operated within 10 acres of the water surface as per the DFAR regulations. But, only two units can be operated now as the Sirakuvalai fishers are using larger size units than the recommended. Accordingly, only two people can be benefited from the 10 acres of marine area the sirakuvalai is being practiced. But a minimum of 10 people will be benefited from these 10 acres of area if it is converted as a sea cucumber pen. It will generate another 10 full-time employment opportunities as security and cleaning persons. It also will provide around 50 person-days of employment for sea cucumber juvenile collectors. The farming would require around 10Mn rupees of initial investment and will generate around 10Mn rupees of net profit per cycle. The cost for the next two cycles will be lower than that of the first cycle. So, the sea cucumber pen culture would be beneficial to the fishers if they are operating the farms on their own. But, it negatively affects the fishers if the fishing ground is licensed to an external entrepreneur and the fishers are employed on those farms as workers.	
9	The number of fishers and the number of fishing gears each fisher is using for fishing has increased now. It has resulted in declining fish catch. According to DFAR guidelines, a fisherman can use only one Sirakuvalai unit. But, each fisher has more than four units on average. Each fisher has got a minimum of 5 shrimp cages. If the fishing effort is reduced, each fisher can get enough income from the very minimum number of fishing gear. The aquaculture can be practiced with no conflict with the capture-based fishery.	
10	There are abandoned land-based aquaculture facilities in the Poonakary DS division. Actions should be taken to re-commence them.	

Participants:

Name	Society	Contact No:
Vallipuram Thayetha	Palavi Fisheries Cooperative Society	0763301689
Senior Navarathnam	Kirangi Shrimurugan Cooperative Society	0767995983
Subramaniam Aratchelvi	Nallur Fisheries Cooperative Society	0772937630
Krishakanthan Nishanthini	Nallur Fisheries Cooperative Society	0776870349
Balasuresh.V	Anbupuram Fisheries Society	0771383606
S. John Kennedy	Iranaithivu F.L. B	0773367766
B.Thayarasu	Nallayar Society Nachikkulam	0740844596
S.Thomas Amalathas	Nallayar Society Nachikkulam	0740844596
Y.Francis		0774631200
M. Vasanthan	Pallikuda Fisheries Cooperative Society	0773291822
S.Jenisran		0778447266
S. Jeyaseelan	Kumulamunai Fisheries Cooperative Society	0778865102
V.Rubathas	Kumulamunai Fisheries Cooperative Society	0772802327
S.Thamizhanban		0779019872
G.Rasakumar	Valarmathi Fisheries Cooperative Society	0778690212
T.Pushparaja	Valarmathi Fisheries Cooperative Society	0771186582

Annex 7- Minutes of the meeting -Meetings between SEA Team, World Bank and NAQDA

Annex 7-A: Minutes of the Introductory meeting for the SEA -15th September 2021

Held on Wednesday, 15th September 2021 from 4.00pm to 4.45pm, Webex Online Meeting

Participants:

Organization	Name	Designation
NAQDA:	Dr. J.M.Asoka	Director (Coastal Aquaculture), NAQDA
	Mr. Nirooparaj Balachandran	Assistant Director-Northern Province (Coastal Aquaculture), NAQDA
NARA:	Dr. Palitha Kithsiri	Director General, NARA
	Ms. Binosha Kalaotuwawe	Scientist, Environmental Studies Division, NARA
World Bank:	Ms. Nadeera Rajapakse	Environmental Specialist
	Ms. Sachiko Kondo	Environmental Specialist
Consultant Team for SEA (Consulting Engineers and Architects Associated (Pvt) Ltd)	Mrs. Ramani Ellepola	Team Leader
	Dr. Kamal Ranathunga	Coastal and Marine Ecologist
	Dr. Nimal Wijayarathna	Coastal Hydrologist
	Dr. Erandathie Lokupitiya	Climate Change Specialist
	Mr. T. Krishnaraja	Socio Economist
	Dr. Vasantha Pahalawattaarachchi	Coastal Aquaculture Specialist
	Mr. Prasanna Samarawickrama	GIS Expert
	Mr. Deshan Gamage	Project Coordinator (Environmental Engineer)
	Mrs. Kamala Ranasinghe	Project Coordinator (Socio Economist)
	Mr. Asanka Rathnayaka	Project Coordinator

No.	Description
1.0	Ms. Nadeera Rajapakse introduced the World Bank team and participants from the Ministry of Fisheries, NAQDA and NARA. Mr. Deshan Gamage introduced the Consultant team of Consulting Engineers and Architects Associated (Pvt) Ltd (CEAA) for Strategic Environmental Assessment.
2.0	Dr. Palitha (NARA) stated that Ministry of Fisheries has discussed regarding the different types of Aquaculture development in Northern Province and suitable sites for aquaculture development needs to be identified. Ministry of Fisheries expect identification of suitable sites for Aquaculture development after consultation with all relevant stakeholders as an outcome of the SEA. Then, NAQDA and Ministry of Fisheries will be able to call for Expressions of Interest from Investors for those sites. Ms. Nadeera Rajapakse pointed out that identification of suitable sites for aquaculture development require more detailed analysis beyond the SEA. The main expectation of the SEA will be identification and preparation of map of coastal areas/zones in the Northern Province that can be developed with minimal environmental and socioeconomic impacts/consequences in consultation with stakeholders. Mr. Nirooparaj also mentioned that the key expectation of the SEA will be identification of feasible coastal areas for aquaculture development that can be developed with minimum environmental and socioeconomic impacts.

3.0	Mrs. Ellepola (Team Leader-SEA) explained that the purpose of SEA should be identification of environmental and other sensitive areas where aquaculture development cannot be implemented and not the selection of suitable sites for aquaculture development. The Consultant can identify all the environmental sensitive areas which are legally protected under the Forest Ordinance and the Fauna and Flora protection Ordinance as well as the Environmental Protection Areas declared under the National Environmental Act and Coast Conservation Act. In addition to the above mentioned areas there are many environmentally sensitive areas within the Northern Province, which have not been as yet fully identified or mapped. These areas will also be identified through stakeholder consultations. This will enable NAQDA to be made aware of areas where aquaculture projects should not be sited due to the identified environmental sensitivities and environmental/socioeconomic issues. Ms. Nadeera Rajapakse clarified that TOR has not requested for an identification of specific sites that aquaculture can be developed. She further explained that, the expectation of the SEA is to provide an opportunity map that shows the level of risk (environmental and socioeconomic) of aquaculture development in the different segments of northern coastal areas and shallow marine areas. And, also the environmental and socioeconomic consequences of implementing the aquaculture development in high risk, medium risk and low risk areas. Ultimately, recommend the areas that social, economic environmental impact will be minimal. Also to select the areas/zones that aquaculture projects can be implemented without any conflicts with other sectoral development projects, which are ongoing or proposed. She further mentioned that the perspective of the World Bank is to use the SEA as an optimum planning tool and not to confine the study to pre-determined zones/sites but to carry out an analysis and to recommend which areas of coastal/shallow marine areas of the Northern Province where aquaculture projects could be carried out with minimum environmental and socioeconomic risks.
4.0	Dr. Palitha elaborated on an incident that they had to face when NAQDA was planning to develop Vedithalathivu area as an aquaculture industrial park, when the NAQDA was about to declare the area as an aquaculture development zone, Department of Wildlife Conservation has informed that the area had already been declared as an environmental protected area. Therefore, the SEA team should consult all the relevant stakeholders. Mrs. Ellepola stated that the SEA team will identify the recorded protected areas, environmental sensitive areas and zones with environmental and socioeconomic issues in northern coastal zones in consultation with stakeholder agencies. Ms. Nadeera Rajapakse also pointed out that stakeholder engagement is one of the major part in the TOR for SEA and team of consultants have to identify all relevant stakeholders , prepare stakeholder engagement plan and conduct comprehensive stakeholder consultations. Dr. Asoka (NAQDA) mentioned, NAQDA can identify whether a site/zone is suitable for aquaculture or not, if the SEA consultants can recommend the zones/areas that can be developed without any environmental or socioeconomic sequences/barriers. She further mentioned that NAQDA has identified some potential sites for aquaculture development in the Northern Province. Mrs. Ellepola stated if NAQDA already identified some sites, analyzing those sites in the SEA will be more useful, as SEA study would usually assess a specific plan or programme for its potential environmental and socioeconomic impacts at a strategic level. Ms. Nadeera Rajapakse expressed that NAQDA has been looking at feasible sites for aquaculture in Northern

	province for the past 1.5 years and identified some feasible sites for aquaculture development in Northern Province. But the sites identified at present are not adequate to produce the targeted quantity of various species. Ms. Nadeera Rajapakse stated that the purpose of the SEA is not merely justify the suitability of the already identified sites by NAQDA, but come up with planning recommendations on where aquaculture could be expanded sustainably with minimum environmental and social conflicts. SEA team can also identify whether the already identified sites fall in to low risk or high risk zones and provide recommendations to NAQDA. Both Mrs. Ellepola and Dr. Asoka agreed with Ms. Nadeera Rajapakse to cover the coastal areas of whole Northern province in order to identify the sensitive areas which should not be used for aquaculture projects. This will pave the way for the expeditious implementation of aquaculture projects in the North which will be lead to increased production and attracting more investors for aquaculture development in the Northern province, since the already identified sites are not adequate to reach the targets of the Aquaculture and Culture based development Plan for 2021-2025. Ms. Nadeera Rajapakse requested Dr.Asoka and Mr. Nirooparaj to provide the list of already identified sites and a list of areas that have ongoing aquaculture projects to the SEA consultants by Friday, 17th September 2021.
5.0	Dr. Kamal Ranathunga (Coastal and Marine Ecologist-SEA) mentioned the most of the shallow marine areas of Northern province including Jaffna lagoon consist of sea grass beds and no recent survey data/literature on sea grass beds is available in these areas, according to his knowledge. It is also impossible to carryout field surveys covering the whole coastal and shallow marine areas in the Northern province within the short time period available. Ms. Binosha Kalaotuwawe (NARA) stated that NARA may have maps of sea grass beds in some of the northern coastal areas and Ms. Nadeera Rajapakse requested the information to be submitted by Friday, 17th September 2021. Mrs. Ellepola mentioned that although these information is not recorded, such information may be available with the regional and provincial officials of the CEA, Coast Conservation Department etc. as they are very familiar with these areas. Ms. Nadeera Rajapakse mentioned that World Bank staff have access to some biodiversity databases and agreed to provide such data to the SEA team. Ground validations from the SEA team would be required for the information available in these databases. Dr. Erandi Lokupitiya (Climate Change Specialist-SEA) stated that there is an ongoing project under the Ministry of Environment to map the sea grass areas and other sensitive areas in the Northern province and the information will be available by mid next year.
6.0	Ms. Nadeera Rajapakse, Ms. Binosha Kalaotuwawe, Dr. J.M.Asoka and Mr. Nirooparaj would form an informal committee and a meeting will be arranged with SEA team every month in order to discuss the progress and issues relating to the assignment. Ms. Nadeera Rajapakse requested the SEA team to keep the Inception Report concise and to include the detailed methodology, work plan and tasks descriptions of the individual experts in the inception report.

Annex 7-B: Minutes of the meeting with Technical Working Group of World Bank and NAQDA-2nd November 2021

Held on Wednesday, 02nd November 2021 from 10.00am to 10.45am, Webex Online Meeting

Participants:

Organization	Name	Designation
NAQDA:	Dr. J.M.Asoka	Director (Coastal Aquaculture), NAQDA
	Mr. Nirooparaj Balachandran	Assistant Director-Northern Province (Coastal Aquaculture), NAQDA
NARA:	Ms. Binosha Kalaotuwawe	Scientist, Environmental Studies Division, NARA
World Bank:	Ms. Nadeera Rajapakse	Environmental Specialist
	Ms. Sachiko Kondo	Environmental Specialist
Consultant Team for SEA (Consulting Engineers and Architects Associated (Pvt) Ltd)	Mrs. Ramani Ellepola	Team Leader
	Dr. Kamal Ranathunga	Marine Ecologist
	Dr. Nimal Wijayarathna	Coastal Hydrologist
	Mr. T. Krishnaraja	Socio Economist
	Dr. Vasantha Pahalawattaarachchi	Coastal Aquaculture Specialist
	Mr. Deshan Gamage	Project Coordinator
	Ms. Amila Gunarathna	Environmental Officer

No.	Description
1.0	Ms. Nadeera Rajapakse warmly welcomed the members of NAQDA, NARA and Consultant Team.
2.0	Regarding the selection of geographical area, Dr. Vasantha asked whether the geographical focus of the study area for the SEA can be limited to the Coastal zone. Ms. Nadeera Rajapakse asked Mr. Nirooparaj to explain the geographical area of the study. As Mr. Nirooparaj mentioned, NAQDA has identified some lands suitable for aquaculture in Mannar and Jaffna districts beyond 300 m buffer zone from the mean high water line. 12 potential locations for aquaculture development have been identified in Northern Province. He further mentioned that most of the identified sites in Northern Province are located within 1-2km belt from the mean high water line and some identified sites in Mannar District are located within 2-3 Km belt. However, Ms. Nadeera Rajapakse mentioned that a broad criterion should be used based on topography of the area and 1 -2 Km belt can be focused when identifying the geographical area for aquaculture. Dr. Asoka also suggested to make 2Km as the base and identify the variations. Mrs. Ellepola (Team Leader-SEA) suggested to study the potential sites that have been already selected for the development. Ms. Nadeera Rajapakse suggested to conduct a meeting physically at NAQDA on Monday, 08th November 2021 at 10.00 a.m. and identify the potential sites along the 4 districts using the

	maps. As she mentioned there may be variations in the width of the selected belt between the districts as well as within the district. Further, she asked Mr. Nirooparaj to roughly map the identified potential sites and existing sites before the meeting and send those maps before Friday, 05th November 2021. Dr. Nimal Wijayarathna (Coastal Hydrologist-SEA) mentioned that most of the Creeks/Thonas found within the study area become dry during the dry season. As he mentioned, records of the seasonal variations are also not available except for Malwathuoya. Therefore, it is doubtful whether all the 24 basins and thonas in Northern Province can be utilized for aquaculture. He further questioned whether the Consultant have to study all the river basins or limit to a certain extent. In response to that, Mr. Nirooparaj stated that they are examining the seasonal fluctuations for 3-4 years and in some cases, they need deepening of creeks to utilize those areas. He agreed to map the identified locations and the identified areas with seasonal fluctuations on Google Earth and to share them with the Consultant.
3.0	Dr. Vasantha stated that NAQDA has considered only Mannar, Kilinochchi and Jaffna districts for culture but not Mulativu District even though some lagoons are there. Dr. Asoka responded that although they have identified some sites in Mulativu district, there are no existing sites.
4.0	Regarding the availability of data, Mrs. Ellepola (Team Leader-SEA) mentioned that there are areas that are not protected or even not proposed to be protected and she has drafted letters to collect such information from regional/provincial offices of the institutions. She further mentioned that those letters will be sent to Dr. Asoka to get the signature. Dr. Asoka has also sent a letter to Forest Department requesting maps and information related to proposed forest reserves in Northern Province. Ms. Nadeera Rajapakse mentioned that she also will send some maps of Northern Province found from a recent lecture on Sea Grass Beds by Mr. Susantha Udagedara.
5.0	Ms. Nadeera Rajapakse asked the earliest date of draft scoping report to be submitted for review and Mrs. Ellepola (Team Leader-SEA) agreed to submit the draft scoping report within the week starting from Monday, 15th November 2021. Ms. Nadeera Rajapakse further mentioned that the overall timeline of the assignment should be kept as fixed, since the fund is closing by April 2022.
6.0	Mr. Krishnaraja stated that although the details of 02 Stakeholder consultations mentioned in NAQDA plan, there are some other ongoing studies. In response to that, Dr. Asoka mentioned that there were some consultation meetings and she will share those consultation notes. She further mentioned that basic feasibility studies have been carried out for some sites and 169 Ha area has been released for aquaculture. She agreed to share those studies as well. Dr. Vasantha also requested information on existing aquaculture practicing areas and NAQDA agreed to provide that information. Ms. Nadeera Rajapakse mentioned that she will also try to share some consultation notes of Rapid Environmental Assessment carrying out by Dr. Priyani Amarasinghe.

Annex 7-C: Minutes of the Meeting with NAQDA- 9th November 2021

Held on Wednesday, 09th November 2021 from 10.00am to 11.30am, at NAQDA Head Office.

Participants:

Organization	Name	Designation
NAQDA:	Mr. Jayantha Wijeratne	Chairman, NAQDA
	Dr. J.M.Asoka	Director General, NAQDA
	Mr. Nirooparaj Balachandran	Assistant Director-Northern Province (Coastal Aquaculture), NAQDA
Consultant Team for SEA	Mrs. Ramani Ellepola	Team Leader
	Dr. Kamal Ranathunga	Marine Ecologist
	Dr. Nimal Wijayarathna	Coastal Hydrologist
	Dr. Vasantha Pahalawattaarachchi	Coastal Aquaculture Specialist
	Mr. Deshan Gamage	Project Coordinator
	Ms. Amila Gunarathna	Environmental Officer

No.	Description
1.0	Chairman and Director General of NAQDA warmly welcomed the members of the Consultant Team. Mrs. R.R. Ellepola explained that the purpose of the meeting is to clarify the study area of the SEA.
2.0	Mr. Nirooparaj has shared a map of some of the identified potential sites for aquaculture in Northern Province. He mentioned that the location maps of other potential sites will be shared in next week. NAQDA has been recording parameters such as pH, Salinity, DO in the identified potential aquaculture sites since 2016. Mr. Nirooparaj agreed to provide that information. Mr. Nirooparaj stated that some areas in Jaffna district have already been released for a private party and all the areas are inland land-based farms. As he stated, Delft Island can be used for seasonal aquaculture, since there are 3 inland ponds that can be used for aquaculture during the rainy season. According to his explanation, monodon shrimp enhancement project was carried out in last 2 years and it was succeeded. In case of large-scale culture, local population will concern how pollution will be controlled, how market price is controlled because it will directly affect the local market price. He further mentioned that local people will not be affected since this is for export market.
3.0	Mrs. Ellepola mentioned that in a SEA, it is not required to carry out in depth studies like EIA. She further mentioned that, more detailed and accurate study can be done if potential sites are provided rather than selecting the entire Northern province. She asked the requirement of NAQDA in this regard. Mr. Nirooparaj explained that the following stretches need to be considered for land based study area of the SEA in Northern Province.

	1. Stretch between the A32 road and Coast from Mannar to Pooneryn, excluding the human settlement areas in Mannar and Kilinochchi districts. 2. Stretch between Jaffna Coastal roads (AB21, B371) and Coast excluding the human settlement areas in Jaffna Peninsula. 3. Stretch between Mullativu-Kokkilai Road (B297), Paranthan-Mulativu Road(A35) and coast in Mulativu District. Dr. Kamal Ranathunga commented that limited mariculture activities can be done in Jaffna area since the area is highly populated and reef is very close to the coast. Mr. Deshan stated that up to 10 m depth contour has been selected as the marine based study area. Mr. Nirooparaj mentioned that in some areas of Northern region, 10 m depth contour is far away from the land, even 10-12 Km away from land in some areas and it is better that NAQDA can have a large Mariculture area.
4.0	Dr. Nimal asked the possibility of practicing aquaculture in river estuaries. In response, Mr. Nirooparaj explained that aquaculture can be practiced in river estuaries which are not declared as sensitive areas.
5.0	Mr. Nirooparaj mentioned that potential private lands exist in West coast and East coast of Mulativu district. As he mentioned, Nandikadal lagoon has been declared as a nature reserve recently, Chundikkulam lagoon area has also been declared as a bird sanctuary and Jaffna lagoon has been proposed as a nature reserve. After declaring as a nature reserve, aquaculture cannot be practiced in Jaffna lagoon since it's difficult to get permission from Department of Wildlife Conservation for aquaculture. As he mentioned approval is not given for the projects proposed in buffer zones as well. Mrs. R.R. Ellepola mentioned that generally projects are allowed in buffer zones subjecting to EIA.
6.0	Dr. Nimal Wijayarathna requested any hydrological data available with NAQDA in Northern region and Mr. Nirooparaj agreed to provide rainfall data of last 2 years, pH, Salinity, DO and other parameters of identified water bodies for last 5 years, and Bathymetry maps finalized by NARA.
7.0	Mr. Nirooparaj stated that aquaculture can be successfully practiced in Punkudutivu and in Analaitivu islands as well. However, Mandathivu area is declared as a mangrove forest by Forest Department.
8.0	Dr. Kamal asked for reports of feasibility studies done for the aquaculture sites in Northern province. In response, Mr. Nirooparaj agreed to provide the reports available for 169-acre land and for the proposed Blocks Vedithalativu area. Dr. Nimal stated that there are some selected sites for mariculture in between the islands of Jaffna. But Dr. Kamals' idea was that there are some limitations for culturing since the area is rich in sea grass beds and since it is a sensitive area. Therefore, culturing species should be specially taken into account. Mr. Nirooparaj mentioned that sea weeds, sea cucumber and floating cages are proposed for that area. As Dr. Kamal stated, proposing floating cages should be reconsidered since it will cover the sea grass beds. Therefore, the consultants asked for the proposals of NAQDA to study and to make suggestions.

9.0	Mr. Nirooparaj mentioned that, cage culture is possible in some areas of Nandikadal lagoon. However, Nandikadal and Nai Aru lagoons will be prohibited for any development after declaring as Nature reserves. He further mentioned that sand dunes and the stretches declared as bird migrating areas by the Department of Wildlife will be excluded. The consultants proposed to have a site visit after submitting the scoping report. Mr. Nirooparaj agreed to share the updated map of existing aquaculture practicing areas, Proposed aquaculture zones, records of water quality done by Central Environmental Authority for existing aquaculture sites and some research articles published by University of Jaffna.

Annex 7-D: Minutes of the Progress Meeting with Technical Working Group of World Bank and NAQDA – 17th February 2022

Held on 17th February 2022 from 8.30am to 9.30am (Webex Online Meeting)

Participants:

Organization	Name	Designation
World Bank	Ms Nadeera Rajapakse	Environmental Specialist
NAQDA	Mr. Nirooparaj Balachandran	Assistant Director-Northern Province (Coastal Aquaculture), NAQDA
Consultant Team for SEA	Mrs. Ramani Ellepola	Team Leader
	Dr. Kamal Ranathunga	Marine Ecologist
	Dr. Nimal Wijayarathna	Coastal Hydrologist
	Dr. Vasantha Pahalawattaarachchi	Coastal Aquaculture Specialist
	Mr. Deshan Gamage	Project Coordinator
	Ms. Amila Gunarathna	Environmental Officer

No.	Description
1.0	Ms. Nadeera Rajapakse chaired the meeting and she wanted to discuss the following key areas, 1) Progress of the SEA and time schedule of the SEA 2) Scoping report of the Aquaculture Development Programme 3) Highlights of the recent stakeholder consultation meeting 4) Any assistance needed from World Bank She mentioned that there will be an Environmental mission meeting for Aquaculture Development Programme with their manager on 02nd March 2022 in the evening and asked the representatives of the SEA team to participate the meeting. At the meeting, the World Bank expect the SEA team to brief about the progress of the SEA, the work plan, and the key findings of the scoping report such as data gaps and how they are filled.
2.0	Dr. Kamal Ranatunga briefly explained about the stakeholder meeting carried out in Jaffna. As he mentioned, it was successfully held with the participation of 72 stakeholders and gained lots of inputs from the officers of the government agencies. He mentioned that there were concerns of the impacts on traditional fisheries, on climate change, and regarding the approval process, but not much information about the environmental concerns. Further, Dr. Kamal Ranatunga and the diving team have visited some places where there are sea cucumber and sea weed farms and carried out underwater surveys.
3.0	Mrs. Ramani Ellepola mentioned that the scoping report consists more information on theoretical background because of lacking the understanding of the ground situation and currently they are in a better position to update the scoping report. Further, Ms. Nadeera Rajapakse suggested to identify the data gaps and asked whether the SEA team carried out any primary data collection surveys. In response to that, Mrs. Ramani Ellepola mentioned that they have developed a questionnaire to collect information regarding environmental sensitive areas of the Northern Province and

	distributed among the officers of the relevant agencies. After collecting the questionnaire data, the World Bank wants the SEA team to carry out a reconnaissance survey. Further, Ms. Nadeera Rajapakse asked about the progress of the SEA study to clarify whether the team stick to the provided timeline. Mrs. Ellepola wanted to do some revisions for the work plan and submit the revised plan by Monday, 21st February 2022.
4.0	Ms. Nadeera Rajapakse asked whether any surveys or studies have been carried out on biodiversity, ecology, water & climate change and asked the progress of collecting information. In response to that, Dr. Kamal Ranatunga mentioned that they are having an issue of unavailability of data on environmental aspects. Ms. Nadeera Rajapakse stated that the World Bank and NAQDA can help in providing required data. Further, Mr. Nirooparaj also mentioned that they can provide the data from MEPA, Irrigation Department, and University of Jaffna which has been provided to Dr. Priyani and Prof. Jayasinghe. As he mentioned, NAQDA has two major concerns such as developing aquaculture with minimum environmental conflicts & fisheries issues and the study has to provide some suggestions for these social and environmental concerns.
5.0	Mrs. Ellepola mentioned that the Ministry of Environment has conducted a project on mapping environmental sensitive areas and asked whether it is possible to get some data from that study. She further mentioned that Dr. Sewwandi may involved in it. Ms. Nadeera Rajapakse suggested SEA team to schedule a meeting with Dr. Sewwandi's team after finalizing the team leader of the above project. She further suggested to conduct a thorough reconnaissance survey selecting a good sample of the coastal border to get an idea of the coastline, to identify the data gaps, and how those data gaps are filled.

Annex 7-E: Minutes of the Meeting with Technical Working Group of NAQDA and World Bank- 2nd September 2022

Held on Friday, 02nd September 2022 from 10.00am to 1.00 pm, at the Head Office of NAQDA.

Participants:

Organization	Name	Designation
NAQDA:	Mr. Jayantha Wijeratne	Chairman
	Dr. J.M. Asoka	Director General
	Mr. G. Mahanama	Deputy Director
	Mr. Nirooparaj Balachandran	Assistant Director-Northern Province (Coastal Aquaculture), NAQDA (via Zoom)
World Bank:	Ms. Nadeera Rajapakse	Environmental Specialist
	Dr. Sithara Athapattu	Environmental Consultant for world Bank
Consultant Team for SEA (Consulting Engineers and Architects Associated (Pvt) Ltd)	Mrs. Ramani Ellepola	Team Leader
	Dr. Kamal Ranathunga	Coastal and Marine Ecologist
	Dr. Nimal Wijayarathna	Coastal Hydrologist
	Mr. T. Krishnaraja	Socio Economist (via Zoom)
	Dr. Vasantha Pahalawattaarachchi	Coastal Aquaculture Specialist
	Dr. Erandathie Lokupitiya	Climate Change Specialist (via Zoom)
	Mr. Deshan Gamage	Project Coordinator-CEA
	Ms. Amila Gunarathna	Environmental Officer-CEA

Item	Description
Commencement	Presentation on the draft SEA report was held on 02nd September 2022 from 10.00 am. to 1.00 pm. at the Conference Hall of the National Aquaculture Development Authority (NAQDA). Mr. Jayantha Wijeratne, Chairman/NAQDA chaired the meeting.
Presentations	The SEA team members presented the findings of the SEA study.
Discussion session	After conducting the presentation, NAQDA and the World Bank raised their concerns on draft SEA report.
Mr. Jayantha Wijeratne, Chairman/ NAQDA mentioned that according to the latest proposal, the area that has planned to be degazetted for an aquaculture industrial park in Vidathaltivu nature reserve should be corrected as 169 Ha.	
Ms. Nadeera Rajapakse asked to interpret the table of district wise land availability for better understanding. Also, she asked the reason for the selection of 5m depth contour instead of using the 10 m depth contour and to give the assumptions made when doing so. Dr. Sithara Athapattu questioned regarding the risk calculation and the criteria used for the risk categorization.	
Dr. J.M. Asoka asked the suitability of the 1900 Acres areas that the NAQDA has identified for sea cucumber farming. In response to that, Mrs. Ramani Ellepola told that they have overlapped those areas on the Opportunity and Risk Map and some of the areas are in high-risk areas. Ms. Nadeera	

Rajapakse mentioned that NAQDA should reconsider whether relocation of those already identified areas is possible and should identify the mitigatory actions.
Dr. J.M. Asoka queried whether the relevant agencies have been consulted regarding the low-risk areas and received any recommendation from them. In response to that, Mrs. Ramani Ellepola stated that the low-risk areas are free of protected areas and other sensitive areas as per the available information.
Ms. Nadeera Rajapakse asked regarding the procedure of inviting the investors for SME and Community type aquaculture farming. In response to that Dr. J.M. Asoka mentioned that they make aware of people through the Divisional Secretary. They have selected farmers for sea cucumber and sea weed farming from relevant areas. For example, out of 100 acres identified, 80 acres have been allocated for the society while 20 acres allocating for the investors.
Dr. J.M. Asoka queried regarding the comments for the buffer zones and for the lengthy licensing process. Mrs. Ramani Ellepola mentioned that the lengthy licensing procedure will not be required within a large development zone and basic evaluation will be enough. As Ms. Nadeera Rajapakse mentioned, since there are 2 types of farming areas namely, Aquaculture Development Zones and Individual farms function outside the development zones (SME & Community type farms), recommendations have to be given to streamline both licensing schemes. According to Dr. Kamal Ranathunga transparency of obtaining the license is also need be ensured.
Ms. Nadeera Rajapakse recommended to have a separate GRM system for aquaculture sector. She mentioned that the recommendations are mixed in last 3 chapters (Chapter 9, 10, and 11). She suggested to present the technical recommendations for developing sustainable aquaculture, existing institutional mechanisms, gaps identified within the institutional arrangement, and what needs to be done to avoid the constraints when implementing and to strengthen the development plan. For example, recommending the expected courses offered by the universities by looking at the existing courses, recommending a list of comprehensive research topics to be done and presented at the NARA research sessions. She further mentioned that the main outputs of the SEA should be the provision of Opportunity and Risk Map, Recommendations with actionable plan, and development of Process diagram. Also, Manuals with good environmental practices (buffer zones maintained, distance between 2 farms), can be prepared for farming practices and translated into Tamil.
Since Climate Change Impacts are extremely important in Northern Province, good specific recommendations have to provided regarding impacts on farming and site selection/ infrastructure.
The World Bank asked whether it is possible to provide the GIS data base to the NAQDA. She further asked to make sure of the accuracy of the polygons in the maps, sources of the maps and the finally updated dates. Therefore, NARA can update the maps with data lacking areas. After finalizing the SEA, there should be a meeting with GIS unit of the NAQDA to handover the data and to have discussions.
Dr. J.M. Asoka asked to come up with a table of recommendations of the other agencies with budget allocations. Before the finalization of SEA, there should be a meeting to make aware of Head Offices of DWC, FD, CC&CRMD for get them to accept. The SEA team mentioned that there were no comments or questions raised by the regional offices of FD and DWC at the stakeholder meetings.
As Ms. Nadeera Rajapakse stated, with the recommendations of SEA, EIA/ IEE will be very easy and trouble free. She suggested to have a committee with a proper process for getting the approval. She further suggested to have a working session to discuss regarding the

implementation with an action plan. There should be a committee to oversee the recommendations. After finalizing the process flow diagram, get DWC, FD, CC&CRMD, & MEPA together and set a meeting to introduce the streamlined single approval for licensing approval process that satisfy all the agencies. If they agree, there should also be a top-level meeting with ministries to formalize the decision. The agreement has to be formalized to make it easier for getting the approval. As per the discussions, approval procedure will depend on the culture species but the approving agencies are same. Any project requires to have EPL from CEA.
As mentioned by the World Bank, the report will be opened to public comments.
The World Bank asked whether the NAQDA is interested in expanding the project for the Eastern province as well. NAQDA agreed with the suggestion.

Annex 8- Maps Prepared by SEA Team

- Map 01: Map showing the Land based and Marine Based Study Areas of SEA
- Map 02: Map of the declared wildlife Conservation areas located within the Study Area of Northern Province
- Map 03: Map of the declared and proposed (To be gazetted) Forest Reserves located within the Study Area of Northern Province
- Map 04: Map showing the declared archaeological reserves and Protected Monuments within land-based SEA Study area of Northern Province
- Map 05: Map showing the Shipwrecks recorded within Northern Province
- Map 06: Map showing the Fresh water/River Outlets within the SEA Study area and river basins within the Northern Province
- Map 07: Cyclone induced Storm Surge Hazard Map with projected storm surge levels for the SEA Study area (Surge Speed=215km/h)
- Map 08: Cyclone induced Storm Surge Hazard Map with projected storm surge levels for the SEA Study area (Surge Speed=270km/h)
- Map 09: Fishery landing sites and Beach Seine areas (Madel Padhu Sites) within the SEA Study area in Northern Province
- Map 10: Locations of tourist attractions and potential areas for marine tourism activities within the SEA study area in Northern Province
- Map 11: Map showing the existing and planned Renewable Energy Development projects within the SEA study area in the Northern Province
- Map 12: Map showing the existing and proposed industrial zones/estates and Salterns within the SEA study area in the Northern Province
- Map 13: Map showing the Demining progress within SEA study area in Northern province
- Map 14: Map showing the high security zones and security camps within SEA study area in Northern province
- Map 15: Opportunity and Risk map developed for the land based coastal aquaculture development
- Map 16: Opportunity and Risk map developed for the marine based coastal aquaculture development
- Map 17: Land use and land cover within the SEA study area in the Northern Province
- Map 18: Simulated Tsunami Inundation Depths for the SEA Study Area in Northern Province
- Map 19: Map showing the Fresh water/River Outlets within the SEA Study area and river basins within the Northern Province
- Map 20: Coral reefs located within Marine study area of the SEA in the Northern Province

- Map 21: Declared/gazetted Mangrove reserves, Mangrove reserves proposed to be declared and other mangrove areas located within SEA Study area of Northern Province
- Map 22: Areas of Sea grass beds located within marine SEA Study area of Northern Province
- Map 23: Tidal Flats, Salt Marshes and Sand dunes located within land based study area of SEA in Northern Province
- Map 24: Map showing the administrative boundaries within the land-based SEA study area in Northern Province
- Map 25: Map showing the Population density of the divisional secretariat areas within the SEA study area in Northern Province

Annex 9- Official Request Letters sent to Stakeholder Agencies obtain required information for SEA

ධීවර අමාත්‍යාංශය - கடற்றொழில் அமைச்சு - Ministry of Fisheries

විසිතුරු මසුන්, මිරිදිය මත්ස්‍ය හා ඉස්සන් ඇති කිරීම, ධීවර වරාය සංවර්ධන, බහුදින ධීවර කටයුතු හා මත්ස්‍ය අපනයන රාජ්‍ය අමාත්‍යාංශය

அலங்கார மீன்கள், நன்னீர் மீன்கள், இறால்களை வளர்த்தல், கடற்றொழில் துறைமுகங்கள் அபிவிருத்தி, பலநாள் கடற்றொழில் அலுவல்கள் மற்றும் மீன் ஏற்றுமதி இராஜாங்க அமைச்சு.

State Ministry of Ornamental Fish, Inland Fish & Prawn Farming, Fishery Harbor Development, Multi day Fishing Activities and Fish Exports.

ශ්‍රී ලංකා ජාතික ජලජීවී වගා සංවර්ධන අධිකාරිය

இலங்கை தேசிய நீர் உயிரின வளர்ப்பு அபிவிருத்தி அதிகாரசபை

National Aquaculture Development Authority of Sri Lanka

මගේ අංකය / எனது இல. / My No. NQ/1/CAD/266 ඔබේ අංකය / உமது இல. / Your No. දිනය / திகதி / Date 09.11.2021

Mr. T. Suboharan,
Director (Attending to the Duties)
Central Environmental Authority
Northern Provincial Office
Ariviyal Nagar
Kilinochchi.

<u>Request information of Forest Reservation Areas in Northern Province</u>
<u>Strategic Environmental Assessment for Coastal Aquaculture Development Plan in Northern Province</u>

National Aquaculture Development Authority of Sri Lanka (NAQDA) has prepared an Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) for 2021-2025 and the objectives set out under the coastal aquaculture are ; i) increase the coastal aquaculture and mariculture production from 7,238 Mt to 60,000 Mt in 2025, ii) increase export earnings from coastal aquaculture and mariculture sub-sector from Rs.8,017.02 Mn to Rs 91,973 Mn by 2025.

The World Bank is engaged with the Government of Sri Lanka (GOSL) in an Advisory Services and Analytics (ASA) work, where a number of analytical work including a Strategic Environmental Assessment (SEA) have been planned focusing on the Northern province as the pilot area. World Bank has engaged Consulting Engineers and Architects Associated (Pvt) Ltd (CEAA) to conduct SEA for Coastal Aquaculture Development Plan in Northern Province.

The main objective of the SEA is to identify any environmental or socioeconomic barriers with respect to the implementation of the proposed plan. In order to identify the environmentally sensitive areas in the Northern coastline, the consultants will carry out a preliminary assessment of the legally protected areas under the Forest Ordinance, Fauna and Flora Protection Ordinance, National Environmental Act as well as the Coast Conservation Act. This would specifically include conservation Forests declared under the Forest Ordinance as well as any protected wetlands, Mangroves, Villus, Lagoons, Sanctuaries, Reef sanctuaries, National Parks, Marine National Parks, Elephant Corridors, Managed Elephant Ranges (if any) gazetted under the Fauna and Flora Protection Ordinance and Forest Ordinance as well as any Environmental Protection Areas (EPAs) gazetted under the provisions in the National Environmental Act. In addition to this the SEA will require to identify any proposed Conservation/Protected areas to be declared under the above mentioned Acts.

While we are already in possession of the legally protected areas under the above mentioned Acts, we would be grateful if your organization could provide information on other areas which are proposed to be bought under protection status in the future.

41/1, නව පාර්ලිමේන්තු පාර, පැලවත්ත, බත්තරමුල්ල. இல 41/1 புதிய பாராளுமன்ற வீதி, பெலவத்த, பத்தரமுல்ல. 41/1 New Parliment Road, Pelawatta, Battaramulla.

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සභාපති / தலைவர் / Chairman 011 -2786497
අධ්‍යක්ෂ ජනරාල් / பணிப்பாளர் நாயகம் / Director General 011 -2786498

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Fax - 011-2786497
E-mail - chairman@naqda.gov.lk
Fax - 011-2786640
E-mail - dg@naqda.gov.lk

In addition to the proposed conservation areas, we would be extremely grateful if you could provide information on the presence of environmentally sensitive areas within your area of jurisdiction of which you or your officers may be aware of, which are not yet under protected status or proposed to be protected but which you believe to be environmentally sensitive in nature. Once the existence of such an area is indicated to the consultants along with the approximate location, our SEA consultants will investigate such location/s and determine the sensitivity of the given location/s along with the precautions to be adopted during the implementation of the NAQDA plan.

We strongly believe that identification of such environmentally sensitive areas which are not yet under protected status or proposed to be protected as yet at an early stage, will assist NAQDA to avoid such sensitive areas during plan implementation, thereby making it an environmentally sustainable plan in the long term.

We believe that the proposed NAQDA plan for the Northern Province has the potential to reap substantial benefits to the Northern Populace through economic benefits, increased employment prospects as well as better nutrition. It is hoped that conducting of the Strategic Environmental Assessment for the proposed plan will also ensure that the plan is environmentally and socially sustainable in the long term which will add value to the plan. Your contribution to the sustainability of the plan is of prime importance and we thank you in advance for your kind cooperation in this regard.

Kindly make arrangements to provide the said information. The Consultants for the SEA, Consulting Engineers and Architects Associated (Pvt) Ltd (Mr. T. Krishnaraja-Socio Economist of the SEA Team-077 3474676) will coordinate this work.

Your assistance in this regard is highly appreciated.

Dr. J. M. Asoka
Director General

Copy: Consulting Engineers and Architects Associated (Pvt) Ltd

ධීවර අමාත්‍යාංශය – கடற்றொழில் அமைச்சு - Ministry of Fisheries

විසිතුරු මත්ස්‍ය, මිරිදිය මත්ස්‍ය හා ඉස්සන් ඇති කිරීම, ධීවර වරාය සංවර්ධන, බහුදින ධීවර කටයුතු හා මත්ස්‍ය අපනයන රාජ්‍ය අමාත්‍යාංශය

அலங்கார மீன்கள், நன்னீர் மீன்கள், இறால்களை வளர்த்தல், கடற்றொழில் துறைமுகங்கள் அபிவிருத்தி, பலநாள் கடற்றொழில் அலுவல்கள் மற்றும் மீன் ஏற்றுமதி இறாஞ்சுங்க அமைச்சு.

State Ministry of Ornamental Fish, Inland Fish & Prawn Farming, Fishery Harbor Development, Multi day Fishing Activities and Fish Exports.

ශ්‍රී ලංකා ජාතික ජලජීවී වගා සංවර්ධන අධිකාරිය

இலங்கை தேசிய நீர் உயிரின வளர்ப்பு அபிவிருத்தி அதிகாரசபை

National Aquaculture Development Authority of Sri Lanka

මගේ අංකය / எனது இல. / My No. NQ/1/CAD/266

ඔබේ අංකය / உமது இல. / Your No.

දිනය / திகதி / Date 09/11/2021

Mr. M.G.C. Sooriyabandara
Director General
Department of Wildlife Conservation
811A, Jayanthipura
Battaramulla

Request for maps of Wildlife Conservation Areas in Northern Province
Strategic Environmental Assessment for Coastal Aquaculture Development Plan in Northern Province

National Aquaculture Development Authority of Sri Lanka (NAQDA) has prepared an Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) for 2021-2025 and the objectives set out under the coastal aquaculture are ; i) increase the coastal aquaculture and mariculture production from 7,238 Mt to 60,000 Mt in 2025, ii) increase export earnings from coastal aquaculture and mariculture sub-sector from Rs.8,017.02 Mn to Rs 91,973 Mn by 2025.

The World Bank is engaged with the Government of Sri Lanka (GOSL) in an Advisory Services and Analytics (ASA) work, where a number of analytical work including a Strategic Environmental Assessment (SEA) have been planned focusing on the Northern province as the pilot area. World Bank has engaged Consulting Engineers and Architects Associated (Pvt) Ltd (CEAA) to conduct SEA for Coastal Aquaculture Development Plan in Northern Province.

The main objective of the SEA is to identify any environmental or socioeconomic barriers with respect to the implementation of the proposed plan and potential conflicts between the proposed plan and other economic sector development plans.

We appreciate if you could provide the electronic copies (GIS Shape files) of the maps and information of Wildlife Conservation areas which are proposed to be bought under protection status in the future in Northern Province that are required for the above study. The Consultants for the SEA, Consulting Engineers and Architects Associated (Pvt) Ltd (Tel – 011 5624503) will coordinate this work.

Your assistance in this regard is highly appreciated.

Dr. J. M. Asoka
Director General

Copy: Consulting Engineers and Architects Associated (Pvt) Ltd

41/1, නව පාර්ලිමේන්තු පාර, පොළවත්ත, බත්තරමුල්ල. இல 41/1 புதிய பாராளுமன்ற வீதி, பொலவத்த, பத்தரமுல்ல. 41/1,New Parliment Road, Polawatte, Battaramulla.

පොදු දුරකථන / தொடர்புகளுக்கு / General Nos. 011-2786495, 2786577
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Fax - 011-2786497
E-mail - chairman@naqda.gov.lk

අධ්‍යක්ෂ ජනරාල් / பணிப்பாளர் நாயகம் / Director General 011 -2786498
Fax - 011-2786640
E-mail - dg@naqda.gov.lk

දිවර අමාත්‍යාංශය - கடற்றொழில் அமைச்சு - Ministry of Fisheries

විසිතුරු මත්ස්‍ය, මිරිදිය මත්ස්‍ය හා ඉඟටැන් ඇති කිරීම, දිවර වරාය සංවර්ධන, බහුදින දිවර කටයුතු හා මත්ස්‍ය අපනයන රාජ්‍ය අමාත්‍යාංශය

அலங்கார மீன்கள், நன்னீர் மீன்கள், இறால்களை வளர்த்தல், கடற்றொழில் துறைமுகங்கள் அபிவிருத்தி, பலநாள் கடற்றொழில் அலகுகள் மற்றும் மீன் ஏற்றுமதி இராஜாங்க அமைச்சு.

State Ministry of Ornamental Fish, Inland Fish & Prawn Farming, Fishery Harbor Development, Multi day Fishing Activities and Fish Exports.

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இலங்கை தேசிய நீர் உயிரின வளர்ப்பு அபிவிருத்தி அதிகாரசபை

National Aquaculture Development Authority of Sri Lanka

මගේ අංකය / எமது இல. / My No. NQ/1/CAD/266

ඔබේ අංකය / உமது இல. / Your No.

දිනය / திகதி / Date 09/11/2021

Assistant Director
Department of Wildlife Conservation (Vavuniya Regional Office)
Puliyadi Irakkamam-Madhu Rd
Paraiyanalankulam.

Request information of Wildlife Conservation Areas in Northern Province
Strategic Environmental Assessment for Coastal Aquaculture Development Plan in Northern Province

National Aquaculture Development Authority of Sri Lanka (NAQDA) has prepared an Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) for 2021-2025 and the objectives set out under the coastal aquaculture are ; i) increase the coastal aquaculture and mariculture production from 7,238 Mt to 60,000 Mt in 2025, ii) increase export earnings from coastal aquaculture and mariculture sub-sector from Rs.8,017.02 Mn to Rs 91,973 Mn by 2025.

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41/1, නව පාර්ලිමේන්තු පාර, පෙළවත්ත, බත්තරමුල්ල. இல. 41/1 புதிய பாராளுமன்ற வீதி, பெலவத்த, பத்தரமுல்ல. 41/1,New Parliament Road, Pelawatta, Battaramulla.

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Fax - 011-2786497
E-mail - chairman@naqda.gov.lk

අධ්‍යක්ෂ ජනරාල් / பணிப்பாளர் நாயகம் / Director General 011-2786498
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We believe that the proposed NAQDA plan for the Northern Province has the potential to reap substantial benefits to the Northern Populace through economic benefits, increased employment prospects as well as better nutrition. It is hoped that conducting of the Strategic Environmental Assessment for the proposed plan will also ensure that the plan is environmentally and socially sustainable in the long term which will add value to the plan. Your contribution to the sustainability of the plan is of prime importance and we thank you in advance for your kind cooperation in this regard.

Kindly make arrangements to provide the said information. The Consultants for the SEA, Consulting Engineers and Architects Associated (Pvt) Ltd (Mr. T. Krishnaraja-Socio Economist of the SEA Team-077 3474676) will coordinate this work.

Your assistance will be greatly appreciated.

Dr. J. M. Asoka
Director General

Copy: Consulting Engineers and Architects Associated (Pvt) Ltd

ධීවර අමාත්‍යාංශය - கடற்றொழில் அமைச்சு - Ministry of Fisheries
විසිතුරු මසුන්, මිරිදිය මත්ස්‍ය හා ඉස්සන් ඇති කිරීම, ධීවර වරාය සංවර්ධන,
බහුදින ධීවර කටයුතු හා මත්ස්‍ය අපනයන රාජ්‍ය අමාත්‍යාංශය
அலங்கார மீன்கள், நன்னீர் மீன்கள், இறால்களை வளர்த்தல், கடற்றொழில் துறைமுகங்கள்
அபிவிருத்தி, பலநாள் கடற்றொழில் அலுவல்கள் மற்றும் மீன் ஏற்றுமதி இறாஞ்ஞாங்க அமைச்சு.
State Ministry of Ornamental Fish, Inland Fish & Prawn Farming, Fishery Harbor Development,
Multi day Fishing Activities and Fish Exports.
ශ්‍රී ලංකා ජාතික ජලජීවී වගා සංවර්ධන අධිකාරිය
இலங்கை தேசிய நீர் உயிரின வளர்ப்பு அபிவிருத்தி அதிகாரசபை
National Aquaculture Development Authority of Sri Lanka

මගේ අංකය / எனது இல. / My No. NQ/I/CAD/269

ඔබේ අංකය / உமது இல. / Your No.

දිනය / திகதி / Date 02.11.2021

Dr. K.M.A.Bandara,
Conservator General,
Forest Deapartment,
Sampath Paya,
82, Rajamalwatha Rd,
Sri Jayawardenepura Kotte.

Dear Sir,

Request for maps of Forest Reserves in Northern Province
Strategic Environmental Assessment for Coastal Aquaculture Development Plan in Northern Province

National Aquaculture Development Authority of Sri Lanka (NAQDA) has prepared an Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) for 2021-2025. The World Bank is engaged with the Government of Sri Lanka (GoSL) in an Advisory Services and Analytics (ASA) work, where a number of analytical work including a Strategic Environmental Assessment (SEA) have been planned focusing on the Northern Province as the pilot area.

World Bank has engaged Consulting Engineers and Architects Associated (Pvt) Ltd (CEAA) to conduct SEA for Coastal Aquaculture Development Plan in Northern Province.

To facilitate the SEA, it is necessary to obtain the electronic copies (GIS Shape files) of the maps of declared Forest Reserves in Northern Province and latest information related to recently declared areas and proposed reserves in Northern Province.

Kindly make arrangements to provide the said information. The Consultants for the SEA, **Consulting Engineers and Architects Associated (Pvt) Ltd (Tel -0115 624 503)** will coordinate this work.

Your assistance will be greatly appreciated.

Yours faithfully,

L. Champika Hewage
Director General (Acting)

Copy: Consulting Engineers and Architects Associated (Pvt) Ltd

41/1, නව පාර්ලිමේන්තු පාර, පැලවත්ත, බත්තරමුල්ල. இல 41/1 புதிய பாராளுமன்ற வீதி, பெலவத்த, பத்தரமுல்ல. 41/1,New Parliment Road, Pelawatte, Battaramulla.
පොදු දුරකථන කාර්යාලයම් / General Nos. 011-2786495, 2786577
සභාපති / தலைவர் / Chairman 011 -2786497
අධ්‍යක්ෂ ජනරාල් / பணிப்பாளர் நாயகம் / Director General 011 -2786498
Fax - 011-2786493
Web - www.naqda.gov.lk
Fax - 011-2786497
E-mail - chairman@naqda.gov.lk
Fax - 011-2786640
E-mail - dg@naqda.gov.lk

දුරකථන
தொலைபேசி
Tel. 2446183 - 4

ෆැක්ස්
தொலைநகல்
Fax 2541184

ඊ-මේල්
மின்னஞ்சல்
E-mail secfisheriesl k@gmail.com

මගේ අංකය
எனது இல
My No. MFAR/TEC/Pro/20 – 5(Vol-II)

ඔබේ අංකය
உமது இல
Your No.

දිනය
திகதி
Date 11.10.2022

දිවර අමාත්‍යාංශය
கடற்றொழில் அமைச்சு
Ministry of Fisheries

නව මහ ලේකම් කාර්යාලය, මාලිගාවත්ත, කොළඹ 10. —புதிய செயலகம், மாளிகாவத்தை, கொழும்பு-10. — New Secretariat, Maligawatta, Colombo -10.

Conservator General
Forest Department

Request for maps of Mangrove Areas in Northern Province
Strategic Environmental Assessment for Coastal Aquaculture Development Plan in Northern Province

National Aquaculture Development Authority of Sri Lanka (NAQDA) under the Ministry of Fisheries has prepared an Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) for 2021-2025. The World Bank is engaged with the Government of Sri Lanka (GoSL) in an Advisory Services and Analytics (ASA) work, where a number of analytical work including a Strategic Environmental Assessment (SEA) have been planned focusing on the Northern Province as the pilot area.

The study aims to identify potential areas for Coastal Aquaculture development in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts. In order to avoid the potential conflicts, it is necessary to obtain information on environmentally sensitive areas within the project area. The consultancy team involved in the SEA study has already obtained data regarding the forest reserves from the Forest Department.

We appreciate if you could provide electronic copies (GIS Shape files) of the maps of mangrove areas in coastal districts of Northern Province (Mannar, Kilinochchi, Jaffna, Mullaitivu) and latest information related to recently declared mangrove forests in the Northern Province.

Kindly make arrangements to provide the said information. The Consultants for the SEA, Consulting Engineers and Architects Associated (Pvt) Ltd (Ms. Amila Gunarathna - Environmental Officer, Tel – 077 4441024, E-mail- amila.cea@gmail.com) will coordinate this work.

Your assistance will be greatly appreciated.

Dhammika Ranathunga
Director General (Technical)
For Secretary

Copy: 1. Director General, NAQDA
2. Consulting Engineers and Architects Associated (Pvt) Ltd.

ධීවර අමාත්‍යාංශය - கடற்றொழில் அமைச்சு - Ministry of Fisheries

විසිතුරු මසුන්, මිරිදිය මත්ස්‍ය හා ඉස්සන් ඇති කිරීම, ධීවර වරාය සංවර්ධන,
බහුදින ධීවර කටයුතු හා මත්ස්‍ය අපනයන රාජ්‍ය අමාත්‍යාංශය

அலங்கார மீன்கள், நன்னீர் மீன்கள், இறால்களை வளர்த்தல், கடற்றொழில் துறைமுகங்கள்
அபிவிருத்தி, பலநாள் கடற்றொழில் அலுவல்கள் மற்றும் மீன் ஏற்றுமதி இராஜாங்க அமைச்சு.

State Ministry of Ornamental Fish, Inland Fish & Prawn Farming, Fishery Harbor Development,
Multi day Fishing Activities and Fish Exports.

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இலங்கை தேசிய நீர் உயிரின வளர்ப்பு அபிவிருத்தி அதிகாரசபை

National Aquaculture Development Authority of Sri Lanka

NAQDA

මගේ අංකය எனது இல. My No.	NQ/1/CAD/266	ඔබේ අංකය உமது இல. Your No.		දිනය திகதி Date	09.11.2021

Ms. Lakshmi Wickramasinghe,
Regional Deputy Conservator
Regional Deputy Conservator of Forest Office
Kilinochchi

Request information of Forest Reservation Areas in Northern Province
Strategic Environmental Assessment for Coastal Aquaculture Development Plan in Northern Province

National Aquaculture Development Authority of Sri Lanka (NAQDA) has prepared an Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) for 2021-2025 and the objectives set out under the coastal aquaculture are ; i) increase the coastal aquaculture and mariculture production from 7,238 Mt to 60,000 Mt in 2025, ii) increase export earnings from coastal aquaculture and mariculture sub-sector from Rs.8,017.02 Mn to Rs 91,973 Mn by 2025.

The World Bank is engaged with the Government of Sri Lanka (GOSL) in an Advisory Services and Analytics (ASA) work, where a number of analytical work including a Strategic Environmental Assessment (SEA) have been planned focusing on the Northern province as the pilot area. World Bank has engaged Consulting Engineers and Architects Associated (Pvt) Ltd (CEAA) to conduct SEA for Coastal Aquaculture Development Plan in Northern Province.

The main objective of the SEA is to identify any environmental or socioeconomic barriers with respect to the implementation of the proposed plan. In order to identify the environmentally sensitive areas in the Northern coastline, the consultants will carry out a preliminary assessment of the legally protected areas under the Forest Ordinance, Fauna and Flora Protection Ordinance, National Environmental Act as well as the Coast Conservation Act. This would specifically include conservation Forests declared under the Forest Ordinance as well as any protected wetlands, Mangroves, Villus, Lagoons, Sanctuaries, Reef sanctuaries, National Parks, Marine National Parks, Elephant Corridors, Managed Elephant Ranges (if any) gazetted under the Fauna and Flora Protection Ordinance and Forest Ordinance as well as any Environmental Protection Areas (EPAs) gazetted under the provisions in the National Environmental Act. In addition to this the SEA will require to identify any proposed Conservation/Protected areas to be declared under the above mentioned Acts.

While we are already in possession of the legally protected areas under the above mentioned acts, we would be grateful if your organization could provide information on other wildlife conservation areas which are proposed to be bought under protection status in the future.

41/1, නව පාර්ලිමේන්තු පාර, පැලවත්ත, බත්තරමුල්ල. இல 41/1 புதிய பாராளுமன்ற வீதி, பெலவத்த, பத்தரமுல்ல. 41/1 New Parliament Road, Pelawatte, Battaramulla.

පොදු දුරකථන / பொதுவானவை / General Nos. - 011-2786495, 2786577
සභාපති / தலைவர் / Chairman - 011 -2786497
අධ්‍යක්ෂ ජනරාල් / பணிப்பாளர் நாயகம் / Director General - 011 -2786498

Fax - 011-2786493
Web - www.naqda.gov.lk

Fax - 011-2786497
E-mail - chairman@naqda.gov.lk

Fax - 011-2786640
E-mail - dg@naqda.gov.lk

In addition to the proposed forest reservation areas, we would be extremely grateful if you could provide information on the presence of environmentally sensitive areas within your area of jurisdiction of which you or your officers may be aware of, which are not yet under protected status or proposed to be protected but which you believe to be environmentally sensitive in nature. Once the existence of such an area is indicated to the consultants along with the approximate location, our SEA consultants will investigate such location/s and determine the sensitivity of the given location/s along with the precautions to be adopted during the implementation of the NAQDA plan.

We strongly believe that identification of such forest areas which are not yet under protected status or proposed to be protected as yet at an early stage, will assist NAQDA to avoid such sensitive areas during plan implementation, thereby making it an environmentally sustainable plan in the long term.

We believe that the proposed NAQDA plan for the Northern Province has the potential to reap substantial benefits to the Northern Populace through economic benefits, increased employment prospects as well as better nutrition. It is hoped that conducting of the Strategic Environmental Assessment for the proposed plan will also ensure that the plan is environmentally and socially sustainable in the long term which will add value to the plan. Your contribution to the sustainability of the plan is of prime importance and we thank you in advance for your kind cooperation in this regard.

Kindly make arrangements to provide the said information. The Consultants for the SEA, Consulting Engineers and Architects Associated (Pvt) Ltd (Mr. T. Krishnaraja-Socio Economist of the SEA Team- 077 3474676) will coordinate this work.

Your assistance in this regard is highly appreciated.

Dr. J. M. Asoka
Director General

Copy: Consulting Engineers and Architects Associated (Pvt) Ltd

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தொலைபேசி
Tel. 2446183 - 4

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தொலைநகல்
Fax 2541184

ඊ-මේල්
மின்னஞ்சல்
E-mail secfisheriesllk@gmail.com

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கடற்றொழில் அமைச்சு
Ministry of Fisheries

මගේ අංකය
எனது இல
My No. MFAR/TEC/Pro/17-4 (Vol-II)

ඔබේ අංකය
உமது இல
Your No.

දිනය
திகதி
Date 05.05.2021

නව ඔප ලේකම් කාර්යාලය, මාලිගාවත්ත, කොළඹ 10. –புதிய செயலகம், மாளிகாவத்தை, கொழும்பு-10. – New Secretariat, Maligawatta, Colombo -10

Director General,
Department of Archaeology.

Requesting GIS maps of Archaeological Sites in Northern Province – Strategic Environmental Assessment for Coastal Aquaculture Development Programme in Northern Province

The National Aquaculture Development Authority of Sri Lanka (NAQDA) which comes under this Ministry has prepared an Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) for 2021-2025. In this regard, the World Bank is engaged with the Government of Sri Lanka (GoSL) in an Advisory Services and Analytics (ASA) work, where a number of analytical work including a Strategic Environmental Assessment (SEA) have been planned focusing on the Northern Province as the pilot area.

The study aims to identify potential areas for Coastal Aquaculture development in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts. It would be appreciated if you could kindly provide the consultant of SEA the GIS shape files of archaeological sites in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts in order to pursue the above-mentioned study by avoiding those areas when selecting the potential areas for coastal aquaculture development.

The Consultant for the SEA, Consulting Engineers and Architects Associated (Pvt) Ltd (Mr.Deshan Gamage-Project Coordinator, Tel – 077 4401630, E-mail- deshan.cea@gmail.com) will coordinate this work.

J.P.I.Swarnalatha
Assistant Director (Ocean Resources)

Sgd/: Dhammika Ranathunga
Director General (Technical)
For Secretary

Cc:
1. Director General, NAQDA
2. Consulting Engineers and Architects Associated (Pvt) Ltd

දුරකථන தொலைபேசி Tel. 2446183 - 4
ෆැක්ස් தொலைநகல் Fax 2541184
ඊ-මේල් மின்னஞ்சல் E-mail secfisheriesslk@gmail.com

දිවර අමාත්‍යාංශය
கடற்றொழில் அமைச்சு
Ministry of Fisheries

මගේ අංකය எனது இல My No. MRAF/TEC/Pro/20-5 (Vol-I)
ඔබේ අංකය உமது இல Your No.
දිනය திகதி Date 09 .03. 2022

නව මාවත මල්ගහවත්ත, මරදාන 10. – புதிய செயலகம், மாளிகாவத்தை, கொழும்பு-10. – New Secretariat, Maligawatta, Colombo -10.

Director General,
Department of Fisheries and Aquatic Resources,

Requesting information on existing and proposed fishery landing sites, traditional fishing grounds, and designated Beach Seine areas in Northern Province – Strategic Environmental Assessment (SEA) for Coastal Aquaculture Development Programme in Northern Province

National Aquaculture Development Authority of Sri Lanka (NAQDA) has prepared an Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) for 2021-2025. The World Bank is engaged with the Government of Sri Lanka (GoSL) in an Advisory Services and Analytics (ASA) work, where a number of analytical work including a Strategic Environmental Assessment (SEA) are carrying out focusing on the Northern Province as the pilot area.

The study aims to identify potential impediments for Coastal Aquaculture development in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts. As part of the SEA study, a provincial level Stakeholder Meeting was conducted by NAQDA on 11th February 2022, with the participation of the representatives of Department of Fisheries in Northern Province at the Auditorium of the Jaffna District Secretariat.

A major concern identified at the stakeholder meeting was the conflicts between traditional fisheries and the proposed coastal aquaculture development. In order to avoid those potential conflicts, it is necessary to have information on existing and proposed fishery landing sites, traditional fishing grounds, and designated Beach Seine areas along the coastal areas in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts.

The Consultant team for the SEA (Mr.T.Krishnaraja, Socio Economist) will coordinate this work and visit the Assistant Directors of the district offices to gather information for the preparation of map of abovementioned sites.

We appreciate if you could make necessary arrangements to provide the required information and maps to the NAQDA and SEA team from relevant district offices in Northern Province.

Dhammika Ranathunga
Director General (Technical)
For Secretary

Copy:

1. Director General, NAQDA
2. Assistant Director (Coastal Aquaculture-NP), NAQDA
3. Consulting Engineers and Architects Associated (Pvt) Ltd.

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தொலைபேசி
Tel. 2446183 - 4

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தொலைநகல்
Fax 2541184

ඊ-මේල්
மின்னஞ்சல்
E-mail secfisheriesllk@gmail.com

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கடற்றொழில் அமைச்சு
Ministry of Fisheries

මගේ අංකය
எனது இல
My No. MFAR/TEC/Pro/20-5 (Vol-II)

ඔබේ අංකය
உமது இல
Your No.

දිනය
திகதி
Date 05.05.2021

නව ඔප සේකම් කාර්යාලය, මාලිගාවත්ත, කොළඹ 10. –புதிய செயலகம், மாளிகாவத்தை, கொழும்பு-10. – New Secretariat, Maligawatta, Colombo -10

Director General,
Disaster Management Centre,
Vidya Mawatha,
Colombo 07.

Requesting Flood inundation maps, Storm Surge hazard maps and Sea level rise maps in Northern Province
– Strategic Environmental Assessment for Coastal Aquaculture Development Programme in Northern Province

The National Aquaculture Development Authority of Sri Lanka (NAQDA), which comes under this Ministry has prepared an Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) for 2021-2025.In this regard, the World Bank is engaged with the Government of Sri Lanka (GoSL) in an Advisory Services and Analytics (ASA) work, where a number of analytical work including a Strategic Environmental Assessment (SEA) have been planned focusing on the Northern Province as the pilot area.

The study aims to identify potential areas for Coastal Aquaculture development in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts. It would be appreciated if you could kindly provide the consultant of SEA the GIS shape files of Flood inundation maps, Storm Surge hazard maps and Sea level rise maps in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts in order to pursue the above-mentioned study by excluding those areas when selecting the potential sites for coastal aquaculture development.

The Consultant for the SEA, Consulting Engineers and Architects Associated (Pvt) Ltd (Mr.Deshan Gamage-Project Coordinator, Tel – 077 4401630, E-mail- deshan.cea@gmail.com) will coordinate this work.

J.P.I.Swarnalatha
Assistant Director (Ocean Resources)

Sgd/: Dhammika Ranathunga
Director General (Technical)
For Secretary

Cc:
1. Director General, NAQDA
2. Consulting Engineers and Architects Associated (Pvt) Ltd.

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தொலைபேசி
Tel. 2446183-4

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தொலைநகல்
Fax 2541184

ඊ-මේල්
மின்னஞ்சல்
E-mail secfisheriesik@gmail.com

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ඔබේ අංකය
உமது இல
Your No.

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திகதி
Date 27 .05.2022

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கடற்றொழில் அமைச்சு
Ministry of Fisheries

නව මහ ලේකම් කාර්යාලය,මාලිගාවත්ත, කොළඹ 10. -புதியசெயலகம்,மாளிகாவத்தை,கொழும்பு-10.- New Secretariat, Maligawatta, Colombo -10.

Director General,
Coast Conservation & Coastal Resource Management Department,

Requesting Storm Surge hazard maps and Sea level rise maps in Northern Province – Strategic Environmental Assessment for Coastal Aquaculture Development Programme in Northern Province

National Aquaculture Development Authority of Sri Lanka (NAQDA) under the Ministry of Fisheries has prepared an Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) for 2021-2025. The World Bank is engaged with the Government of Sri Lanka (GoSL) in an Advisory Services and Analytics (ASA) work, where a number of analytical work including a Strategic Environmental Assessment (SEA) have been planned focusing on the Northern Province as the pilot area.

The study aims to identify potential areas for Coastal Aquaculture development in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts. We appreciate if you could provide us the GIS shape files of following maps,

1. Sea level rise maps/Coastal inundation hazard maps due to predicted sea level rise in 25,50,75 and 100 year periods in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts in 1:50,000 Scale

2. Cyclone induced Storm Surge hazard maps based on projected storm surge levels in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts in 1:50,000 Scale

in order to pursue the above-mentioned study by excluding those areas when selecting the potential sites for coastal aquaculture development.

The Consultants for the SEA, Consulting Engineers and Architects Associated (Pvt) Ltd (Mr.Deshan Gamage-Project Coordinator, Tel – 077 4401630, E-mail- deshan.cea@gmail.com) will coordinate this work.

J.P.I.Swarnalatha
Assistant Director (Ocean Resources)

Sgd:/ Dhammika Ranathunga,
Director General (Technical)
For Secretary

Copy: 1. Director General, NAQDA
2. Consulting Engineers and Architects Associated (Pvt) Ltd.

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தொலைபேசி
Tel. 2446183 - 4

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தொலைநகல்
Fax 2541184

ඊ-මේල්
மின்னஞ்சல்
E-mail secfisheriesik@gmail.com

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கடற்றொழில் அமைச்சு
Ministry of Fisheries

මගේ අංකය
எனது இல
My No. MFAR/TEC/Pro/20-5 (Vol-II)

ඔබේ අංකය
உமது இல
Your No.

දිනය
திகதி
Date ෙෙ .05.2022

නව මහ ලේකම් කාර්යාලය, මාලිගාවත්ත, කොළඹ 10. – புதிய செயலகம், மாளிகாவத்தை, கொழும்பு-10. – New Secretariat, Maligawatta, Colombo -10

Director General,
Land Use Policy Planning Department.

Requesting Digital Land use maps of Northern Province
– Strategic Environmental Assessment for Coastal Aquaculture Development Programme in Northern Province

The National Aquaculture Development Authority of Sri Lanka (NAQDA) which comes under this Ministry has prepared an Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) for 2021-2025. In this regard, the World Bank is engaged with the Government of Sri Lanka (GoSL) in an Advisory Services and Analytics (ASA) work, where a number of analytical work including a Strategic Environmental Assessment (SEA) have been planned focusing on the Northern Province as the pilot area.

The study aims to identify potential areas for Coastal Aquaculture development in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts. It would be appreciated if you could kindly provide the consultant of SEA the Arc GIS shape files of land use and land cover map in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts in order to facilitate the above-mentioned study.

The Consultant for the SEA, Consulting Engineers and Architects Associated (Pvt) Ltd (Ms. Amila Gunarathna-Environmental Officer, Tel – 077 4441024, E-mail- amila.cea@gmail.com) will coordinate this work.

J.P.I.Swarnalatha
Assistant Director (Ocean Resources)

Sgd/: Dhammika Ranathunga
Director General (Technical)
For Secretary

Cc:
1. Director General, NAQDA
2. Consulting Engineers and Architects Associated (Pvt) Ltd.

ධීවර අමාත්‍යාංශය - கடற்றொழில் அமைச்சு - Ministry of Fisheries

විසිතුරු මසුන්, මිරිදිය මත්ස්‍ය හා ඉස්සන් ඇති කිරීම, ධීවර වරාය සංවර්ධන, බහුදින ධීවර කටයුතු හා මත්ස්‍ය අපනයන රාජ්‍ය අමාත්‍යාංශය

அலங்கார மீன்கள், நன்னீர் மீன்கள், இறால்களை வளர்த்தல், கடற்றொழில் துறைமுகங்கள் அபிவிருத்தி, பலநாள் கடற்றொழில் அலுவல்கள் மற்றும் மீன் ஏற்றுமதி இராஜாங்க அமைச்சு.

State Ministry of Ornamental Fish, Inland Fish & Prawn Farming, Fishery Harbor Development, Multi day Fishing Activities and Fish Exports.

NAQDA

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இலங்கை தேசிய நீர் உயிரின வளர்ப்பு அபிவிருத்தி அதிகாரசபை

National Aquaculture Development Authority of Sri Lanka

මගේ අංකය / எனது இல. / My No. } NQ/ 1/CAD/266 ඔබේ අංකය / உமது இல. / Your No. } දිනය / திகதி / Date } 08.11.2021

Mr. Stanley Mascarenhas
Chairman,
Tourism Bureau
Northern Provincial Council
A9 Road, Kaithady.

<u>Requesting maps and information of Proposed BOI Zones in Northern Province</u>
<u>Strategic Environmental Assessment for Coastal Aquaculture Development Plan in Northern Province</u>

National Aquaculture Development Authority of Sri Lanka (NAQDA) has prepared an Aquaculture and Culture-based Fisheries Sector Development Plan (ACBFSDP) for 2021-2025 and the objectives set out under the coastal aquaculture sub-sector are; i) increase the coastal aquaculture and mariculture production from 7,238 Mt to 60,000 Mt in 2025, ii) increase export earnings from coastal aquaculture and mariculture sub-sector from Rs 8,017.02 Mn to Rs 91,973 Mn by 2025.

The World Bank is engaged with the Government of Sri Lanka (GoSL) in an Advisory Services and Analytics (ASA) work, where a number of analytical work including a Strategic Environmental Assessment (SEA) have been planned focusing on the Northern Province as the pilot area. World Bank has engaged Consulting Engineers and Architects Associated (Pvt) Ltd (CEAA) to conduct SEA for Coastal Aquaculture Development Plan in Northern Province.

The main objective of the SEA is to identify any environmental and socioeconomic barriers with respect to the implementation of the proposed plan and potential conflicts between the proposed plan and other economic sector development plans.

We appreciate if you could provide the electronic copies of the maps and information of Tourist Attractions/Coastal Tourism Development Zones in Northern Province that are required for the above study. The Consultants for the SEA, Consulting Engineers and Architects Associated (Pvt) Ltd (Mr. T. Krishnaraja-Socio Economist of the SEA Team - 077 3474676) will coordinate this work.

Your assistance in this regard is highly appreciated.

Dr. J.M. Asoka
Director General

Copy: Consulting Engineers and Architects Associated (Pvt) Ltd

41/1, නව පාර්ලිමේන්තු පාර, පැලවත්ත, බත්තරමුල්ල. இல 41/1 புதிய பாராளுமன்ற வீதி, பெலவத்த, பத்தரமுல்ல. 41/1 New Parliment Road, Pelawatte, Battaramulla.

පොදු දුරකථන / கரும்பீடம் / General Nos. } 011-2786495, 2786577
Fax - 011-2786493
Web - www.naqda.gov.lk

සභාපති / தலைவர் / Chairman } 011 -2786497
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Fax - 011-2786640
E-mail - dg@naqda.gov.lk

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தொலைபேசி
Tel. 2446183-4

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தொலைநகல்
Fax 2541184

ඊ-මෙල්
மின்னஞ்சல்
E-mail secfisheriesl k@gmail.com

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கடற்றொழில் அமைச்சு
Ministry of Fisheries

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My No. MFAR/TEC/Pro/20-5(Vol-II)

ඔබේ අංකය
உமது இல
Your No.

දිනය
திகதி
Date 16.03.2022

නව මහ ලේකම් කාර්යාලය,මාලිගාවත්ත,කොළඹ 10. -புதியசெயலகம்,மாளிகாவத்தை,கொழும்பு-10.- New Secretariat, Maligawatta, Colombo -10.

Secretary
Ministry of Environment

Requesting permission to obtain data on Environmentally Sensitive Areas in the Northern Province from the Draft Report of "ESA National Scale Up Project"

The National Aquaculture Development Authority of Sri Lanka (NAQDA) under the Ministry of Fisheries has prepared an Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) for 2021-2025. The World Bank is engaged with the Government of Sri Lanka (GoSL) in an Advisory Services and Analytics (ASA) work, where a number of analytical work including a Strategic Environmental Assessment (SEA) is being carried out for this plan, focusing on the Northern Province as the pilot area.

The study aims to identify potential areas for Coastal Aquaculture development in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts. In order to avoid the potential conflicts, it is necessary to obtain information on environmentally sensitive areas within the project area. The consultancy team involved in the SEA study has already obtained data regarding the environmentally sensitive areas which are already gazetted. We understand that the Ministry of Environment is in the process of identifying additional environmentally sensitive areas island wide under the "ESA National Scale Up Project" in order to ensure the protection and proper management of such areas.

The consultancy team for the SEA had a meeting with Prof. Sevvandi Jayakody who is involved in the "ESA National Scale Up Project" in order to obtain information regarding the newly identified environmentally sensitive areas in the Northern Province, in order to update the information on such area. She is happy to disclose the findings with the permission of the Ministry of Environment.

Since development of aquaculture in the North is a major activity through which the government can ensure socioeconomic development in the Northern Province and in order to ensure that development of aquaculture does not affect the environmentally sensitive areas, we would greatly appreciate if you could grant permission and make necessary arrangements to release the data relevant to the environmentally sensitive areas in the Northern Province from the Draft Report of "ESA National Scale Up Project" to the NAQDA and SEA team.

Since the SEA study for the Aquaculture Development Program has to be completed by April 2022, we appreciate your prompt response in this regard.

The Consultants for the SEA, Consulting Engineers and Architects Associated (Pvt) Ltd (Ms. Amila Gunarathna - Environmental Officer, Tel – 077 4441024, E-mail- amila.cea@gmail.com) will coordinate this work.

Dhammika Ranathunga
Director General (Technical)
For Secretary

Copy: 1. Director General, NAQDA
2. Prof. Sevvandi Jayakody, Consultant for "ESA National Scale Up Project"
3. Consulting Engineers and Architects Associated (Pvt) Ltd.

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தொலைபேசி
Tel. 2446183 - 4

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தொலைநகல்
Fax 2541184

ඊ-මේල්
மின்னஞ்சல்
E-mail secfisheriesllk@gmail.com

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கடற்றொழில் அமைச்சு
Ministry of Fisheries

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My No. MRAF/TEC/Pro 20- 5 (Vol-II)

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உமது இல
Your No.

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திகதி
Date 03 .02. 2022

නව මහ ලේකම් කාර්යාලය, මාලිගාවත්ත, කොළඹ 10. — புதிய செயலகம், மாளிகாவத்தை, கொழும்பு-10. — New Secretariat, Maligawatta, Colombo -10.

Director,
National Mine Action Centre.

Requesting maps of Mine Cleared Areas in Northern Province – Strategic Environmental Assessment for Coastal Aquaculture Development Programme in Northern Province

National Aquaculture Development Authority of Sri Lanka (NAQDA) under the Ministry of Fisheries has prepared an Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) for 2021-2025. The World Bank is engaged with the Government of Sri Lanka (GoSL) in an Advisory Services and Analytics (ASA) work, where a number of analytical work including a Strategic Environmental Assessment (SEA) have been planned focusing on the Northern Province as the pilot area.

The study aims to identify potential aquaculture sites for Coastal Aquaculture development in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts. As part of the SEA study, a provincial level Stakeholder Meeting has been successfully held on 11th February 2022, from 9.00 am to 1.30 pm with the participation of more than 70 stakeholders (including the representatives of Regional National Mine Action Centre in Northern Province) at the Auditorium of the Jaffna District Secretariat.

We appreciate if you could provide us the maps of mine cleared areas, areas where there are ongoing surveys, and areas to be cleared in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts in order to pursue the above-mentioned study by avoiding those areas when selecting the potential sites for coastal aquaculture development.

The Consultants for the SEA, Consulting Engineers and Architects Associated (Pvt) Ltd (Ms.Amila Gunarathna -Environmental Officer, Tel – 0774441024, E-mail-amila.cea@gmail.com) will coordinate this work.

Dhammika Ranathunga
Director General (Technical)
For Secretary

Cc:

1. Director General,NAQDA
2. Consulting Engineers and Architects Associated (Pvt) Ltd
3. Regional Mine Action Centre, Kilinochchi

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தொலைபேசி
Tel. 011 2446183 - 4

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தொலைநகல்
Fax 011 2541184

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மின்னஞ்சல்
E-mail secfisheriesmlk@gmail.com

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உமது இல
Your No.

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திகதி
Date 13 .05.2022

මධ්‍ය මහ ලේකම් කාර්යාලය, මාලිගාවත්ත, කොළඹ 10. - புதிய செயலகம், மாளிகாவத்தை, கொழும்பு 10. - New Secretariat, Maligawatta, Colombo 10.

කිවර අමාත්‍යාංශය
கடற்றொழில் அமைச்சு
Ministry of Fisheries

Director General,
Geological Survey and Mines Bureau,
569, Epitamulla Road,
Pitakotte.

Requesting a Map of areas with Mineral Resources/Mineral Sites identified in Northern Province
– Strategic Environmental Assessment for Coastal Aquaculture Development Programme in Northern Province

National Aquaculture Development Authority of Sri Lanka (NAQDA) under the Ministry of Fisheries has prepared an Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) for 2021-2025. The World Bank is engaged with the Government of Sri Lanka (GoSL) in an Advisory Services and Analytics (ASA) work, where a number of analytical work including a Strategic Environmental Assessment (SEA) have been planned focusing on the Northern Province as the pilot area.

The study aims to identify potential areas for Coastal Aquaculture development in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts. We appreciate if you could provide us the GIS shape files of Mineral Sites/identified areas with Mineral Resources in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts in order to pursue the above-mentioned study by excluding those areas when selecting the potential sites for coastal aquaculture development.

The Consultants for the SEA, Consulting Engineers and Architects Associated (Pvt) Ltd (Mr.Deshan Gamage-Project Coordinator, Tel – 077 4401630, E-mail- deshan.cea@gmail.com) will coordinate this work.

Dhammika Ranathunga,
Director General (Technical),
Ministry of Fisheries.
For Secretary

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විසිතුරු මසුන්, මිරිදිය මත්ස්‍ය හා ඉස්සන් ඇති කිරීම, දිවර වරාය සංවර්ධන, ඔසුවීන දිවර කටයුතු හා මත්ස්‍ය අපනයන රාජ්‍ය අමාත්‍යාංශය

அலங்கார மீன்கள், நன்னீர் மீன்கள், இறால்களை வளர்த்தல், கடற்றொழில் துறைமுகங்கள் அபிவிருத்தி, பலநாள் கடற்றொழில் அலுவல்கள் மற்றும் மீன் ஏற்றுமதி இராஜாங்க அமைச்சு.

State Ministry of Ornamental Fish, Inland Fish & Prawn Farming, Fishery Harbor Development, Multi day Fishing Activities and Fish Exports.

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இலங்கை தேசிய நீர் உயிரின வளர்ப்பு அபிவிருத்தி அதிகாரசபை

National Aquaculture Development Authority of Sri Lanka

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Mr. Anton Jeyamanon,
Senior Deputy Director,
Jaffna Regional Office,
Board of Investment,
Jaffna

Requesting a map and information of Proposed BOI Zones in Northern Province
Strategic Environmental Assessment for Coastal Aquaculture Development Plan in Northern Province

National Aquaculture Development Authority of Sri Lanka (NAQDA) has prepared an Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) for 2021-2025 and the objectives set out under the coastal aquaculture are ; i) increase the coastal aquaculture and mariculture production from 7,238 Mt to 60,000 Mt in 2025, ii) increase export earnings from coastal aquaculture and mariculture sub-sector from Rs.8,017.02 Mn to Rs 91,973 Mn by 2025.

The World Bank is engaged with the Government of Sri Lanka (GOSL) in an Advisory Services and Analytics (ASA) work, where a number of analytical work including a Strategic Environmental Assessment (SEA) have been planned focusing on the Northern province as the pilot area. World Bank has engaged Consulting Engineers and Architects Associated (Pvt) Ltd (CEAA) to conduct SEA for Coastal Aquaculture Development Plan in Northern Province.

The main objective of the SEA is to identify any environmental or socioeconomic barriers with respect to the implementation of the proposed plan and potential conflicts between the proposed plan and other economic sector development plans.

We appreciate if you could provide the electronic copies of the maps and information of existing and proposed BOI Zones in Northern Province which are required for the above study. The Consultants for the SEA, Consulting Engineers and Architects Associated (Pvt) Ltd (Mr. T.Krishnaraja-Socio Economist of the SEA Team- 077 3474676) will coordinate this work.

Your assistance in this regard is highly appreciated.

Dr. J. M. Asoka
Director General

Copy: Consulting Engineers and Architects Associated (Pvt) Ltd

41/1, නව පාර්ලිමේන්තු පාර, පැළවත්ත, බත්තරමුල්ල. இல. 41/1 புதிய பாராளுமன்ற வீதி, பெலவத்த, பத்தரமுல்ல. 41/1,New Parliament Road, Pelawatte, Battaramulla.

පොදු දුරකථන / காரியாலய / General Nos.	011-2786495, 2786577	සභාපති / தலைவர் / Chairman	011 -2786497	අධ්‍යක්ෂ ජනරාල් / பணிப்பாளர் நாயகம் / Director General	011 -2786498
Fax	- 011-2786493	Fax	- 011-2786497	Fax	- 011-2786640
Web	- www.naqda.gov.lk	E-mail	- chairman@naqda.gov.lk	E-mail	- dg@naqda.gov.lk

දුරකථන
தொலைபேசி
Tel. 2446183 - 4

ෆැක්ස්
தொலைநகல்
Fax 2541184

ඊ-මේල්
மின்னஞ்சல்
E-mail secfisheriesllk@gmail.com

මගේ අංකය
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திகதி
Date 03 .02. 2022

මධ්‍ය මහ ලේකම් කාර්යාලය, මැලිගාවත්ත, කොළඹ 10. – புதிய செயலகம், மாளிகாவத்தை, கொழும்பு-10. – New Secretariat, Maligawatta, Colombo -10.

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கடற்றொழில் அமைச்சு
Ministry of Fisheries

Commander of the Army,
Sri Lanka Army

Requesting maps of High Security Zones in Northern Province
– Strategic Environmental Assessment for Coastal Aquaculture Development Programme in Northern Province

National Aquaculture Development Authority of Sri Lanka (NAQDA) under the Ministry of Fisheries has prepared an Aquaculture and Culture Based Fisheries Sector Development Plan (ACBFSDP) for 2021-2025. The World Bank is engaged with the Government of Sri Lanka (GoSL) in an Advisory Services and Analytics (ASA) work, where a number of analytical work including a Strategic Environmental Assessment (SEA) have been planned focusing on the Northern Province as the pilot area.

The study aims to identify potential aquaculture sites for Coastal Aquaculture development in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts. As part of the SEA study, a provincial level Stakeholder Meeting was successfully held on 11th February 2022, from 9.00 am to 1.30 pm with the participation of more than 70 stakeholders at the Auditorium of the Jaffna District Secretariat. Representatives of Commander-Security Forces (Jaffna and Mullativu) also participated at the meeting.

We appreciate if you could provide us the maps of existing high security zones in Jaffna, Mannar, Kilinochchi, and Mullaitivu districts in order to pursue the above-mentioned study by avoiding those areas when selecting the potential sites for coastal aquaculture development.

The Consultants for the SEA, Consulting Engineers and Architects Associated (Pvt) Ltd (Ms.Amila Gunarathna -Environmental Officer, Tel – 077 4441024, E-mail- amila.cea@gmail.com) will coordinate this work.

Please liaise Dr.(Mrs) J.M.Asoka, Director General /National Aquaculture Development Agency on 0714397722, if you need any further clarifications in this regard.

Dhammika Ranathunga
Director General (Technical),
For Secretary

Cc: 1. Director General, NAQDA
2. Consulting Engineers and Architects Associated (Pvt) Ltd
3. Commander, Security Forces (Jaffna)
4. Commander, Security Forces (Mullaittivu)
5. Commander, Security Forces (Vavuniya)