ENVIRONMENTAL ASSESSMENT AND REVIEW FRAMEWORK

Document Stage: Draft

Project Number: 55020-001
August 2022

Indonesia: Infrastructure Improvement for Shrimp Aquaculture Project

Prepared by the Ministry of Marine Affairs and Fisheries for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 25 July 2022)

Currency unit	–	rupiah (Rp)
Rp1.00	=	$0.000066
$1.00	=	Rp15,018

ABBREVIATIONS

ADB	–	Asian Development Bank
AMDAL	–	Analisis Mengenai Dampak Lingkungan Hidup (environmental impact assessment process in Indonesia)
BAPPENAS	–	Ministry of National Development Planning
COVID-19	–	Coronavirus disease
CPMU	–	Central Project Management Unit
DED	–	Detailed Engineering Design
DGA	–	Directorate General for Aquaculture
EA	–	Executing Agency
EARF	–	Environmental Assessment and Review Framework
ECOP	–	Environmental Code of Practice
EHS	–	Environment, Health, and Safety
EIA	–	Environmental Impact Assessment
EMP	–	Environmental Management and Monitoring Plan
FS	–	Feasibility Study
GERPARI	–	Gerakan Pakan Mandiri
GHG	–	Greenhouse Gas
GOI	–	Government of Indonesia
GRM	–	Grievance Redress Mechanism
IA	–	Implementing Agency
IEE	–	Initial Environmental Examination
IFC	–	International Finance Corporation
IISAP	–	Infrastructure Improvement of Shrimp Aquaculture Project
IUCN	–	International Union for Conservation of Nature
MMAF	–	Ministry of Marine Affairs and Fishery
MOEF	–	Ministry of Environment and Forestry
MSDS	–	Material Safety Data Sheet
NBC	–	Nucleus Breeding Center
PAM	–	Project Administration Manual
PMO	–	Project Management Office
PCR	–	Polymerase Chain Reaction
PIU	–	Project Implementation Unit
PPC	–	Project Preparation Consultant
PPE	–	Personal Protective Equipment
ROW	–	Right of Way
RTRW	–	Local Regulation on Regional Spatial Plan
SNI	–	Indonesia National Standard
SPPL	–	Surat Pernyataan Pengelolaan Lingkungan Hidup
SPS	–	Safeguard Policy Statement
UKL-UPL	–	Upaya Pengelolaan Lingkungan Hidup dan Upaya Pemantauan
	–	Lingkungan Hidup

UNFCCC	–	United Nations Framework Convention on Climate Change
UPT	–	Unit Pelaksana Teknis (an extended units of MMAF at local/regional level assigned for specific tasks, including managing shrimp ponds, broodstocks, and laboratory)
WWTP	–	Wastewater Treatment Plant

NOTE

In this report, "$" refers to US dollars.

Disclaimer

This environmental assessment and review framework is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature. Your attention is directed to the “terms of use” section on ADB’s website.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

CONTENTS

I. INTRODUCTION

A. Project Description

1. **Context.** Indonesia is among the top five shrimp producers in the world, together with India, People's Republic of China, Thailand, and Viet Nam.[1] The main farmed shrimp species is the whiteleg shrimp *(Litopenaeus vannamei)* accounting for 80% of production, which is produced by large companies and around half of the smallholders. The other half of the smallholders cultivate the tiger shrimp (*Penaeus monodon*) in an extensive way. Indonesia lags behind its peers in exports of freshwater shrimps, and fresh, salted, or smoked shrimps.[2] In 2021, Indonesia's shrimp production reached 707,951 tons with a value of Rp43 trillion;[3] and had a global market share of 7.1%. Global shrimp production is expected to grow by more than 5.2% annually.[4] In 2021, traditional farming covered 93% of the total pond area with a productivity of 0.6 tons/ha/year compared to 10 tons/ha/year for semi-intensive systems and 30 tons/ha/year for intensive systems.[5]

2. While the shrimp aquaculture potential is high, several barriers constrain its growth and sustainability. Smallholder farming profitability is constrained by the lack of economy of scale, expensive inputs (seeds and feed), limited access to finance and technology, unsustainable farming practices, and low bargaining power with aggregators. The low level of certification of farmers, aggregators, and processors also limit the ability to properly trace products, further limiting international buyers' confidence. As the demand for sustainability grows, there is a need to shift toward responsible and transparent production and sourcing. Promoting sustainable aquaculture practices will reduce pressure on the ecosystem, reduce the potential for shrimp disease outbreaks and help the sector access new markets and improve profitability. The Ministry of Marine Affairs and Fisheries (MMAF) will need to improve quality control and traceability and support for product certification. Clustering production facilities will enable economies of scale, providing farmers with purchasing and bargaining power with suppliers and buyers.

1. Project Outputs

3. The project will help the Ministry of Marine Affairs and Fisheries (MMAF) in introducing sustainable shrimp aquaculture and improving transparency, and traceability processes towards increased productivity, quality, profitability, and environment sustainability of smallholder's shrimp farming. The project will deliver an integrated investment addressing upstream, production, and downstream processes through infrastructure, capacity support to improve farming practices and post-harvest systems, and value chain strengthening in selected locations. The project will deliver three outputs: (i) Output 1: quality and sustainable inputs production increased; (ii) Output 2: sustainable aquaculture infrastructure and services developed; and (iii) Output 3: shrimp aquaculture value chain strengthened.

4. The project is aligned with the following impact: contribution of the fisheries sector to the national economy and value added of aquaculture increased. The outcome is productivity,

---

[1] J. Anderson et al. 2019.Goal 2019: Global Shrimp Production Review. *Global Aquaculture Alliance.* 4 November.
[2] Mainly Asian tiger shrimp and whiteleg shrimp. Daniel Workman. Big Export Sales for Frozen Shrimp. *World's Top Exports.*
[3] Directorate General of Competitiveness, Ministry of Marine Affairs and Fisheries. 2021. Shrimp Export Baseline Data.
[4] *Globe Newswire*.2019. Shrimp: The Future of the $45+ Billion Market, 2019-2024. 13 June.
[5] C. Rabbi. 2021. Produksi Udang Indonesia Ditargetkan Tembus 2 Juta Ton di 2024 (Indonesian Shrimp Production Targeted to Reach 2 Million Tons in 2024. *Katadata.* 12 July.

profitability, and environment sustainability of shrimp aquaculture increased.

5. **Output 1: Quality and sustainability of inputs production increased.** This output will finance the development of a modern broodstock center and two multiplication centers to provide smallholders access to affordable and quality whiteleg shrimp broodstock. The project will facilitate transfer of knowledge from the Oceanic Institute of Hawai to MMAF in producing high quality genetic shrimp fry. To control quality of broodstock and juveniles and water quality in production facilities, the project will finance construction, modernization, and climate and disaster proofing of seven laboratories under MMAF.[6] Facilities financed under the project will be incorporate gender responsive and inclusive features.[7] The project will purchase equipment and train MMAF staff in operating and maintaining these facilities.[8] This output will also help small and medium seed suppliers to comply with national broodstock breeding protocols, good hatchery practices, and biosecurity and environment monitoring. This output will also strengthen farmers capacity in producing their own feed aligned with the national fish feed program GERPARI (*Gerakan Pakan Mandiri*). A grant proposed for funding under the Global Environment Facility will complement those activities by engaging feed suppliers in diversifying raw material for feed to reduce reliance on fish wild catch and imported raw material and improve tracking of shrimp feed.

6. **Output 2: Sustainable aquaculture infrastructure and services developed.** This output will support establishment and strengthening of farmer-based enterprises enabling smallholders to consolidate their production facilities under a cluster approach. Accordingly, the project will support them in developing sustainable aquaculture development plan (SADP) as the basis for investment in their respective clusters. This SADP will help farmers to access to credits and develop partnerships with the private sector as relevant. The project will upgrade farmers groups production facilities introducing a sustainable aquaculture model.[9] Selected MMAF production facilities will also be upgraded following this model as demonstration sites. The sustainable aquaculture model aims to increase production, while minimizing impact on the ecosystem. For each cluster, the project will (i) rehabilitate or upgrade associated infrastructure (canals, drains, production roads, inlet reservoir, waste water treatment facility, and access to the electricity grid),[10] and (ii) purchase equipment towards modern aquaculture production.[11] MMAF will establish operation and maintenance guidelines and upgrade its infrastructure registry information system to a full asset management information system to ensure sustainability of the investments made under the project. Where suitable, farmers will plant and maintain mangrove trees in inlet and outlet canals and along the shoreline, to help reducing soil erosion and improving water quality. The project will strengthen famers technical capacity to adhere the INDOGAP guidelines towards economically and environmentally sustainable and viable shrimp production;[12]

---

[6] Benefiting from the MMAF's partnership with the University of Arizona.

[7] These include, but are not limited to, lactation rooms, separate male and female toilets, and separate male and female prayer rooms.

[8] The training programs will cover, but no limited to: (i) operating broodstock and multiplication centers; (ii) laboratory management, and disease surveillance and monitoring.

[9] This includes provision of inlet reservoir to stabilize water, wastewater treatment facility, canal and ponds upgrading, and replanting of mangroves in inlet and outlet canals to improve water quality.

[10] The project will assess water balance and water quality to ensure a fair water allocation among water users and include climate and disaster proofing, and gender responsive and inclusive features. The project will exclude clusters requiring land acquisition and/or resettlement.

[11] Equipment includes among others waste water equipment, power generation, water pumping, paddle wheel, generator, high-density polyethylene (HDPE) liner, grower and finisher for shrimp feed, spiral and plastic hose, DO meter, pH meter, refractor salinometer.

[12] Covering pond water quality, waste water management, cleaning technology; feed management, disease and biosecurity, financial literacy, marketing, mangrove management.

and to better manage water quantity and quality, and disease.

7. **Output 3: Shrimp aquaculture value chain strengthened.** This output will support value chain downstream processes for shrimp aquaculture. This output will purchase postharvest equipment,[13] and build farmers' capacity in food safety, handling and cold chain management, food safety, transformation, and marketing. Towards improved transparency, the project will facilitate registration of broodstock and feed suppliers, farmers, aggregators, and processors into the INDOGAP system and to register transactions in the MMAF's traceability system. Towards a harmonized regulatory framework, the project will assist MMAF in preparing quality standards, reviewing and rationalizing regulations and incentive systems for sustainable aquaculture. This output will also support the executing and implementing agencies to undertake project supervision and strengthen their capacities, considering social and gender dimensions. Under the proposed GEF grant, the Ministry of National Development Planning (BAPPENAS) will prepare a National Action Plans for Shrimp Aquaculture adopting an Aquaculture Management Area (AMA) approach including climate change mitigation and resiliency and conduct strategic coordination to institutionalize sustainable aquaculture development nationwide.[14]

8. **Approach.** The project will apply a sector lending approach in selecting subprojects that are outside MMAF land.[15] To be financed under the project, these subprojects will need to comply with the applicable selection criteria described in the Project Administration Manual. For each subproject, a Sustainable Aquaculture Development Plan (SADP) will be prepared

9. This Environmental Assessment and Review Framework (EARF) focuses on the first two outputs, *as* the third output as described are soft activities without physical investment and direct environmental impacts, which is not subject to environmental assessment.

B. Core Subprojects

10. The locations of subprojects are spread over several districts/provinces as shown in the table below

11. All five shrimp ponds, three broodstocks, and seven laboratories managed by the MMAF are selected as representative subprojects, and subject for the environmental assessment under IISAP.

[13] Processing, packaging, and logistics.
[14] This activity is proposed for funding under the Global Environment Facility.
[15] Those include canals, water treatment and production facilities outside MMAF land. A subproject is defined as a cluster of farmers within a hydraulic unit or tertiary block.

Table 1: Major Components and Location

Output 1			Output 2[a]				Output 3
Hatchery	**Laboratories**	**HSRT (Broodstock/ Nauplius)**	**MMAF Cluster**	**Farmers Cluster**	**Irrigation canal**	**Pond construction+ Comm WWTP**	**Value Chain[b]**
BPBAP Ujung Batee, Aceh	BPBAP Ujung Batee, Aceh	Pidie, Aceh	Jepara, Central Java–1 cluster (5 Ha)	Pidie, Aceh –1 cluster (5 Ha)	Pidie, Aceh 22 km (220 Ha)	Pidie, Aceh – 2 packages (10 Ha)	Pidie, Aceh (308 farmers)
BPBAP Takalar, South Sulawesi	BBPBL Lampung, Lampung	Pidie Jaya, Aceh	Tangerang, Banten – 1 cluster (5 Ha)	Bireuen, Aceh – 1 cluster (5 Ha)	Bireuen, Aceh Pidie, Aceh 22 km (220 Ha)	Bireuen, Aceh – 2 packages (10 Ha)	Bireuen, Aceh (630 farmers)
BPIU2K Karangasem, Bali	BPKIL Serang, Banten	Bireuen, Aceh	Pasuruhan, East Java–1 cluster (5 Ha)	Aceh Besar, Aceh– 1 cluster (5 Ha)	Aceh Besar, Aceh – 22 km (220 Ha)	Aceh Besar, Aceh–2 packags (10 Ha)	Aceh Besar, Aceh (105 farmers)
	BPBAP Situbondo, East Java	Lampung Selatan, Lampung	Pinrang, South Sulawesi–1 cluster (5 Ha)	Aceh Jaya, Aceh – 1 cluster (5 Ha)	Aceh Jaya, Aceh - 22 km (220 Ha)	Aceh Jaya, Aceh-2 packags (10 Ha)	Aceh Jaya, Aceh (120 farmers)
	BPIU2K Karangasem Bali	Situbondo, East Java	Takalar, South Sulawesi–1 cluster (5 Ha)	Aceh Barat, Aceh – 1 cluster (5 Ha)	Aceh Barat, Aceh - 22 km (220 Ha)	Aceh Barat, Aceh – 2 packgs (10 Ha)	Aceh Barat, Aceh (160 farmers)
	BPBAP Takalar,South Sulawesi	Tuban, East Java		Lampung Timur, Lampung – 1 cluster (5 Ha)	Lampung Timur, Lampung - 22 km (220 Ha)	Lampung Timur, Lampung–2 packags (10 Ha)	Lampung Timur, Lampung (278 farmers)
	BBPBAP Jepara, Central Java	Barru, South Sulawesi		Lampung Selatan, Lampung – 1 cluster (5 Ha)	Lampung Selatan, Lampung - 22 km (220 Ha)	Lampung Selatan, Lampung–2 packags (10 Ha)	Lampung Selatan, Lampung (395 farmers)
		Pinrang, South Sulawesi		Tanggamus, Lampung – 1 cluster (5 Ha)	Tanggamus, Lampung - 22 km (220 Ha)	Tanggamus, Lampung–2 packags (10 Ha)	Tanggamus, Lampung (60 farmers)
		Takalar, South Sulawesi		Situbondo, East Java – 1 cluster (5 Ha)	Situbondo, East Java - 22 km (220 Ha)	Situbondo, East Java–2 packags (10 Ha)	Situbondo, East Java (60 farmers)
				Gresik, East Java – 1 cluster (5 Ha)	Gresik, East Java - 22 km (220 Ha)	Gresik, East Java –2 packags (10 Ha)	Gresik, East Java (3,200 farmers)

Output 1			Output 2[a]				Output 3
Hatchery	**Laboratories**	**HSRT (Broodstock/ Nauplius)**	**MMAF Cluster**	**Farmers Cluster**	**Irrigation canal**	**Pond construction+ Comm WWTP**	**Value Chain[b]**
				Sidoarjo, East Java – 1 cluster (5 Ha)	Sidoarjo, East Java - 22 km (220 Ha)	Sidoarjo, East Java –2 packages (10 Ha)	Sidoarjo, East Java (630 farmers)
				Jembrana, Bali – 1 cluster (5 Ha)	Jembrana, Bali - 22 km (220 Ha)	Jembrana, Bali – 2 packgs (10 Ha)	Jembrana, Bali (40 farmers)
				Buleleng, Bali – 1 cluster (5 Ha)	Buleleng, Bali - 22 km (220 Ha)	Buleleng, Bali – 2 packages (10 Ha)	Buleleng, Bali (30 farmers)
				Jepara, Central Java -2 cluster (10 Ha)	Jepara, Central Java - 22 km (220 Ha)	Jepara, Central Java–2 packages (10 Ha)	Jepara, Central Java (210 farmers)
				Serang, Banten - 1 cluster (5 Ha)	Serang, Banten - 22 km (220 Ha)	Serang, Banten -– – 2 packages (10 Ha)	Serang, Banten (550 farmers)
				Bone, South Sulawesi-1 cluster (5 Ha)	Bone, South Sulawesi - 22 km (220 Ha)	Bone, South Sulawesi – 2 packags (10 Ha)	Bone, South Sulawesi (1,900 farmers)
				Pangkep, South Sulawesi-1 cluster (5 Ha)	Pangkep, South Sulawesi - 22 km (220 Ha)	Pangkep, South Sulawesi – 2 packages (10 Ha)	Pangkep, South Sulawesi (5,600 farmers)
				Pinrang, South Sulawesi -1 cluster (5 Ha)	Pinrang, South Sulawesi - 22 km (220 Ha)	Pinrang, South Sulawesi – 2 packages (10 Ha)	Pinrang, South Sulawesi (8,400 farmers)
				Sinjai, South Sulawesi - 1 cluster (5 Ha)	Sinjai, South Sulawesi- 22 km (220 Ha)	Sinjai, South Sulawesi – 2 packages (10 Ha)	Sinjai, South Sulawesi (650 farmers)
				Bulukumba, South Sulawesi - 1 cluster (5 Ha)	Bulukumba, South Sulawesi - 22 km (220 Ha)	Bulukumba, South Sulawesi – 2 packages (10 Ha)	Bulukumba, South Sulawesi (1,000 farmers)

Output 1			Output 2[a]				Output 3
Hatchery	**Laboratories**	**HSRT (Broodstock/ Nauplius)**	**MMAF Cluster**	**Farmers Cluster**	**Irrigation canal**	**Pond construction+ Comm WWTP**	**Value Chain[b]**
				Wajo, South Sulawesi -1 cluster (5 Ha)	Wajo, South Sulawesi - 22 km (220 Ha)	Wajo, South Sulawesi – 2 packages (10 Ha)	Wajo, South Sulawesi (2,900 farmers)
				Luwu, South Sulawesi-1 cluster (5 Ha)	Luwu, South Sulawesi - 22 km (220 Ha)	Luwu, South Sulawesi – 2 packages (10 Ha)	Luwu, South Sulawesi (2,370 farmers)
TOTAL				**115 Ha**	**506 Km (5,060 Ha)**	**230 Ha**	**35,390 farmers**

[a] For each cluster, the project will upgrade ponds construction, waste water treatment facilities, rehabilitate irrigation canals, electrical networks, and farm roads.

[b] Training programs to farmers and extension workers on (i) food safety; (ii) shrimp handling, (iii) certification processes; (iv) quality assurance system and food safety of aquaculture products; (v) CBIB, CPIB, CPPIB. Facilitate MOU between farmers-based enterprises with private sector; Facilitate registration of broodstock and feed suppliers, farmers, aggregators, and processors into the INDOGAP system and transactions in the MMAF's STELINA

Source:

C. Purposes of the EARF

12. EARF sets out criteria and procedure for the screening (categorizing), assessment and management of environmental impacts of project activities/subprojects that only be identified during the implementation, i.e., after the Asian Development Board (ADB) approval, to ensure their compliance with domestic and ADB environmental requirements. It summarizes anticipated adverse impacts and mitigation measures as well as proposed implementation arrangement based on assessment of the representative subprojects or past experiences of similar activities.

Figure 1: Map of IISAP Subprojects Location

Source:

II. LEGAL FRAMEWORK AND INSTITUTIONAL CAPACITY

A. Environmental Requirement of Indonesia

13. The Government's screening procedure is presented in the MOEF Regulation No. 4/2021 on List of Business Plans and/or Activities requiring Environmental Impact Assessment (EIA) (AMDAL in Indonesian), simplified EIA (UKL-UPL or SPPL in Indonesian). Essentially, an AMDAL study corresponds to an EIA, and an UKL-UPL corresponds to an IEE of the ADB. The Statement of Environmental Management and Monitoring undertaking (*Surat Pernyataan Kesanggupan Pengelolaan dan Pemantauan Lingkungan Hidup* - SPPL) generally corresponds to the ADB's Category C projects requiring a simple EMP (called SPPL). Several studies have been carried

out to study the alignment of Indonesia safeguard system and ADB SPS.[16]

14. The screening considers potential significant impacts as well as magnitude or size of business or activities. The decree mentions that the types of business and/or activities that require an Environmental Impact Assessment are determined based on: (i) potential significant impact, and (ii) uncertainty of technological capabilities available to overcome significant negative impacts that will arise. The aquaculture activities are listed in Appendix 1 of MOEF Regulation No. 4/2021 as activity subject to AMDAL requirement.

Table 2: Domestic Environmental Screening Criteria – Fishery and Multisector[17]

No.	Indicative Type of Projects	Threshold Criteria by Scale		
		AMDAL	UKL-UPL	SPPL
A	**Shrimp Aquaculture**			
	Shrimp aquaculture (sea water)	>500 Ha	500 - >10 Ha	≤10 Ha
	Shrimp aquaculture (brackish water)	>500 Ha	500 - >10 Ha	≤10 Ha
B	**Infrastructure (Public Works)**			
	New development of irrigation	≥ 3000 ha	3000 – 1,000 ha	< 1,000 ha
	Improvement of irrigation (additional irrigation schemes)	≥ 1,000 ha	1,000 - 100 ha	< 100 ha
	Rural roads: (by length) (by land acquisition area)	≥5 km with land acquired ≥ 40 Ha ≥ 40 ha	<5 km and/or land acquisition < 10 ha <40 Ha	
	Development / Rehabilitation / Renovation of buildings (including laboratory)	Built area ≥ 10,000 m^2	5,000 – 10,000 m^2, except for cultural heritage which require AMDAL for any scale	< 5,000 m^2, except cultural heritage which require AMDAL for any scale
	Construction of drainage			
	a. Big /Metropolitan city	⩾ 5 km	5 km > Length > 100 m	< 100 m
	b. Medium/Small city or rural area	⩾ 10 km	10 km > Length >100 m	< 100 m
	Drilling for groundwater (with flow)	⩾50 l/sec	50 l/sec > Flow > 10 l/sec	< 10 l/sec
	Retaining wall and/or breakwater	⩾ 500 m	500 m > Length > 10 m	⩽ 10 m
C	**Energy (Electricity)**			
	Development of solar photovoltaic powerplant (PLTS)	≥ 50 MW	≥ 1 MW – < 50 MW	< 1 MW

ha = hectare, km – kilometer, l = liter, m = meter, m^2 = square meter, MW = megawatt, sec = second.
Source: MOEF Regulation No. 4/2021

15. Since all subprojects, which comply with the selection criteria, will involve the development of shrimp pond on average 10 - 50 per ponds cluster at existing Balai/UPT land together with its supporting facilities (rural scale[18] canals, production roads etc), only UKL-UPL would be required, and SPPL for smaller ponds. Accordingly, refurbishment (rehabilitation) of existing laboratories

[16] Aligning Asian Development Bank and Country Systems for Improved Project Performance (https://www.adb.org/projects/documents/aligning-asian-development-bank-and-country-systems-improved-project-performance-tar) and https://www.adb.org/sites/default/files/project-document/185257/43220-014-pssa-01.pdf.
[17] MOEF Regulation No. 4/2021 on Types of Activities Requiring AMDAL, UKL-UPL and SPPL.
[18] Below the threshold of activities requiring AMDAL or UKL-UPL (Table 1).

and broodstock center also require SPPL or UKL-UPL. As per the MOEF Regulation, (Table 1) most of these interventions will not require EIA (AMDAL). However, where the command area is substantially expanded by the development of a ponds cluster of more than 500 ha, a full environmental assessment might be required. Similarly, if the farms are expanded more than 500 ha, an EIA required.

B. ADB Environmental Requirements

16. The ADB's environmental requirements are captured in its Safeguard Policy Statement (SPS 2009) and various instructions and guidance notes. The specific requirements are described and integrated throughout this EARF. Its definitions for environmental categories are:

(i) **Category A**: Likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities;
(ii) **Category B**: Potential adverse environmental impacts are less adverse than those of category A. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A;
(iii) **Category C**: Likely to have minimal adverse environmental impacts.

17. It is expected that most subprojects under the project will be classified under ADB guidelines/rules as category B. Such subprojects are judged to have some adverse environmental impacts mostly occurring during construction phase, but of lesser degree and/or significance than those for category A projects. For these subprojects, an IEE is required to determine whether or not significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report. Since the project has been classified as a category B project, any proposed subproject that is classified as a category A will be excluded.

III. ANTICIPATED ENVIRONMENTAL IMPACTS

A. Potential Impacts

18. A summary of potential impacts that need to be addressed during the design, construction and operation phases of the project is given in **Table 3.**

Table 3. Potential Adverse Environmental Impacts of the Project

Project Activities	Potential Environmental Impacts
Design and preparation (Pre-Construction)	
Bidding and contracting	Project delays due to administrative issue (permit and approval)
Selection of quarry, borrow pits, and disposal sites, etc.	Encroachment of protected areas
Design of ponds and hatcheries/ broodstocks	Climate change**;** induced impacts (flood, drought, increase in temperature, etc)
Site selection of ponds and broodstocks	Conversion of natural habitats
Construction (mainly from infrastructure subprojects)	
Earthworks and movement of vehicles	Air pollution; dust and air emission
Operation of construction equipment	Nuisance; noise

Project Activities	Potential Environmental Impacts
Excavation, earthworks and grading and domestic wastewater from workers camp	Water pollution: runoff causing siltation; sewage contributing to water pollution
Earth moving work	Loss of valuable topsoil; soil erosion/ contamination
Construction works	Generation of solid wastes, inert construction wastes, hazardous wastes, debris and spoil
Construction workers may undertake hunting of wildlife and cutting of wood	Impact on ecological resources
Poor planning and execution of tree clearing/ vegetation removal at project facilities	Clearing of vegetation
Community access to areas in the vicinity of schools, temples, village offices, marketplaces, and meeting halls	Temporary disruption of rural roads, paths, and accesses
Movement of construction vehicles and equipment	Increased volume of traffic; accidents
Workers use of tools and operation of heavy equipment	Occupational health and safety risks and impacts
Working camp siting and management	Coronavirus disease (COVID-19)
Operation (mainly from aquaculture and broodstocks and laboratories)	
Manual works during operation of shrimp ponds and broodstocks (lifting of materials/loads and harvest)	Occupational risks during operation – heavy lift
Operation of pump, paddle wheel, lighting, and other electric powered units	Occupational risks during operation – electric shock
Water based works at the ponds	Occupational risks during operation - drowning
Accidental introduction of wild breeds or non-certified (SPF) breeds into the ponds	Diseases and outbreak
Fertilizing of ponds for growing natural feeds and application of chemicals/ medicines/ hormones to promote the shrimp growth	Contaminating water due to excessive/ inefficient fertilizing and chemicals/ medicine use, and thus load more pollutants in the wastew***ater*** treatment plant (WWTP) to treat
Feeding with mainly fish meal and fish oil	Contaminating water due to excessive/ inefficient feeding (fish meal, fish oil, and other commercial manufactured feeds), and thus load more pollutants in the WWTP to treat
Shrimp ponds, broodstock hatchery preparation including piping, water treatment	Excessive water extraction and use and saline water intrusion (to public well nearby, if any)
Application of antibiotics and veterinary medicines or hormones	Contamination of food products, increased discharge of chemicals
Ponds operation	Exposure to chemicals, infectious disease vectors (malaria, dengue, etc.)
Operation of WWTP facility of shrimp ponds and broodstock	Odor from sludge handling during malfunction or power outage etc.
Dumping of domestic and organic/ biological wastes at ponds site	Odor from solid wastes and biological wastes
Laboratory operation and sanitary use of water for sanitation, cleaning, and washing	Domestic wastewater
Operation and maintenance of WWTP and septic tank	Odor from sludge handling of lab WWTP and septic tank (desludging)
Operation and maintenance of laboratory (sampling and measurement/ testing	Occupational health and safety hazards: fire
	Occupational health and safety hazards: explosions

Project Activities	Potential Environmental Impacts
	Occupational health and safety hazards: chemical and thermal burns
	Occupational health and safety hazards: cuts
Operation of mobile laboratory	Occupational health and safety hazards: traffic related accident/ chemical contamination

Source: IFC and other references

IV. SCREENING AND SELECTION PROCEDURE FOR SUBPROJECTS

19. The criteria and procedure are developed jointly by the CPMU and consultants under the guidance of the ADB team for the screening and selection of subprojects from environmental perspective during the implementation. Below is the logic framework for the screening and selection of subprojects:

(i) Subproject proposals are first judged against minimal criteria agreed jointly by CPMU and ADB for their technical, economical-financial, environmental and social eligibility;
(ii) Only those eligible will their technical-economic/financial feasibility study (FS) and social-environmental impacts be assessed (except those with minimal or low impacts, i.e. category C);
(iii) Only those that passed both eligibility and feasibility test (with adjustment to the project design as a result of assessments) can be selected for the project funding.

A. Environmental Screening Procedure

20. Only subprojects that have minimal or moderate environmental impacts and risks that are equivalent to Category B-C as defined by the ADB and have all necessary domestic approval and permits will be eligible. The step-by-step screening procedure is specified below:

(i) All subproject proponents need to submit proposals according to the format set by the CPMU, which should include basic information on types of activities and technical process involved, scale, location/site characteristics in order to judge their potential environmental impacts preliminarily (screening).
(ii) Subprojects belonging to ADB's Prohibited Investment Activities List (see Annex 1) and the CPMU's exclusion list will not be eligible.
(iii) Subprojects that passed the above minimal criteria will be screened by comparing their proposal with the project's environmental thresholds (Table 2 and Table 3) based on the country's EIA thresholds-based rules modified to also meet ADB's criteria.
(iv) To help environmental screening, all subprojects will also need to be checked against the siting criteria below (Table 4). Combined with professional judgement of environmental officer and consultants of the CPMU, category of a subproject will be determined.
(v) For subprojects judged to have minimal to low adverse environmental impacts, category C is assigned. No impact assessment is needed and it can be selected from environmental perspective.
(vi) For subprojects judged to have medium level impacts, category B is assigned. They need impact assessment following the requirements specified in the section

below. Based on the result of such assessment, the CPMU/PIUs will decide whether to select it or not.

(vii) Subprojects classified as Indonesia's highest environmental category requiring AMDAL (Category A)[19] or judged to have high impacts as defined by ADB as category A will be rejected/excluded.

B. Siting Criteria for Subprojects:

21. During the FS and referring to the prevailing regulations and consultation with EA, siting criteria were proposed for the ponds, broodstocks and laboratories as well as other supporting facilities. The criteria tested by the core subprojects will be adjusted and used to screen future subprojects that can only be identified, screened and/or assessed during the implementation stage of this project.

Table 4: Siting Criteria for IISAP Subprojects

Type of Activity	Siting Criteria
Ponds[a] and broodstock	- Comply with the regional spatial plan (RTRW) and coastal spatial plan (RZWP3K); - Available water source, maintenance water, and adequate and suitable land; - Not inside or within 100 meters from the boundary of mangrove area and any protected or conservation areas; - The location is free from periodic flood (for twenty-five years cycle or Q25) and effect of pollution or other contaminants/hazards for food safety reason; - The shrimp ponds are located at least 100 m at the back (hinterland) of coastal demarcation line (coastal zone), at least 100 m from river demarcation line (riparian zone) of large river and at least 50 m from small river; - Soil texture of the location meets the specifications that support growth of natural feed, suitable water quality for shrimp, and able to hold volume of shrimp and negligible leakage (<10 % per week).
Rural roads and other associated rural infrastructure	- In compliance with spatial plan (RTRW); - Not inside or within[b] the boundary of mangrove area and any protected or conservation areas; - Located beyond right-of-way/demarcation of riparian zone[c]: at least 5 (five) meters from the foot of river with embarkment; at least 100 (one hundred) meters from the riverbank of large river without embankment; at least 50 (fifty) meters from the riverbank for tributary without embankment outside of settlement area
Laboratory and other supporting buildings	- In compliance with spatial plan (RTRW) and building permit (PBG) - Located in an area with stable soil and avoidance of disasters-prone areas (flood, landslide, forest fire, volcanoes eruption, etc.) - Near to the main aquaculture activities (i.e., near to broodstock center and ponds) to facilitate environmental and ponds monitoring

[a] MMAF's Regulation No. 75/Permen-KP/2016 on General Guidance of Shrimp Ponds.

[b] Distance is not specifically regulated but depending on the specific characteristic of the fauna in the areas, considering their migration route, nesting, feeding and mating route

[c] Regulation of Ministry of Public Works and Housing No. 28/PRT/M/2015 on right of way/demarcation of rivers and lakes

Source: Various government regulations (including MMAF Regulation)

[19] AMDAL Category A is one with high risk and significant impact to environment (carrying capacity and supporting capacity of the environment).

22. Siting criteria must also consider the subproject's location vis-à-vis protected areas and presence of physical cultural resources (PCR) where the subproject will be located. Though the subprojects are not located within or at the boundary of protected areas, some are within 30 km or more from the project sites as identified in Table 5. The table provides the nature and value, level of protection, boundary and scope, protection requirement and government body in charge, and their relative distance to the project. Only those within 5 km range may be considered, while the areas beyond the project area of influence are presented as reference.

Table 5: List of Relevant Protected Areas in the Project Provinces/Districts

Location	Name	Protection targets	Size (ha)	Distance (km)
Sumatra Island				
Northern Sumatra: Aceh (Aceh Besar)	Lhoknga Marine Tourism Park	Marine habitats protection area	14	5
	Wildlife Sanctuary Area of Pinus Jantho	The sanctuary area covers: ➢ Natural Tourism Park (TWA) covering Pinus Aceh (2,556 Ha), and Kuta Malaka (1,544 Ha). ➢ Grand Forest Park of Pocut Meurah Intan in Seulawah Valley (6,122 ha) where Elephant Conservation Center (2 ha) is located. ➢ Cultural heritage and scientific sanctuary area covering relic of Aceh Sultanate in Mesjid Raya in form of Indrapatra Fort (3.09 ha).	15,281	63
	Kebun Plasma Nutfah (KPN) Leupung	Protected forest assigned for genetic protection	695	34
Southern Sumatra: Lampung (Pesawaran)	Bukit Barisan National Park	Bukit Barisan Selatan National Park is a national park in Sumatra. The park is located along the Bukit Barisan mountain range, has a total area of 3,568 km^2, and spans three provinces: Lampung, Bengkulu, and South Sumatra	3,568 k m^2	2 (to outer boundary)
	Natural preservation area	Covering grand forest park located in sub-districts of Gedong Tataan, Kedondong, Way Lima, Teluk Pandan, Way Ratai, and Padang Cermin	21,563	14
	Conservation of coastal area and isles	Located in Pulau Tegal of Teluk Pandan sub-district (hamlets/villages of Suak Panjang and Dusun Pahawang Lunik), and Pulau Pahawang of Marga Punduh district, hamlets/village of Suka Panjang and Pulau Siuncal of Punduh Pedada sub-district	700	4.5
Java Island				

Location	Name	Protection targets	Size (ha)	Distance (km)
Western Java: Banten (Serang and Tangerang)	Natural sanctuary area	a. Natural sanctuary of Rawa Danau in sub-districts of Padarincang, Mancak, and Gunung Sari; and b. Natural sanctuary of Mt. Tukung Gede in sub-districts Anyar, Cinangka, and Mancak	5,063	22 19
	Natural preservation area	a. Natural Tourism Park in Pulau Sangiang of Anyar sub-district covering 559 ha; and b. Natural Marine Tourism Park in Pulau Sangiang of Anyar sub-district covering 616 ha.	1,175	32 32
	Coastal and isles conservation area	a. Pulau Tunda and its marine area in Kecamatan Tirtayasa; and b. Pulau Pemujan Besar and its marine area in Kecamatan Pontang		69
Central Java: Jepara,	Karimunjawa National Marine Park	Coral reef, seagrass, mangrove forest, and terrestrial ecosystem of tropical forest and coastal forest	111,625	55
	biodiversity spots	Seagrass ecosystem in Jepara district covers approximately, in six sub-districts (including Kecamatan Jepara)	155	1
	Coral reef area	Coral reef area in Jepara covers seven sub-districts (including Kecamatan Jepara)	32,541	1
	Protected Mt. Muria	Mt. Muria has elevation of 1602 m above mean sea level, consisting of protected forest and coffee plants. Total area of Mt. Muria covering 69,812.08 ha, comprising of districts of Jepara 20,096.51 ha, Pati 47,338 ha, and Kudus 2,377.57 ha, respectively	69,812	21
East Java: Situbondo and Pasuruan,	Natural sanctuary of Gunung Abang	Located in Village Kedungpengaron (Kejayan sub-district), and Village Sapulante (Pasrepan sub-district). As natural sanctuary for various reptiles and endemic flora.	50	113
	Mt. Arjuna	The wilderness park of Raden Soerjo located in the complex of Arjuno-Welirang-Anjasmoro mountains, covering 27,868.30 Ha, consisting of protected forest 22,908.3 Ha, and natural sanctuary of Arjuno-Lalijiwo (PHPA) 4,960 Ha.	27,868	28
	Bromo Tengger Semeru National Park	Highland ecosystem, and indigenous people (Tengger tribe)	4,642	23
	Baluran National Park	Savanna, lowland forests, mangrove forests, and hills	25,000	58
	Yang Highland Wild Sanctuary	Wildlife sanctuary of Yang Highland represents one of natural conservation in East Java with various ecosystem	14,177	20
Bali Island				
Karangasem	Forest area in Mt. Agung	Located in sub-districts of Rendang (4,717.5 ha), Selat (970.78 ha), Kubu	12,275	8

Location	Name	Protection targets	Size (ha)	Distance (km)
		(5,093.66 ha), Abang (236.39 ha), and Bebandem (1,257.19 ha)		
	Batur Lake	Located in Kitamani (Bangli District), represent the largest lake in Bali. The lake covers a) aquatic area of 1,667 ha and specific areas around the lake to preserve the lake ecosystem of 102 ha	1,667	13
Sulawesi Island				
South Sulawesi (Takalar and Pinrang)	Mt. Latimojong	Latimojong Mountain located at 03°08'07"-03°45'49" South Latitude and 119°53'31"-120°17'50" East Meridien with specific ecosystem. The mountain spread over from north to south in administrative area of Enrekang, South Sulawesi	100,000	13
	Bantimurung National Park	This national park is also known as The Kingdom of Butterfly and The Spectacular Tower Karst. At the area there has been identified 240 types of Papilionoidea (butterflies), classified into 5 families (111 Nymphalidae, 25 Papilionidae, 28 Pieridae, 74 Lycanidae and 2 Riodinidae.	22,800	47
	Protected forest area	Located in Pinrang which assigned in some of sub-districts of Patampanua, Duampanua, Batulappa, and Lembang.	45,168	60

Source:Various references

C. Assessment and Review of Subprojects

23. The environmental screening and appraising of subprojects will be undertaken by the seven PIUs supported by the environmental specialists of regional technical consultants (RTC) The subproject environment category dictates the required level of EIA as specified below.

1. For Category B Subprojects

24. The subproject proponent is responsible for IEE. The IEEs should **follow examples set in the IEE/EMPs for representative subprojects of** each type of activities in terms of coverage, depth, level of details and format, including public disclosure and consultation. More specifically:

(i) For infrastructure subprojects whose proponents are IAs/PIUs, environmental specialists will prepare the IEE/EMPs;
(ii) For shrimp/fishery processing subprojects by cooperatives which have low capacity and resources, the environmental specialist prepares the IEE/EMPs;
(iii) The 7 PIUs will review IEEs/EMPs assisted by the environmental specialists;
(iv) If IEE is required for subprojects domestically, such IEE/EMP can help with domestic IEE to comply with domestic requirements and submit to environmental authority (MOEF or local environmental agencies/DLH) for review and approval before the CPMU select it for funding.
(v) The first IEE/EMP of category B will also be furnished to ADB for review.

25. To facilitate the assessment and review without compromising the quality, a consolidated

IEE/EMP can be prepared for multiple subprojects of similar type or in one locality (e.g. a province) unless unpermitted domestically. Results of both internal and external IEE/EIA reviews can have the following scenarios:

(i) Approved by all reviews: can be selected from environmental perspective.
(ii) Rejected by any of the reviews: NOT to be selected.
(iii) Additional study or improvement requested by any reviews: the proponent works with the Environmental specialists to revise and resubmit.

26. The environmental policy principle 6 of ADB's safeguard policy (SPS, 2009) stipulates to "Disclose a draft environmental assessment (including the EMP) in a timely manner, before project appraisal, in an accessible place and in a form and language understandable to affected people and other stakeholders". In addition to local disclosure, the English version of all IEE/EMPs need to be disclosed at the ADB website.

2. For Category C Subprojects

27. For category C subprojects, or those with minimal to low adverse environmental impacts, it is required to develop and implement an *Environmental Code of Conduct (ECoC)* or Environmental Code of Practice (ECOP) for both construction and operation. ECOP for such activities is presented in **Annex 3**. It is mandatory for category C subprojects to follow this ECOP and should be included in tender documents, construction contracts, and operational procedures whenever applicable.

3. Climate Change Risk

28. A Climate Change Risk Assessment for the project has been carried out during project preparation with recommendations proposed. The impact assessment and especially the EMPs of all subprojects need to take account of its findings and recommendations.

V. IMPLEMENTATION AND SUPERVISION OF SUBPROJECTS

A. Responsibilities and Institutional Arrangement

29. Ministry of Marine Affairs and Fishery (MMAF) is the executing agency and will be responsible for overall project co-ordination and management. MMAF will establish a CPMU which will be responsible for day-to-day management of this project.

30. The CPMU (e.g., *at national level*) is responsible for supervision, monitoring, and reporting of the EMP implementation and environmental performance by the subprojects. It should ensure the necessary people and resource available to follow the EARF and supervise environmental performance by subprojects, both category B and C.

31. The designated safeguard staff or focal point of the CPMU should coordinate environmental management of the project according to this EARF and the EMPs of subprojects. S/he is in charge of environmental supervision and monitoring and preparation of semi-annual environmental performance report for submission to the EA and the ADB.

32. The environmental specialists need to assist the CPMU in carrying out all its duties related to the environment as described in this EARF, the EMPs and the loan agreement. The consultant also needs to provide training on the use of EARF, the ECOP for category C and the EMPs for category B subprojects to all CPMU/PIUs and applicable contractors.

33. The PIUs established under the UPTs as the first layer of management need to supervise and monitor the EMP implementation by contractors or operators of their subprojects. The CPMU assisted by the environmental specialists will serve as the second layer of supervision and monitoring.

34. The subproject owners (also act as *local PIUs)* are responsible for compliance with both domestic and ADB applicable environmental, health and safety requirements through implementing the EMP, among others. The EMP must be included in bidding documents and contracts with contractors for construction and operators for operation and maintenance (O&M).

B. Monitoring and Reporting Requirements

1. For Category B Subprojects

35. PIUs should carry out onsite inspection including checking the EMP compliance at least once a year during the contract period. Findings in both desk review and field inspection should be duly recorded to furnish the semi-annual reporting. If the issues are found unresolved, the frequency of onsite supervision should be increased until the issues are corrected and remedial measures are undertaken.

36. Day-to-day supervision of EMP implementation during construction (e.g., infrastructure subprojects) should be carried out by supervision engineer in case resident engineers are not present to oversee construction quality and progress.

37. The CPMU assisted by the environmental specialists need to conduct site visit as second layer of supervision complementing to that performed by local PIUs. The selection of subprojects and frequency of visit depends on the judgment of CPMU/PIC.

2. For Category C subproject

38. Routine onsite supervision is usually not necessary. Instead, the local PIUs can check on random basis. If subprojects are found not following ECOP, PIUs should have more regular site visits until their performance improved. The CPMU assisted by the environmental specialists can also conduct random field check selectively.

3. Reporting to the ADB

39. This will be the responsibility of the CPMU assisted by the consultants. The PIUs as most subproject owners need to provide their routine supervision reports to the CPMU which will compile them into semi-annual reports. Subproject owners that are farmers groups, SMEs or cooperatives will only need to provide data and necessary information requested by the CPMU. Based on the above data, its own review and field supervision, the CPMU can easily produce and submit semi-annual environmental report of the project (outline is in Annex 3).

C. Changes and Non-Compliance in Subprojects

40. During subproject contract period, any change to the design of subprojects that may potentially cause negative environmental impacts shall be screened by the environmental specialists of the CPMU (and/or the ADB) to judge: (a) whether such negative impacts go beyond the original environmental category; (b) whether such negative impacts go beyond the scope of the original IEE, and if yes, (c) additional impact assessment needs to be conducted with environmental monitoring and mitigation measures in the EMP being revised or amended.

41. If the answer is Yes to (a) which results in a rise from category C to B, IEE and EMP will need to be prepared according to the requirements in this EARF and IEE/EMP of representative subprojects. In case of a category B subproject originally, a rise to category A will in effect disqualify it for the project support. Therefore, fund to such subproject will be discontinued or follow non-compliance procedure described below.

42. In case of non-compliance by subprojects with the EMP and other applicable domestic and ADB environmental, health and safety requirements, the following procedure will apply:

(i) The CPMU assisted by the consultants requires the subprojects to remedy breaches within an appropriate timeframe (any costs of remediation are the responsibility of the sub-borrowers). The CPMU will continue to monitor the issue and be satisfied that the situation is remedied in line with requirements outlined in the original EMP and/or any updated action plans or code.
(ii) The CPMU will obtain written confirmation from an appropriate environmental authority or independent monitor that they are satisfied with the steps being taken to resolve the non-compliance; or
(iii) If the subproject has not rectified the non-compliance issue within the time frame, the funding by the project will be suspended. The CPMU will act in terms of its penalty.

43. The CPMU will promptly report to ADB any actual or potential material non-compliance. PIUs will promptly report to the IA and CPMU who will notify the EA and ADB any actual or potential breach of the compliance requirements after becoming aware of it.

D. Grievance Redress Mechanism

44. The CPMU and PIUs will set up central grievance redress mechanism (GRM) and be coordinated by its safeguards officer (ESO) supported by consultants. Each local PIUs will set up a local GRM in similar pattern and ensure that the GRM is publicized so that the community is fully aware the local points of entry to it. The local GRM will consist of the nominated PIU's safeguards focal point, a representative of contractors, and two representatives (1 male and 1 female) of the village or farming community for which the subproject is being implemented.

45. The GRM will be accessible to diverse members of the community, including more vulnerable groups such as women and youth. Multiple points of entry, including face-to-face meetings, written complaints, telephone conversations, or e-mail, will be available. Opportunities for confidentiality and privacy for complainants will be given utmost importance. A sign will be posted at each construction site providing the public with updated details of the GRM, its entry points, contact persons and mechanisms to resolve grievances at different levels.

46. The preferred action sequence for complaints handling is that the complaint should be investigated and if considered legitimate be resolved by the unit receiving the complaint. If this is not possible, the complaint should be referred to the CPMU (the wider membership of which will enable a response and actions which are appropriate and coordinated). The CPMU /PIUs will maintain records of complaints and actions taken to correct them. The GRM data will be included in the CPMU's reports to ADB. The procedures and timeframes for the GRM are described below:

(i) Stage 1: If a concern arises during construction and operation of project facilities, the affected person will submit a written or oral complaint to the Contractor.
(ii) Stage 2: If no appropriate solution can be found, the complaint can be addressed to higher level.

47. During construction, the CPMU/PIUs will be informed by contractors, construction supervisors, or cooperative board if people complain about the project. During operation, the CPMU/PIUs will be advised of complaints by the Balai/UPT, and will also inform the ADB project team and submit all relevant documents. The CPMU and PIUs will maintain records of complaints and actions taken to correct them. This data will be included in the PMU's reports to the ADB.

VI CONSULTATION AND INFORMATION DISCLOSURE

A. Public Consultation

48. The public consultation and participation process during the project preparation stage should involve: (i) reconnaissance surveys of the subproject sites; and (ii) participatory meetings with local stakeholders.

49. Reconnaissance surveys of the subproject sites will comprise on-site discussions with local officials to provide information on the physical and biological resources, socio- economic environment, opportunities, and constraints relevant to the proposed subproject.

50. Participatory meetings will be conducted with government stakeholders and representatives from farmers and cooperatives. Feedback from the participants on subproject implementation and consensus on how to deal with environmental issues in the area will be important goals of the consultation process.

B. Public Disclosure

51. SPS environmental principle 6 requires the borrower to "Disclose a draft environmental assessment (including the EMP) in a timely manner, before project appraisal, in an accessible place and in a form and language understandable to affected people and other stakeholders" (this usually means not in English only). To translate ADB's policy in practice, the following procedure and requirements are adopted by the project:

Step 1. Draft the public announcement about IEE with key contents below:

(i) Objective of the disclosure and the follow-up consultation
(ii) A summary of the project and IEE including EMP
(iii) Weblink to e-version of draft documents
(iv) Addresses/locations to get or view the hard copies (local government office, community centers, and public library);
(v) Deadline for feedback from the public: the longer the better to allow sufficient time for the public to read, think, discuss, consult and coordinate to form opinions (at least two weeks between draft IEE disclosure and consultation dates)
(vi) Contact information for the public to send feedback: names of persons, email and post address, telephone numbers, websites, social media, or other means.

Step 2. Publicize the announcement at least two weeks prior to consultation using:

(i) Traditional media: bulletin board, popular newspaper, TV/radio channels
(ii) Social media (Facebook, Instagram, Whatsapp, and Telegram)
(iii) Mobile phone text messaging or mass emails to key stakeholders

Step 3. Consultation, usually a combination of typical methods below:

(i) Get feedback through contacts in the announcement: deadline by last consultation
(ii) Questionnaire or online surveys: anonymous, efficient, broader, less interactive
(iii) Meetings or interviews: costlier, limited participants, afraid to speak out at meetings, but more interactive (might be difficult during Covid-19 restriction).
(iv) Representativeness of project affected persons (PAPs) and stakeholders: by age, gender, ethnicity, profession, and education level.

ANNEX 1. ADB PROHIBITED INVESTMENT ACTIVITIES LIST

1. The following do not qualify for Asian Development Bank financing:

   (i) production or activities involving harmful or exploitative forms of forced labor[1] or child labor;[2]
   (ii) production of or trade in any product or activity deemed illegal under host country laws or regulations or international conventions and agreements or subject to international phaseouts or bans, such as (a) pharmaceuticals,[3] pesticides, and herbicides,[4] (b) ozone-depleting substances,[5] (c) polychlorinated biphenyls,[6] and other hazardous chemicals,[7] (d) wildlife or wildlife products regulated under the Convention on International Trade in Endangered Species of Wild Fauna and Flora,[8] and (e) transboundary trade in waste or waste products;[9]
   (iii) production of or trade in weapons and munitions, including paramilitary materials;
   (iv) production of or trade in alcoholic beverages, excluding beer and wine;[10]
   (v) production of or trade in tobacco;[11]
   (vi) gambling, casinos, and equivalent enterprises;[12]
   (vii) production of or trade in radioactive materials,[13] including nuclear reactors and components thereof;
   (viii) production of, trade in, or use of unbounded asbestos fibers;[14]
   (ix) commercial logging operations or the purchase of logging equipment for use in primary tropical moist forests or old-growth forests; and
   (x) marine and coastal fishing practices, such as large-scale pelagic drift net fishing and fine mesh net fishing, harmful to vulnerable and protected species in large numbers and damaging to marine biodiversity and habitats.

---

[1] Forced labor means all work or services not voluntarily performed, that is, extracted from individuals under threat of force or penalty.
[2] Child labor means the employment of children whose age is below the host country"s statutory minimum age of employment or employment of children in contravention of International Labor Organization Convention No. 138 "Minimum Age Convention" (www.ilo.org).
[3] A list of pharmaceutical products subject to phaseouts or bans is available at http://www.who.int.
[4] A list of pesticides and herbicides subject to phaseouts or bans is available at http://www.pic.int.
[5] A list of the chemical compounds that react with and deplete stratospheric ozone resulting in the widely publicized ozone holes is listed in the Montreal Protocol, together with target reduction and phaseout dates. Information is available at http://www.unep.org/ozone/montreal.shtml.
[6] A group of highly toxic chemicals, polychlorinated biphenyls are likely to be found in oil-filled electrical transformers, capacitors, and switchgear dating from 1950 to 1985.
[7] A list of hazardous chemicals is available at http://www.pic.int.
[8] A list is available at http://www.cites.org.
[9] As defined by the Basel Convention; see http://www.basel.int.
[10] This does not apply to project sponsors who are not substantially involved in these activities. Not substantially involved means that the activity concerned is ancillary to a project sponsor's primary operations.
[11] See footnote 10.
[12] See footnote 10.
[13] This does not apply to the purchase of medical equipment, quality control (measurement) equipment, and any equipment for which ADB considers the radioactive source to be trivial and adequately shielded.
[14] This does not apply to the purchase and use of bonded asbestos cement sheeting where the asbestos content is less than 20%.

ANNEX 2. SCREENING FOR ENVIRONMENTAL CATEGORIZATION

Instruction:

1. The purpose of this set of tables is to collect basic information necessary to determine the potential environmental impacts of a project and thus its category (A, B or C) for assessment and management. Part I captures the nature and scale of a project, key factors that determine environmental impacts thus its category. Part II is about its siting, the third determinant especially needed when the category seems cross-category judging by the first two. EIA categorization criteria in most countries are exactly based on nature and scale, basics that any project proposals must have, supplemented by its siting information. Explanation on how to fill out the tables are in *italic.*

Part I. Basic features of the (sub)project

- **Nature of the project activities:**

(*What is it about or in which sub/sector? Such intrinsic feature sets the tune of impacts, for example:*

- *Linear infrastructure: road or irrigation channel? New or rehab? If rehab, any widening? How much wider roughly? The former normally has more environmental impacts than the latter in above pairs.*
- *Non-linear infrastructure: Landfill, WWTP, or power plant? Coal-fired has bigger and more complex impacts than gas or biomass fired. Treatment of garbage is more complex than sludge.*
- *Agro-processing or industries: clarify which subsector or industries, as some are highly polluting and energy/water-intensive, e.g. slaughtering and tanning, others much less such as grain processing, yet others are in between, such as dairy, edible oil and juice production*.
- *For sector, FI, RBL or PBL modalities*: What are the sub/sector planned to cover?)

- **Scale of the project activities:**

(Design capacity or actual capacity, e.g., length of proposed roads or canals? Size of command area (ha), how many m^3/day the WWTP can treat? How many tons/day for landfill or incineration, number of animal per farm or per day for animal production and processing. Such data is crucial for judging and justifying, because within one industry/subsector, scale decides the magnitude of impacts.

For sector, FI, RBL or PBL modalities: provide range of scale foreseen for each sub/sector covered*)*

- **Applicable domestic environmental compliance requirements**

(Compare the information gathered in the above 1-2 with the EIA classification criteria of the country which are all by subsector and scale-thresholds. For activities not covered in country's

rule, consult with relevant environmental authority about domestic category and associated EIA requirements, and other approval or permits needed in the country. This is also as reference for your judgement.)
Other information that can help judge the impacts or risks (thus category): *(For example, the host's capacity in environmental management, their track-record etc)*

PART II. Siting of the (sub)project proposed

Sensitive receptors and/or various protected areas **Include but are not limited to:**	**If inside these areas, please provide details**	**If outside, where and how far from their boundary?**
Critical and natural habitat as defined by SPS, world natural or cultural heritage sites, officially designated nature reserves, forest park, geo-park, important wetland, key habitats for wildlife, reproduction area of protected flora, spawning, feeding, wintering ground and migrating route for key aquatic life, estuary, mangrove etc, unofficial domestically but designated internationally as various protected areas, such as by IUCN, UNEP etc.		
Designated basic farmland, basic grassland, scenic area/park, drinking water source protective zone, oceanic special protective zones, natural fishery ground, key zone for water and soil erosion control, closure zone for desertification etc		
Areas with main function as residential, health and medical, cultural, educational, R&D, and offices as well as physical cultural resources/relics, airports, air fields or military bases/zones etc.		

ANNEX 3. ENVIRONMENTAL CODE OF PRACTICE

1. Category C subprojects are those with minimal to low adverse environmental impacts thus without IEE and EMP. To guide their implementation in compliance with domestic and ADB environmental, health and safety (EHS) requirements, an Environmental Code of Practice (ECOP) is developed that incorporates domestic EHS related guidelines, standards and code of practice and applicable international good practice , e.g. IFC/WB's Environmental, Health and Safety (EHS) guidelines for aquaculture sector and general one. The ECOP measures include both construction of subprojects and operation phase (see table below).

Table 3.1 Environmental Code of Practice for IISAP Subprojects

Impact	Activities	Mitigating measures
Pre-Construction		
Risk of unexploded ordnance (UXO)		1. Conduct site investigation and consult local authority and community ASAP 2. Offsite area such as borrow pits or disposal sites can have UXO risks.
Overall	Bidding and contracting	1. Comply with all statutory requirements set out by Government; 2. Confirm government approval and secure requisite permits, and clearances; 3. PMUs ensure the EMP be included in bidding documents thus in contracts of civil work. 4. The tender documents shall include a lump sum bid item "Environmental Mitigation Measures". It shall be clarified in the specification documents that the applicable measures in the ECOP and EMP are to be charged to this item. This will allow the construction supervision engineer to require the contractor to quickly address the environmental issues during construction.
Encroachment of protected areas	Selection criteria for quarry, borrow pits, disposal sites	<u>Quarry, borrow pits and disposal sites selection criteria:</u> 1. Located beyond of right-of-way/demarcation of riparian zone: at least 5 (five) meters from the foot of river with embankment; at least 100 (one hundred) meters from the riverbank of large river without embankment; at least 50 (fifty) meters from the riverbank for tributary without embankment outside of settlement area 2. Alternatively, outsource of quarry, borrows pits and disposal with competent and certified third parties
Climate e.g., flood, drought, increase in temperature)	Design of ponds and hatcheries/ broodstock	Climate mitigation and adaptation already anticipated in design phase: - Flood protection (embankment) with Q25 (25-years periodical floods) - Use of corrosion resistant materials against weather and saline air
Conversion of natural habitats	Site selection of ponds and broodstocks	1. Prevention of the impacts done through using strict siting criteria during design: 2. MMAF's assistance program for the pond's clusters outside of the project to adopt sustainable aquaculture model. 3. Implement mangrove restoration program with community participation
Construction:		
Air pollution: Dust and air	Earthworks and movement of vehicles can pose nuisance	1. Require the contractor to cover materials with tarpaulin or other suitable materials while in transit to avoid spillage of materials. 2. Moisten earthen roads during dry and dusty conditions, particularly roads near residences and through the town core area. 3. Impose speed limits on construction vehicles.

Impact	Activities	Mitigating measures
emission Affect workers and community health	to nearby communities	4. Conduct regular maintenance on construction equipment and vehicles to control air emissions during vehicle operation. 5. Sites of borrow pits and spoil disposal must be at least 300 m from residential areas so as to reduce dust from these sites. 6. Effective dust suppression measures will be implemented near sensitive receptors such as schools, hospitals, or housing.
Nuisance Noise: Affect workers and community health	Operation of construction equipment will cause excessive noise	1. Limit construction activities, particularly operation of noise generating equipment at night. 2. Position any stationary equipment that produce high noise levels such as diesel generators as far as practical from sensitive receptors. 3. Erect temporary barriers around construction sites especially near schools, hospitals, and houses. 4. Install noise suppression devices to noise generating equipment. 5. Require drivers to minimize blowing of horn and to comply with speed limits. 6. Provide information to community on schedule of construction activities through billboard/signs.
Wastewater: Runoff cause siltation; sewage to pollute water	Excavation, earthworks, Wastewater from camp	1. Construct silt traps, deviation channels, mounting barriers or trenches around the stockpiles of materials. 2. Provide adequate water supply and temporary toilet facilities at the worker's camp.
Soil Erosion/ Contamination	Earth moving work Loss of valuable topsoil	1. Cutting of trees will be undertaken as per approved design and only upon approval of relevant authorities. 2. Avoid cutting of trees as much as possible and minimize damage to native vegetation. 3. Implement landscaping and planting of trees/vegetation at sites of the proposed facilities. 4. Soil erosion management plan to be prepared by the contractor and to be approved by the responsible authority before construction starts. 5. Maintain slope stability at cut faces by implementing erosion protection measures. 6. Construction in erosion and flood-prone areas should be mainly restricted to the dry season. 7. Control silt runoff and cover soil stockpiles; 8. Locate temporary soil stockpiles in areas where runoff will not induce sedimentation of waterways. 9. Establish protection measures for river embankment works, cut slopes, material stockpiles and other areas at risk of soil erosion prior to periods of heavy rainfall
Construction debris and spoil; Pollute land and water	Solid wastes, inert construction wastes, and hazardous wastes during construction	1. Surplus excavated material/cut soil will be used as backfill material for low-lying areas that have been identified by the village authority. 2. Provide appropriate segregation bins or areas for construction wastes. 3. Secure and control storage of all hazardous materials including fuels. 4. Reuse recyclable construction wastes such as wood, steel, and scaffoldings or sell to junk shops. 5. Solid waste to be collected and disposed in approved disposal site of the districts.
Impact on ecological resources	Construction workers	1. The contractors will prohibit activities such as cutting wood for cooking, hunting, or wildlife trade.

Impact	Activities	Mitigating measures
Clearing of vegetation	Poor planning and execution of tree clearing vegetation removal a loss of vegetation and general landscape	1. Cutting of trees will be undertaken as per approved design and only upon approval of relevant authorities. Avoid cutting of trees as much as possible and minimize damage to native vegetation. 2. Roads and paths to the facilities will only be sufficiently wide to accommodate construction vehicles/equipment to minimize land take. 3. Manual labor will be utilized in sloping terrain where use of heavy equipment would cause unnecessary damage. Steep exposed slopes will be graded and covered with bush and grass to minimize erosion. 4. Implement landscaping and planting of trees/vegetation at sites of the proposed facilities.
Social disturbance Temporary disruption of community roads, paths, and accesses	Community access to areas, schools, temples, village offices, market and meeting halls may be affected during construction	1. Walking access will be maintained to affected properties and access routes will be temporarily lined with timber or similar material. Particular attention will be given to ensuring safety along roads and paths used by pedestrians. 2. Install barriers and safety warning signs on road sections and if necessary, deploy traffic aides/ flag persons at affected locations. Information boards at blocked roads will provide information about the temporary closure of roads, schedule of works and the traffic-rerouting plan. 3. Require the contractor to immediately rehabilitate the excavated areas and any damaged road and path sections. 4. Enclose construction site perimeters so that pathway use, and access remains unimpeded.
Damage physical cultural resources (PCR)	Uncover relics and artifacts during civil works.	1. Chance-find procedure: ➢ in the event of accidental finds relics, should immediately cease any works in the area and protect the site ➢ Promptly report the find to their supervisor who immediately report local authority for PCR, e.g., cultural relic bureau. ➢ Contractor will ensure that the workforce is briefed on this procedure during prior training on EMP/ECC.
Community health and safety	Exposed to open excavation	1. Install barricades/barriers and sturdy plate covers in open excavations during non-working time. 2. Install warning signs in the area.
Increased volume of traffic	Increased traffic volumes and higher speeds may lead to accidents	1. Prepare a traffic control and management plan together with the local traffic police prior to any construction. The plan shall include provisions for diverting or scheduling construction traffic to avoid morning and afternoon peak traffic hours, regulating traffic at road crossings with an emphasis on ensuring public safety through clear signs, controls and planning. 2. In case of lane closures, deploy workers to direct traffic. 3. Signage and other appropriate safety features will be installed to indicate construction works are being undertaken 4. Speed limits shall be established in the work sites to minimize the risk of accidents.
Occupational health and safety	Construction activities may pose hazards to workers because of the use of heavy equipment, lifting of heavy loads, and exposure to open excavations and chemicals.	1. Require the contractor to implement the construction health and safety plan in accordance with the World Bank EHS Guidelines (http://www.ifc.org/ehsguidelines) as a minimum standard. The contractor will appoint an environment, health and safety officer to ensure implementation of the plan. The plan will at minimum include: ➢ Provision of first-aid facilities readily accessible by workers. ➢ Provision of personal protective equipment (PPEs) such as hard hats, gloves, rubber boots, etc. ➢ Wearing of PPEs while working onsite will be a mandatory requirement for workers. ➢ Posting of safety signs/reminders in strategic areas within the construction area. ➢ Installation of sufficient lighting at night. ➢ Ensure that vehicle and equipment operators are properly licensed and trained. ➢ Provide staff with COVID 19, communicable disease and HIV-related

Impact	Activities	Mitigating measures
		awareness training. 2. The contractor will be required to provide priority hiring of qualified construction workers from the villages and to consult with the local authorities to avoid conflict if migrant workers brought in.
COVID-19 risk management	Working camp siting and management	1. Siting of camps and field offices that meet the requirements: ➢ Not in area susceptible to flooding, landslide or other natural disaster ➢ Not in area affected by dust, noise, sewage or other pollution; Not in a residential area ➢ Minimum housing standards ➢ Separate bed for each worker ➢ Beds should not be arranged in tiers of more than two ➢ Separate accommodation of the sexes or to accommodate couples ➢ Adequate natural light during the daytime and adequate artificial light ➢ Adequate ventilation to ensure sufficient movement of air ➢ Adequate supply of safe potable water; Adequate sanitary facilities and drainage. ➢ Adequate furniture for each worker to secure his or her belongings, such as a locker ➢ Common dining areas, canteens, or mess rooms, located away from the sleeping areas ➢ Appropriately situated and furnished laundry facilities ➢ reasonable access to plug sockets for charging telephones and other devices ➢ Rest and recreation areas and health facilities, where not available in the community ➢ Minimum accommodation sizes; Sleeping space and room with Beds minimum 2m apart ➢ Inside dimensions over 198 centimeters by 80 centimeters. ➢ Headroom of over 203 centimeters allowing full free movement
Sanitation	Workers camps	1. Provide sanitation facilities ➢ One toilet, one tap / basin, one toilet for every 6 people, Fresh cold running water ➢ Convenient location to accommodation; Provision of soap, Ventilation to open air ➢ Separate facilities for men and women, Clean and hygienic 2. Septic tank/sewage treatment facility, or pit latrines located at least 200m from surface waters, and in areas of suitable soil profiles and above the groundwater levels 3. Separate area for sick workers to prevent transmission of disease 4. Fire safety throughout accommodation such as fire extinguishers, fire alarms, fire blankets 5. Worker training in fire prevention and procedures; Smoke detector in sleeping area 6. Fire exit sign, adequate means of escape and clearly maintained exit 7. Security lighting within camp and for sanitation block and lighting for route from sleeping area to sanitation block 8. Electrical cables to be in safe condition, elevated and not in areas liable to flood 9. Inspection ➢ 2 weekly inspections for cleanliness, state of repair of building, accommodation and fire equipment. ➢ Record inspection results and retain for review
Occupational health and safety	Construction site working conditions	1. Form a joint team to plan and organize commencement and/or return to work 2. Develop or convene a joint occupational safety and health committee with members representing the employer and workers 3. Train team members on the basic principles for the formulation and implementation of occupational safety and health preventive and control measures.

Impact	Activities	Mitigating measures
		4. Develop and communicate a work plan on safe working for COVID-19. Such plan should be fully aligned with any government regulations and guidelines on COVID-19 prevention and control, or in the absence thereof international good practice guidelines as may be updated from time to time 5. Risk assessment to decide when to work, who works and how 6. Undertake a risk assessment to determine the preventive and control measures 7. Ensure preventative measures are in place before resuming or beginning construction work 8. Adopt engineering, organizational and administrative measures ➢ Avoid physical interaction and maintain physical distancing requirements as prescribed by national policy of at least 2 meters, or in the absence thereof, international good practice ➢ Ventilate enclosed workplaces including work camps and communal spaces ➢ Avoid concentration of workers - limit the capacity of common areas such as work camp dining areas and changing rooms to allow the minimum separation of 2 meters and organize one-way systems. This includes sleeping areas which must be a minimum of 2 meters between beds ➢ Put in place training and information on COVID-19 and measures required for its management. ➢ The construction site is to be segregated to the extent possible in zones or other methods to keep different crews physically separated at all time ➢ Stagger break and lunch schedules to minimize the number of people near one another ➢ Regularly clean and disinfect ➢ Increase the frequency of cleaning and disinfection, heavily trafficked areas and common areas, including work camps ➢ All door handles, railings, ladders, switches, controls, eating surfaces, shared tools and equipment, taps, toilets, and personal areas are wiped down at least twice a day with a disinfectant ➢ Discourage the sharing of items such as cups, glasses, plates, tools 9. Promote personal hygiene ➢ Provide workers with the conditions and means necessary for frequent hand washing (soap, water or alcohol gel) with a posted hand washing protocol at site entries, exits, bathrooms, communal areas, offices, and any other areas with commonly touched surfaces ➢ Inform workers of the need to avoid physical contact when greeting, and avoid touching eyes, nose and mouth ➢ Inform workers of the need to cover the mouth and nose with a disposable handkerchief when coughing or sneezing or the crook of their arm ➢ Dispose of tissues in a lined and covered waste bin and wash hands afterwards 10. Provide personal protective equipment (PPE) and inform workers of its correct use 11. Identify appropriate PPE related to the tasks and health and safety risks faced by workers according to the results of risk assessment and the level of risk, and provide it to workers free of charge and in sufficient number, along with instructions, procedures, training and supervision 12. Non-medical face-coverings (such as homemade cloth masks) should be worn as mitigation for catching and transmitting the virus, but are not to be treated as substitutes for proper hand washing 13. Health surveillance and insurance 14. Before entering the site, staff and visitors must confirm that they are not currently exhibiting flu-like symptoms 15. Monitor the health status of workers, develop protocols for cases of

Impact	Activities	Mitigating measures
		suspected and confirmed COVID-19. The protocol will state that: ➢ Workers with symptoms or confirmed cases must be isolated within the construction camp or stay at home for 7 days after symptoms started ➢ If symptoms persist after 7 days, the person must isolate until the symptoms stop ➢ People who have been in close contact with the person with confirmed COVID-19 be quarantined for 14 days ➢ All workers in quarantine or isolation must be provided with adequate food, water, medical assistance and sanitation ➢ Identify workers who have had close contact with people infected with COVID-19 and follow national medical guidance ➢ Communicate confirmed cases of COVID-19 infection to the appropriate authorities ➢ All workers should be provided with health insurance that includes COVID-19 treatment 16. Consider other hazards, including psychosocial 17. Promote a safe and healthy working environment free from violence and harassment. 18. Encourage health promotion and wellbeing in the workplace through enough rest, balance of physical and mental activity and adequate work life balance 19. Implement prevention and control measures for the use and storage of chemicals, particularly those used for disinfection during COVID-19Review emergency preparedness plans ➢ Review and update preventive and control measures as the situation evolves ➢ Periodically monitor prevention and control measures to determine whether they have been adequate to avoid or minimize risk, and implement remedies for continuous improvement ➢ Establish and maintain records related to work-related injuries, illnesses and incidents, worker exposures, monitoring of the work environment and workers' health 20. Refer to the emergency preparedness plan required by MMAF (https://kkp.go.id/djpb/artikel/33175-surat-edaran-nomor-b-21940-djpb-viii-2021-tentang-penerapan-protokol-kesehatan-pencegahan-covid-19-pada-usaha-perikanan-budidaya) and other government regulation

ANNEX 4 (A) ENVIRONMENTAL MANAGEMENT PLAN FOR SHRIMP PONDS AND BROODSTOCKS

(All measures are implemented by the operators with cost include in O&M budget, and supervised by Balai/UPT)

Environmental Impacts	Main Activity	Prevention and Mitigation Measure
Wastewater effluent from ponds and tanks Contaminated due to excessive/ inefficient feeding (fish meal, fish oil, and other commercial manufactured feeds),	Breeding, hatching, feeding for growing shrimps and harvesting	➢ Manufactured feeds shall be registered in the Ministry (MMAF) and used as the direction for use ➢ Ensure that pellet feed has a minimum number of "fines" or feed dust. Fines are not consumed and add to the nutrient load in the water ➢ Match the pellet size to the species' life-cycle stage (e.g., smaller pellets should be fed to fry or juvenile animals to reduce the unconsumed fraction) ➢ Regularly monitor feed uptake to determine whether it is being consumed and adjust feeding rates accordingly. Feed may be wasted due to overfeeding or not feeding at the right time of day. ➢ Where feasible, use floating or extruded feed pellets as they allow for observation during feeding time ➢ Store feed in cool, dry facilities and ideally for no longer than 30 days to avoid reduction in vitamin contents. Moldy feed should never be used as it may cause disease ➢ Spread feed as evenly as possible throughout the culture system, ensuring that as many animals as possible have access to the feed. Some species are highly territorial, and uneaten feed adds to the nutrient loads ➢ Feed several times a day, especially when animals are young, allowing better access to food, better feed conversion ratios and less wastes ➢ Halt feeding at a suitable interval before harvest to eliminate the presence of food and / or fecal material in the animal's gut ➢ During harvesting, contain and disinfect blood water and effluent to reduce the risk of disease spread and to contain effluent matter.
Excessive water extraction and use, cause saline water intrusion	Prepare ponds, broodstock and hatchery include piping, water treatment	➢ Abstract groundwater for sanitation and domestic use only (surface and PDAM piped water supply is preparable, if any) ➢ Use shallow aquifer, instead of deep wells (considering groundwater level of all subprojects)
Contamination of food, increase discharge's chemical content	Application of antibiotics and veterinary medicines or hormones	➢ Medicines (used for aquaculture) shall be registered in the Ministry (MMAF) and used as the direction for use ➢ Apply approved over-the-counter antibiotics in strict accordance with the manufacturer's instructions to ensure responsible use ➢ Apply approved antibiotics that are purchased and utilized by prescription under the guidance of a qualified professional ➢ Develop a contingency plan covering how antibiotics should be applied following the identification of disease outbreaks ➢ Store antibiotics in their original packaging, in a dedicated location ➢ Avoid stockpiles of waste antibiotics by adopting a "first-in, first-out" principle so that they do not exceed their expiration date. Any expired antibiotics should be disposed of in compliance with national regulations ➢ consider sanitation and prevent the aquaculture products from various hazards for food safety such as bacteria, biotoxin, heavy metals and pesticides, as well as forbidden residues (antibiotic, hormone)

Exposure to chemicals, Infectious disease vectors (malaria, dengue, etc)	Ponds operation	➢ Follow guidance for the management of occupational chemical exposure is discussed in the General EHS Guidelines ➢ Follow MMAF's occupational health and safety (Appendix 1 of MMAF Regulation No. 6/PERMEN-KP/2018) ➢ Addressed as part of the occupational health and safety program including specific additional medical screening for the labor force ➢ Implementation of preventive measures (e.g., mosquito nets in living quarters). ➢ Additional guidance on the prevention and control of communicable diseases is provided in the General EHS Guidelines
➢ Wastewater treatment (WWT) Lagoon:		
Odor or effluent from WWT and its sludge can contaminate water and soil etc. .	Operation of WWT of shrimp ponds and broodstock, hatcheries	➢ Optimise operation following SOP for O&M to reduce odor in normal operation and malfunctioning. ➢ Use PDE such as mask to reduce the odor (affecting the workers); ➢ Observe and test regularly at inlet and outlet of lagoon following SOP to monitor treatment performance in order to adjust accordingly, e.g., the aeration intensity, retention time etc. to ensure treated effluent meet standard. ➢ During the biological stage, the excess sludge (i.e., excess bacteria) is pumped ➢ Sludge is digested and dewatered to the optimal degree, is finally disposed of at the dump ➢ The sludge is dried using SDB (sludge drying bed) consisting of sludge feeding (from 1 to 10 days) followed by drying period (from 4 days to 3 months), and subsequently drain. ➢ Drying of the sludge using evaporation process (solar light) are affected by several factors that shall be maintained, among others: temperature, light intensity, area of the surface, and barometric pressure. ➢ As the sludge from shrimp ponds and ponds' WWT are quite similar and mostly constitutes of organic material, both can be used for embankment, compost, and construction material. ➢ In case the sludge will be used for other purposes (as agriculture media or raw material for brickstone etc) or dumped at the other areas, the sludge shall be tested for heavy metals contents per government regulation ➢ Especially for constructed wetland some preventions and mitigations to be carried out: - All components expected to receive and/or trap debris and sediment should be inspected for clogging and excessive accumulation at least annually, or as needed; these components may include control structures, weirs, orifices, and outfall pipes. - All structural components should be inspected annually for cracking, subsidence, spalling, erosion, and deterioration. - Check the forebay for accumulated sediment. In general, the forebay should be dredged if sediment fills over 50% of design volume.
Direct discharge or spillage of wastewater due to malfunction, poor O&M or outage of on-site WWT:	O&M of on-site wastewater treatment lagoon and wetland for ponds	➢ Include bypass/emergency lagoon in WWT design to store effluent during these incidents. ➢ In case testing of the wastewater exceeded the quality standard set forth, then: - Conduct inspection of the process in the WWT, and fix the problem, as the deviation or failure identified - Check all machines and equipment of WWT, and fix the problem, as the deviation or failure identified. - Check inlet and outlet on monthly basis. ➢ In case of electric blackout, genset shall be turned on automatically ➢ In case of leakage/fracture of WWT ponds (due to earthquake or other reasons), WWT process shall be halted. Open the emergency standby lagoon to store excessive Wastewater that continues to be generated from aquaculture operation. The inspection and repair shall be carried out until safe condition. ➢ In case of accident in WWT, first aid shall be provided at the site, and subsequently referred to polyclinic or hospital emergency unit for further medical care.

		➢ In case of flood in the WWT, reserve pumps shall be turned on to avoid the flood water entering the WWT or wastewater contaminate the floodwater
➢ Solid waste management		
General solid wastes cause aesthetic and health/sanitary problem	domestic garbage from offices and operation,	➢ Collection of the solid wastes in the temporary depot and then segregated the wastes by its characteristics: organic wastes, inorganic wastes, and recyclable materials. ➢ In case the facilities located at remote areas and unable to access Dinas Kebersihan service, it is allowed to burn the solid wastes in incinerator, especially for small volume of unwanted wastes after segregation and separate plastic wastes and other recyclables
Organic wastes can cause odor, aesthetic, and health/sanitary problem.	Organic solid wastes, e.g., sludge from ponds dredging/clearing, residues of feeds, and plants	➢ Reuse organic wastes as fuel (such as tree branches) and others is utilized through simple composting or digestion or fermentation on site or by nearby farmers. ➢ Use of sediment/sludge from dredging for compost and inert wastes reused in embankment of ponds ➢ Cover the wastes with soil layer to avoid odor, aesthetic and health problem (growing of diseases vectors such as rats, flies, and others); ➢ Bury of remains or carcass of shrimp or its parts in the soil (especially for small volume);
Hazardous wastes cause pollution and poisoning	Hazardous wastes, e.g., biological and chemical hazardous wastes from the shrimp ponds and broodstock/hatchery	➢ All contaminated liquid or solid wastes are labeled, recorded to facilitate their proper handling and storage. ➢ Provide special room for stoting of chemicals (such as bleaching powder, PAC, chlrorine, ozone) ➢ All hazardous and chemicals should be decontaminated and neutralized before disposal. ➢ Follow the instruction in Material Safety Data Sheet (MSDS) in storage, handling, transport or use as well as disposal and OHS procedure in case of intoxication and exposure ➢ In co-located subprojects: Coordinate with co-located laboratory to collect and transferred the hazardous wastes to the Lab and follow measures in Table below on labs; ➢ If standalone without lab nearby: cooperate with nearby hospitals or industries capable to manage the hazardous.
➢ Occupational health and safety:		
Occupational risks during operation – Heavy Lift	Manual works during operation of shrimp ponds and broodstocks (lifting of materials/loads and harvest)	➢ Use mechanical and / or automated equipment to facilitate lifts heavier than 25 kg ➢ Use workstations that can be adapted to individual workers, especially if shrimp are processed at post-harvest ➢ Construct ponds that are rectangular in shape to facilitate harvesting. ➢ Use embankments which at least 2.5 meters wide, to be accessed by vehicles to drag harvest seines
Occupational risks during operation – Electric Shock	Operation of pump, paddle wheel, lighting, and other electric powered units	➢ Waterproof all electrical installations ➢ Ensure that fuses are used and that there is an appropriate connection to the ground ➢ Ensure that all cables are intact, waterproof, and without connection ➢ Provide training in the correct handling of electric equipment (e.g., pumps and) to avoid the risk of short circuits ➢ Employ lock out / tag out (LOTO) procedures
Occupational risks during operation – Drowning	Water based works at the ponds	➢ Provide lifejackets and harnesses with safety clips (karabiners) that lock on to lines or fixed points ➢ Ensure that personnel are experienced swimmers ➢ Train personnel in safety at sea, including procedures for supervision of personnel ➢ Require that personnel wear lifejackets on exposed sites and at sea

		➢ Where large vessels are used to transport personnel and equipment to marine sites, ensure that the vessel can be securely berthed on the pontoons, reducing the risk of falling into the gap between the vessel and the pontoon
Diseases and outbreak	Accidental introduction of wild breeds or non-certified (SPF) breeds into the ponds	➢ Use the seeds come from certified broodstock unit which implement good hatchery practices and proved by Health's Notification from authorized agency ➢ Equipment and machines for shrimp aquaculture shall be made from environmentally friendly materials, non-toxic, and free from diseases.

ANNEX 4 (B) ENVIRONMENTAL MANAGEMENT PLAN FOR LABORATORY

(All measures are implemented by the operators with cost include in O&M budget, and supervised by Balai/UPT)

Environmental Impacts	Activity	Mitigation Measure
➢ **Wastewater treatment (WWT):**		
Domestic wastewater from Toilets, staff sanitary use, cleaning, and washing	O&M of septic tank and related drainage	➢ All domestic wastewater is discharged into septic tank or settled in pond before discharge into drain ➢ Solid wastes are separated from the domestic wastewater by physical screen in drainage. ➢ O&M of septic tank: maintain plumbing and ventilation (gas release of the septic tank) ➢ Septage clean-up: Need to clean up septage once every 3–5 years or more frequent in some cases of irregularities identified such as overload, explosive methane gas, etc.) ➢ Septage treatment/disposal: dumped as fertilizer, as appropriate (containing no heavy metals) and adequate humic contents ➢ Before use and/or transported to other areas the solid sludge shall be tested to confirm that no heavy metals (Cd, Pb, Zn, Hg, As, Cr) which exceed the allowable threshold.
Odor and groundwater pollution During the operations phase of the project, one of the key issues is related to odour generation from the plant. Releases of hydrogen sulphide (H_2S) and other odorous gases such as ammonia, mercaptans, etc. from the inlet works area would be the major source of odour.	Septic tanks to treat domestic sewage; from biotank and reedbed for lab wastewater	➢ Conduct periodic maintenance of the septic tank, including periodic desludging of the sludge ➢ Maintain air release of the septic tank downwind against the workspace ➢ Proper consideration of plant layout, buffer zones and others to provide necessary/appropriate odour control system. ➢ Installation of odour control system at the site to treat the unpleasant smell of the contaminated incoming sewage water ➢ The pre-treatment facilities that consist of coarse screening, fine screening, grease and grit removal chamber that stored contaminated sewage is enclosed to minimise the odour generated during the operational of septic tank/biotank ➢ Use PDE such as mask to reduce the odor (affecting the workers)

Process and tests wastewater high in chemicals etc and complex. Treated discharge does not meet standard, causing pollution	O&M of biotank and reedbed to treat Wastewater from labs' tests and preparation	➢ Optimize the testing SOP to reduce water use and thus wastewater amount; ➢ Follow the SOP for the O&M of biotank and reedbed with needed training to Lab staff. ➢ For hazardous chemicals like acids and alkalis: reuse as much as possible; neutralize them by mixing properly in order to avoid erode the drainage and WWT equipment and pipes. ➢ Spent solvent and liquid: should store temporarily in glass bottles, not drain into drainage and thus WWT. ➢ Observe and monitor regularly the inlet and outlet of above two WWT components (biotank and reedbed) to ensure proper operation and take actions to adjust their operation depending on monitoring results. ➢ Manage WWT sludge and other biodegradable wastes and proper disposal and/or reuse ➢ Sludge from labs is not recommended to reuse as its potential chemical contents ➢ Provide separate lab septic tank/biotank and domestic septic tank ➢ Avoid rainwater from roofing into the wastewater treatment system and divert away properly constructed soakaway ➢ Especially for reedbed/ constructed wetland some preventions and mitigations to be carried out: ➢ All components expected to receive and/or trap debris and sediment should be inspected for clogging and excessive accumulation at least annually, or as needed; these components may include control structures, weirs, orifices, and outfall pipes. ➢ All structural components should be inspected annually for cracking, subsidence, spalling, erosion, and deterioration. ➢ Check the forebay for accumulated sediment. In general, the forebay should be dredged if sediment fills over 50% of design volume.
Direct discharge or spillage incidents of wastewater	due to malfunction, poor O&M or power outage	➢ Design should include bypass and emergency storage tanks on site; ➢ In case of leakage/fracture of WWT biotank (due to earthquake or other reasons), WWT process shall be halted. The inspection and repair shall be carried out until safe condition. ➢ Include bypass/emergency lagoon in WWT design to store effluent during these incidents; ➢ In case testing of the wastewater exceeded the quality standard set forth, then: □ Conduct inspection of the process in the WWT, and fix the problem, as the deviation or failure identified □ Check all machines and equipment of WWT, and fix the problem, as the deviation or failure identified. □ Check inlet and outlet on monthly basis. ➢ In case of electric blackout, genset shall be turned on automatically ➢ In case of leakage/fracture of WWT biotank due to earthquake or other reasons), WWT process shall be halted. ➢ In case of accident in WWT, first aid shall be provided at the site, and subsequently referred to polyclinic or hospital emergency unit for further medical care. ➢ In case of flood in the WWT, reserve pumps shall be turned on to avoid the flood water entering the WWT or wastewater contaminate the floodwater
➢ **Solid waste management**		
Hazardous wastes contaminate Land and water	Sampling and testing of the samples in the laboratory	➢ All contaminated liquid or solid wastes are labeled, recorded to facilitate their proper handling and storage. ➢ All hazardous and chemicals should be decontaminated and neutralized before disposal. ➢ Follow the instruction in Material Safety Data Sheet (MSDS) in storage, handling, transport or use as well as disposal and OHS procedure in case of intoxication and exposure) ➢ Collect the hazardous waste at temporary storage before transfer to third party which is certified for hazardous treatment and dumping ➢ provided in specific areas which lined, with enclosed walls and roofs to store hazardous waste containers. ➢ Install and use properly-sized sterilization devices (e.g. autoclave) to timely sterilize infectious wastes into general wastes, reducing need for special further treatment; ➢ For hazardous chemicals like acids and alkalis: reuse as much as possible; neutralize them by mixing properly following relevant lab SOP and safety procedure;

		➢ For inflammable chemicals/solvents: reuse as much as possible permitted by H&S rules; burn by onsite incinerator with O&M improved to meet its standard performance; ➢ Initiate regular training on safe practices to handle hazardous wastes. ➢ Use of appropriate PPEs for the workers.
Aesthetic and sanitary nuisance	General solid wastes, garbage	➢ Collect and segregate the wastes by its category (especially, separate hazardous wastes with general non-hazardous wastes) ➢ Reduce, reuse and/or recycle of certain wastes (plastic, metal, glass, and cardboard) ➢ Use of organic wastes as raw material for composting ➢ Promote waste segregation to avoid hazardous waste mixing with general wastes.
➢ **Air emissions of labs**		
Air emission and smell/ odor	Operation of fume hoods and ventilation in labs	➢ Keeping all apparatus at least 6 inches back from the face of the hood and keeping the slots in the hood baffle free of obstruction; ➢ Elevating large equipment at least two inches off the base of the fume hood, to allow for the passage of air underneath the apparatus; ➢ Minimizing movement and other forms of potential air disturbances past the face of the hood while you are working; ➢ Eliminating sources of ignition inside the hood when flammable liquids or gasses are present; ➢ Limiting the storage of chemicals and apparatus in the hood to those that are required for current work; ➢ Maintain good ventilation of the workspace (lab), Including use of air blower ➢ Use of fume hood and other methods to suction the hazardous vapor and odor ➢ Use PDE such as mask to reduce the odor (affecting the workers)
Flue gas emission with common air pollutants and probably toxic dioxin	From boilers, and Solid waste onsite management at labs i.e., handling, storage, incineration	➢ Proper O&M of boilers on site or switch to gas or electricity boilers if possible; ➢ Maintain feed of the wastes and air so reduce incomplete combustion that produces toxic carbon monoxide (CO) ➢ Avoid combustion of material that potentially release dioxin and other toxic gases; ➢ Retrofit onsite existing incinerators to ensure optimal operation, and add filers at chimney; ➢ Operate onsite incinerator in their standard condition, i.e., burn at temperature 850 for min two seconds to avoid and destroy dioxin etc.; ➢ Reducing the introduction of plastic material in the incineration process, reduces the calorific value inside the incineration chamber, which sometimes prevents the feed process due to the abrupt rise in temperatures inside the incinerator
➢ **Occupational Health and Safety**		
hazards: Fire,Explosions Chemical and Thermal Burns	Operation and tests in standard labs, and wet labs of aquaculture ponds and hatcheries	**Measures related to Fire:** ➢ Never be open flames in the laboratory. Specifically, never heat any organic solvent in an open vessel, such as a test tube, Erlenmeyer flask, or beaker, with a flame. ➢ Volatile solvents should be heated in a hood with a steam bath, not a hot plate. ➢ Never keep volatile solvents, such as ether, acetone, or benzene in an open beaker or Erlenmeyer flask. ➢ All staff to know where the nearest safety shower and fire extinguisher are located. All staff in the laboratory will be trained in the use of fire extinguishers.

Cuts; Absorption or Inhalation of Chemicals		**Explosions:** ➢ Never heat a closed system or conduct a reaction in a closed system (unless specifically directed to perform the latter process and then only with frequent venting). ➢ Before starting a distillation or a chemical reaction, make sure that the system is vented. **Chemical and Thermal Burns:** ➢ Avoid contact with inorganic chemicals such as the mineral acids and alkalis which are corrosive to the skin and eyes. ➢ Avoid and prevent spill of organic chemicals, such as acid halides, phenols, and so forth are corrosive and often toxic. ➢ If there are spilled on the desk, in the hood, or on a shelf, call for assistance in cleaning them up. ➢ Be careful with hot plates to avoid burns. Always assume that hot plates are hot **Cuts/Injury:** ➢ Avoid cut while attempting to force a cork or rubber stopper onto a piece of glass tubing, a thermometer, or the side-arm of a distilling flask. ➢ Be sure to make a proper-sized hole, lubricate the cork or stopper (lubrication is essential with a rubber stopper), and use a gentle pressure with rotation on the glass part. ➢ Severed nerves and tendons are common results of injuries caused by improper manipulation of glass tubes and thermometers. ➢ Always pull rather than push on the glass when possible **Absorption of Chemicals:** ➢ Keep chemicals off the skin. ➢ Be careful about touching face or eyes in the lab; make sure hands are clean first. ➢ Use gloves available in the lab. However, gloves provide only a temporary layer of protection against chemicals on your skin and may be permeable to some chemical reagents, without visible deterioration. ➢ If gloves come in contact with a chemical reagent, remove them, wash hands, and get a new pair immediately **Inhalation of Chemicals:** ➢ Keep nose away from chemicals. Many of the common solvents are extremely toxic if inhaled in any quantity or over a period of time. ➢ Do not evaporate excess solvents in the laboratory; use the hood or a suitable distillation apparatus with a condenser. ➢ When in doubt, use the hood or consult with the laboratory instructor about the use of chemicals required for your work **Ingestion of Chemicals:** ➢ Avoid accidental ingestion of chemical reagents –Pipets must be fitted with suction bulbs to transfer chemicals. ➢ Do not use suction by mouth, ➢ Wash hands before handling anything (cigarettes, chewing gum, food) which goes into your mouth. ➢ Wash hands when you leave the laboratory, ➢ Do not eat or drink in the laboratory. ➢ Remove gloves and wash your hands before using the water fountain or bathroom, ➢ Never use chemicals (salt, sugar, alcohol, bicarbonate, etc.) from the laboratory or stockroom on food. The source containers may be contaminated or mislabelled, ➢ Never use laboratory glassware as a food or drink container,

		➢ Never store food or drink in a laboratory refrigerator or ice machine. Never consume ice from a laboratory ice machine.
Occupational Health and Safety hazards: Traffic related accident/ chemical contamination	Operation of mobile laboratory	➢ Equip the mobile laboratory with decontamination kit in case of chemicals spill ➢ Provide special training (safety driving training) for the driver(s) of mobile laboratory ➢ Provide portable fire extinguisher in the mobile laboratory ➢ Provide first aid kit in the mobile laboratory