



Initial Environmental Examination:

Subproject: Enhancing Management Effectiveness, Anambas National Marine Protected Area, Anambas Islands, Indonesia

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CURRENCY EQUIVALENTS

(as of 11 March 2013)

Currency Unit – IDR
 IDR 1.00 = \$ 0.00001032
 \$1.00 = IDR 9,687

ABBREVIATIONS

GLOSSARY

ADB	-	Asian Development Bank
BAPEDAL		Environmental Impact Control Agency (<i>Badan Pengendalian Dampak Lingkungan</i>)
BAPEDALDA		Local Environmental Impact Control Agency (<i>Badan Pengendalian Dampak Lingkungan Daerah</i>)
BAPPENAS		National Development Planning Agency (<i>Badan Perencanaan Pembangunan Nasional</i>)
BKKPN		National Marine Conservation Center (BKKPN) of Kupang
BPLHD		Local Environmental Management Agency (<i>Badan Pengelolaan Lingkungan Hidup Daerah</i>)
Bupati	-	District Mayor
COREMAP	-	Coral Reef Rehabilitation and Management Project
CT	-	Coral Triangle
CTI	-	Coral Triangle Initiative
DG	-	Directorate General
DPL		Marine Protected Areas (<i>Daerah Perlindungan Laut</i>)
GEF	-	Global Environment Facility
GoI	-	Government of Indonesia
ha	-	Hectare
IDR	-	Indonesian Rupiah
KKJI	-	Directorate for Conservation of Area and Fish Species (<i>Direktorat Konservasi Kawasan dan Jenis Ikan or KKJI</i>)
km	-	Kilometer
LIPI	-	National Science Agency
LKKPN	-	National Marine Conservation Areas (<i>Loka Kawasan Konservasi Perairan Nasional or LKKPN</i>) of Pekanbaru
LPSTK		<i>Coral Reef Resource Management Agency (Lembaga Pengelola Sumberdaya Terumbu Karang)</i>
MCSI		Directorate General of Marine, Coast and Small Islands (<i>Kelautan, Pesisir Dan Pulau-Pulau Kecil or KP3K</i>)
MMAF	-	Ministry of Marine Affairs and Fisheries (<i>Kementarian Kelautan dan Perikanan or KKP</i>)
MoU	-	Memorandum of Understanding
MPA		Marine Protected Area (<i>Kawasan Konservasi Laut Daerah or KKLD</i>)
NGO	-	non-governmental organization
PES	-	Payment for ecosystem services
PKBL	-	Partnership and Environment Development Program

PMO	-	Project Management Office
POKMAS	-	Community groups
Rp	-	Rupiah
SOE	-	state owned enterprise
SOP	-	Standard Operating Procedure
UPT	-	Technical Implementation Unit
USD	-	United States Dollar

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I. INTRODUCTION

1. The Coral Reef Rehabilitation and Management Program: Coral Triangle Initiative Project (COREMAP-CTI, the Project) aims to manage coral reef resources, associated ecosystems and biodiversity in a sustainable manner for the welfare of coastal communities. The design of COREMAP-CTI reflects a phased and incremental approach. The first or initiation phase known as COREMAP Phase I (1998–2004) represented the pilot phase leading to the design of COREMAP Phase II (COREMAP II). The second or acceleration phase, COREMAP II (2004–2011) represented the initial implementation phase. The proposed Project is the third and final phase which intends to (i) complete remaining gaps in Phase II; (ii) “institutionalize” Phase II interventions; and (iii) build a “model” of coral reef rehabilitation and management program in Indonesia for replication and up-scaling in new areas. “Institutionalization” will mean integrating community-based activities within local Government functions and policies, and facilitate learning networks and institutional partnerships across regional and national institutions for project sustainability. The Project will follow a project financing modality for a sector loan.

2. COREMAP-CTI will be aligned with Indonesia’s National Plan of Action (NPOA) for the Coral Triangle Initiative (CTI), and aims to manage coral reef resources, associated ecosystems and biodiversity in a sustainable manner for increasing the incomes of coastal communities in Indonesia. Building upon Phase II interventions, the Project will deliver 10 effective MPA models that can be replicated across the country for sustainable coral reef management. MPAs in Phase II were in MPA initiation stage (“red” category) or the MPA established stage (“yellow” category). The Project will help to move the MPAs to the next higher stage(s): “yellow”, MPA managed minimally stage (“green” category), or MPA managed optimally stage (“blue” category) by increasing and evaluating their management effectiveness.

3. The selection of subprojects within this sector modality will be based on the following key criteria: the subproject (i) contributes directly to environmentally sound non-consumptive resource utilization across the MPAs (e.g., environmentally-responsible tourism); (ii) supports development of sustainable fisheries (e.g., enhancing fish market facilities, fish landing sites, fish catch monitoring and catch regulation); (iii) contributes to fostering alternative livelihoods that reduce fishing pressure or provides non-traditional gainful employment within the sector; and (iv) enhances effectiveness, governance, and financial sustainability of co-managed MPAs. Subprojects will be formulated and implemented using a community-driven development (CDD) approach.

4. Based on these criteria, the feasibility study for the project preparation will appraise three representative (core) subprojects, one for a national level MPA and two for subnational MPAs. The core subprojects may include: (i) enabling infrastructure for private sector participation in ecotourism development (e.g., mooring buoys, jetties, village roads, solid waste management, water supply, sanitation, electricity supply, telecommunications etc.); (ii) fisheries productivity-related infrastructure (e.g., hatcheries, fish markets, fish landing sites, fishing ports, etc.); (iii) alternative livelihood-related infrastructure (fish ponds, fish cages, fish processing etc.) and (iv) MPA governance (e.g., management board, spatial plans, management plans, financing plans, threatened species management plans, coral monitoring and database systems, monitoring and surveillance operations).

5. This IEE Report focuses on the environmental assessment of the management interventions, as a sample subproject of Mentawai Islands and is limited to ecotourism and livelihood, as these project interventions have potential for environmental impacts.

6. The environmental assessment was undertaken by the ADB consultant team through field visits between May 26, 2013 and June 7, 2013 in the project sites, interviews/consultation and focus-group discussions with officials or representatives from project stakeholders such as the regencies, cities and municipal governments, villages, and district/field offices of national government agencies including the Ministry of Marine Affairs and Fisheries (MMAF), National Development Planning Agency (Badan Perencanaan Pembangunan Nasional or BAPPENAS), Regional Development Planning Agency (Badan Perencanaan Pembangunan Daerah or BAPPEDA), National Science Agency (*Lembaga Ilmu Pengetahuan Indonesia or LIPI*), National Marine Conservation Areas (LKKPN), National Marine Protected Area (*Kawasan Konservasi Perairan Nasional*), Marine Protected Area (*Kawasan Konservasi Laut Daerah or KKLD*), Directorate for Conservation of Area and Fish Species (*Direktorat Konservasi Kawasan Dan Jenis Ikan or KKJI*) and others. Collection of secondary data such as the regency profile/statistics, maps, and management/development plans were also done.

II. DESCRIPTION OF THE PROJECT

A. Overview of the Sector Loan

7. **Type.** This sector loan project is associated with environment and natural resources. It is multi-component, and related to investment in capacity building, coastal and fishery management, and livelihood development.

8. **Category.** The Project is categorized as Category B for environment under the ADB Safeguard Policy Statement (SPS) 2009 due to the project's emphasis on conservation of marine and coastal resources and the localized impacts for which mitigation measures can be readily designed and implemented.

9. **Need for project.** Low coastal community awareness and inadequate institutional capacity to manage land and marine-based pollution, insufficient institutional framework to effectively manage marine protected areas (MPAs), and persistent poverty in coastal areas have resulted in 70% of Indonesian coral reefs becoming degraded. The Government of Indonesia plans to address these root causes of resource and environmental degradation by undertaking this project.

10. **Location.** The Project will be implemented in existing COREMAP Phase II areas of seven districts that include at least 57 existing project villages in three provinces in Sumatra (North Sumatra, West Sumatra and Riau). Additional project activities will focus on MPA management effectiveness at three national MPAs: Anambas in Anambas District in Riau Islands province, Pulau Pieh in Pariaman District in West Sumatra province, and Gili Matra in North Lombok District of West Nusa Tenggara province.

11. **Magnitude of Operation.** The ADB-financed portion of the project would cover three national and seven sub-national marine protected areas (MPAs) in primarily eastern and western part of Sumatra Island. ADB will prepare the IEEs for three representative (core) subproject areas, one for a national level MPA and two for subnational MPAs.

12. **Proposed Schedule of Implementation and Project Proponents.** The Project is proposed to be implemented within five years from 2013 to 2017, with the MMAF as the Executing Agency (EA).

13. **Description of Project Components.** The Project has four major components or outputs:

- (i) **Output 1: Coral reef management and institutions strengthened.** This component will focus on strengthening and institutionalizing capacities developed under COREMAP II. Significant key targets under this output are (i) Number of community development extension workers deployed (30% are women), (ii) Number of villages implementing coastal management regulations, (iii) Number of joint monitoring and surveillance patrols undertaken, and (iv) Number of DGMCSI, DGCF, Secretariat General and LIPI staff obtaining postgraduate qualifications.
- (ii) **Output 2: Ecosystem based resources management developed.** This component will strengthen MPA management effectiveness and biodiversity conservation. Identified targets are (i) Number of district spatial plans prepared, (ii) Number of person days of training conducted, (iii) Number of regulations adopted for protecting threatened and endangered species, and (iv) Number of MPA and threatened species management action plans developed.
- (iii) **Output 3: Sustainable marine-based livelihoods improved.** This component will promote sustainable livelihoods and income-generating infrastructure. Targets under this output are (i) Number of eco-friendly infrastructures installed, (ii) Number of demonstration models for enterprises installed (30% women's participation), (iii) Number of households provided with livelihood financial and/or input assistance, (iv) COREMAP-CTI project villages financed from PES contributions undertake Pokmas activities (WB), and (v) Number of operational Sustainable Enterprise Alliances.
- (iv) **Output 4: Project coordination and management.**

B. Description of the Subproject

14. The Anambas Islands Marine Recreational Park is of high strategic importance and high conservation value nationally with tourism potential as it is close to countries and territories with growing outbound international tourists (Malaysia, Thailand, PRC, Hong Kong). The government has prepared a master plan to attract investors and international tour operators and organized an investor forum on attracting investments to small islands.

15. The biodiversity and fishery resource is under threat and some coral reefs have been damaged from destructive fishing practices. Overfishing of some species has placed them in an endangered category and the government has taken steps to carry out surveys and draft a management plan. This national MPA requires establishment of biodiversity inventory and monitoring, stock assessments and monitoring, management support, capacity building, awareness raising and empowerment of local people to co-manage the resource and establish environmentally responsible tourism.

16. The outcome of the subproject is to enhance management effectiveness of Anambas Islands Marine Recreational Park, achieving the blue level status by year 5 after project start as compared to start of project with the conservation area / Marine Recreational Park being designated but with minimal management organization on the ground. The impact or long term objective of the subproject is to achieve Gold standard on the Management Effectiveness scale by 2025, which can be evidenced by sustainable financing, improved community welfare and

ecosystem health of the MPA. The main outputs are: a) Management Plan implemented; b) Biodiversity conservation and ecosystem based fisheries management enhanced; c) Basic infrastructure for management operations provided; d) Financial sustainability and livelihoods enhanced.

17. This environmental assessment will be limited to **Output 3: Basic infrastructure** that is required to make the MPA operational; such facilities will allow effective communication and services, provision of educational information to visitors, and basic amenities such as water supply and waste water treatment plant/system. It follows the environmental screening checklists for port, fishery and urban development projects under the ADB SPS 2009 (See ADB REA Checklists).

18. These basic infrastructures of the subproject are listed in Table 1 below:

Table 1. Basic Infrastructure of the subproject

Infrastructure	No, of units	Location
MPA Office Complex consisting of:		Tarempa, near harbor, next to MMAF surveillance office
MPA offices	1	
MPA signage	1	
Information Center	1	
Public washroom	2	
Water supply	1	
Waste water treatment unit?	1	
Communication tower	1	
Pier / jetty	1	
Turtle hatchery	1	Durai island
Coastal boundary markers and signage	4	
Security and Remote Surveillance Post	1	Other islands
Mooring buoy	unknown	Other islands
Gazebo	1	Outer islands
Information Center	2	Other islands

Source: Anambas MPA Draft Management Plan, 2013, MMAF

19. **Implementation Schedule.** The schedule of implementation for Output 3: Basic infrastructures are shown in Table 2 below.

Table 2: Schedule of Implementation of Subproject Interventions

Type of Interventions	Unit	Physical Target	Implementation Schedule				
			Year 1	Year 2	Year 3	Year 4	Year 5
OUTPUT 3: BASIC INFRASTRUCTURE							
Detailed Engineering Design							
MPA Office complex	1	Unit					
Turtle hatchery	1	Unit					
Coastal boundary markers and signage	4	sets					

Type of Interventions	Unit	Physical Target	Implementation Schedule				
			Year 1	Year 2	Year 3	Year 4	Year 5
Security and Remote Surveillance Post	1	unit					
Mooring buoys	unknown	unit					
Gazebo	1	unit					
Information Center	2	unit					

III. DESCRIPTION OF THE ENVIRONMENT¹

20. The islands of Anambas, Indonesia, are located in the South China Sea at about 3°N latitude and 106°E longitude. The group includes three large islands (Jemaja, Siantan and Matak), two medium-sized islands (Badjau and Mubur) and numerous small islands. The major villages are Tarempa on Siantan Island and Letong, Padang and Kuala Maras on Jemaja Island. The region is located adjacent to the western edge of the Coral Triangle (CT), renowned for its globally outstanding marine biodiversity.

21. Kepulauan Anambas Regency consists of 7 subdistricts, and 54 villages. These subdistricts, with their corresponding area and capital, are listed in the Table 3 below. Jemaja Timur is the largest subdistrict while Siantan Tengah is the smallest subdistrict.

Table 3. Subdistricts of Anambas Regency and their corresponding area and capital town.

Subdistrict (Kecamatan)	Area (Sq. Km)	Percentage of Total	Capital
Jemaja	78,26	12%	Letung
Jemaja Timur	154,24	24%	Ulu Maras
Siantan Selatan	115,48	18%	Air Bini
Siantan	45,39	7%	Tarempa
Siantan Timur	88,92	14%	Nyamuk
Siantan Tengah	22,14	3%	Air Asuk
Palatak	129,94	20%	Tembang Ladan
Total	634,37	100%	

Source: Kepulauan Anambas in Figures 2011

22. Some of the environmental issues and concerns in the Subproject that were elicited during the field visits, and from the results of meetings with stakeholders and from the results of studies that have been conducted in 2011 (Compilation RPZ, 2011) and in 2012 (Working Group Meetings and Socio-Economic Assessment MRAP) are: illegal and destructive fishing, overfishing, coral bleaching, coral destruction, illegal sea turtle egg and meat collection, overexploitation of Napoleon fish (*Cheilinus undulatus*), intensified sands and rocks mining, unregulated cutting of mangroves and waste pollution.

¹ Sourced mostly from Kepulauan Anambas in Figures 2011 Katalog BPS 1102001 2105

A. Physical Resources

23. Land. The land area of Anambas is dominantly covered by primary and secondary forest estimated at 25,359 ha and 28,750 ha respectively, and patches of paddy with an aggregate area of about 80 ha.

24. Topography and Soil. The Anambas Islands are generally hilly over 500 meters above sea level and with little flat lands. A narrow coastal plain exists in a few areas, but in most places the coastline is steep and rocky but tree-covered. The principal crop is coconut but various fruits and spices are also grown on the steep hillsides. Anambas include many islands separated by narrow, usually deep channels. Numerous bays and coves occur affording some protection from winds and oceanic waves. Many of these are 20–30 m deep, but most have coral heads and fringing reefs extending to within two meters of the surface at low tide. Shallow areas, some sandy or muddy, occur toward the head of most coastal bays. The soil is generally a thin covering over solid rock. The islands apparently are not of sedimentary origin and lack the minerals of the Riau group.

25. Rivers/Lakes. Freshwater is relatively scarce but a few small streams occur. There are no freshwater lakes or swamps.

26. Climate. The climate is typical of the South China Sea with south monsoon winds from May through October, and north monsoon winds from November through April. The islands received an average of 228,6 mm of rainfall annually, with an average of 13 rainy days per month. The temperature ranges from 21.32 to 34.03 °C and the average atmospheric pressure is 1009.2 mb. Average humidity ranges from 66% to 88%. Seawater temperatures recorded July 15–19 at various locations were 28–30.5 °C

27. Oceanographic conditions. Water quality of the sea in some areas of Anambas is shown in the table below.

Table 4. Water quality parameters in TWP Anambas Islands

No.	Parameter	Value
1	Temperature (°C)	28,9 – 31,5
2	Salinity (psu)	23 - 34
3	Water flow (cm/det)	15-40
4	Wave (cm)	80-150
5	Chlorophyll (mg/m ³)	<0,3
6	Turbidity (NTU) (mg/l)	0,46 - 1.07
7	pH	7,96 – 9,61
8	Dissoved Oxygen (DO)	4,34 – 6,15
9	Ammonia (NH ₃ -N) (mg/l)	0,042 - 0,31
10	Nitrite (NO ₂ -N) (mg/l)	0,002
11	Nitrate (NO ₃ -N) (mg/l)	0,001 - 0,027
12	Total Phosphate (PO ₄ -P) (mg/l)	0,27 – 5,51
13	Mercury (Hg) (mg/l)	<0,001
14	Lead (Pb) (mg/l)	0,028 – 0,169
15	Cadmium (Cd) (mg/l)	< 0,001 – 0,015
16	Aluminum (Al) (mg/l)	-

Source of data: Directorate TRLP3K, 2012

B. Ecological Resources

28. Forest/Vegetation. Anambas islands belong to the biogeographical region of Kalimantan: lowland evergreen forests; montane forests; extensive mangroves; peat and fresh water swamp forests; and large heath forests. Among the mangrove species belong to the genera of *Avicennia*, *Rhizophora*, and *Sonneratia*. Extensive seagrass beds (*Enhalus acoroides*, *Halophila ovalis*, *Thalassia hemprichii*) are found in Anambas with about 62,77 acres.

29. Wildlife/Biodiversity. In terms of reef fish biodiversity, a total of 578 species of reef fish from 256 genera and 71 families have been recorded. About 801 species are predicted on the Anambas reefs. These are mostly: Gobies (*Gobiidae*), wrasses (*Labridae*), damselfishes (*Pomacentridae*), groupers (*Serranidae*), cardinalfishes (*Apogonidae*), blennies (*Blenniidae*), butterflyfishes (*Chaetodontidae*) and parrotfishes (*Scaridae*). Sites with the most fish diversity included SE Pulau Bawah (240 species), Pulau Selai (215 species), Pulau Piantai (199 species), Pulau Pahat (198 species), SE Pulau Jemaja (196 species) and Pulau Mandariau Laut (194 species). However, large, commercially important reef fishes (jacks, grouper, snapper, sharks, Napoleon wrasse) appear to have been severely overfished

Table 5. Distribution of Coral Fish Species in sites assessed in Anambas MPA

Species	% Sites	Species	% Sites
<i>Chrysiptera rollandi</i>	100.0	<i>Chlorurus sordidus</i>	95.0
<i>Pomacentrus alexanderae</i>	100.0	<i>Siganus corallinus</i>	95.0
<i>Pomacentrus moluccensis</i>	100.0	<i>Parupeneus barberinus</i>	90.0
<i>Pomacentrus philippinus</i>	100.0	<i>Chaetodon baronessa</i>	90.0
<i>Epibulus brevis</i>	100.0	<i>Chaetodon octofasciatus</i>	90.0
<i>Labroides dimidiatus</i>	100.0	<i>Amblyglyphidodon curacao</i>	90.0
<i>Thalassoma lunare</i>	100.0	<i>Dascyllus trimaculatus</i>	90.0
<i>Scarus quoyi</i>	100.0	<i>Neoglyphidodon nigroris</i>	90.0
<i>Siganus virgatus</i>	100.0	<i>Pomacentrus bankanensis</i>	90.0
<i>Siganus vulpinus</i>	100.0	<i>Pomacentrus lepidogenys</i>	90.0
<i>Cephalopholis cyanostigma</i>	95.0	<i>Bodianus mesothorax</i>	90.0
<i>Cephalopholis microprion</i>	95.0	<i>Cheilinus fasciatus</i>	90.0
<i>Lutjanus decussatus</i>	94.4	<i>Cirrhilabrus cyanopleura</i>	90.0
<i>Caesio cuning</i>	95.0	<i>Halichoeres hortulanus</i>	90.0
<i>Lethrinus erythropterus</i>	95.0	<i>Hemigymnus fasciatus</i>	90.0
<i>Pentapodus aureofasciatus</i>	95.0	<i>Hemigymnus melapterus</i>	90.0
<i>Scolopsis bilineatus</i>	95.0	<i>Paracheilinus filamentosus</i>	90.0
<i>Heniochus varius</i>	95.0	<i>Thalassoma hardwicke</i>	90.0
<i>Centropyge vroliki</i>	94.4	<i>Chlorurus microrhinos</i>	90.0
<i>Pygoplites diacanthus</i>	95.0	<i>Scarus forsteri</i>	90.0
<i>Amblyglyphidodon leucogaster</i>	95.0	<i>Scarus niger</i>	90.0
<i>Dascyllus reticulatus</i>	95.0	<i>Eviota guttata</i>	90.0
<i>Plectroglyphidodon lacrymatus</i>	95.0	<i>Siganus puellus</i>	90.0
<i>Oxycheilinus digamma</i>	95.0		

Source. Marine Resource Assessment Report, 2012

C. Economic Development

30. Land Use. The existing land use of the Subproject area as of 2009 is summarized in the table below.

Table 6: Land Use of Anambas Islands (2009)

Subdistrict	Land Use Types in hectares						Total
	Plantation	Land/ yard	Field	Grassland	Forest	Swamp	
Jemaja	4919	97	148	30	1742	250	7186
Jemaja Timur	6655	50	100	100		748	7653
Siantan Selatan	2400	50	200	10		56	2716
Siantan	2500	152	236	50	3070	25	6033
Siantan Timur	3318	30	150	2		50	3550
Siantan Tengah	1734	45	76	5		78	1938
Palmatak	5450	146	175	15	1736	300	7822
Total	26976	570	1085	212	6548	1507	36898

Source : Kepulauan Anambas Regency Agriculture and Forestry

31. Agricultural crops. In the year 2011, Anambas regency has 9 928 hectares of farm that produced 2 041 tons of coconut, 54 hectares of rice paddy that produced 324 tons of rice, 2 492 hectares that produced 1151 tons of rubber, and 2 839 hectares that produced 259 tons of cloves. It has also produced 225 tons of corn, 735 tons of cassava, 420 tons of sweet potatoes, 16 tons of long beans, 250 tons of mustard, 440 tons of spinach, 616 tons of kangkung, 60 tons of pineapple, 738 tons of durian, and 6910 tons of bananas on the same year. There are also 94 farmers group organized for different crop production.

32. Livestock. The regency recorded 3 606 cows, 356 goats, 13 496 broiler chicken and 796 ducks in year 2011. They produced 23 380 kg of cow meat, 7 371 kg of chicken meat and 544 kg of goat meat, 6478 kg of chicken eggs and 477 kg of duck eggs.

33. Fishery. The regency harvested 1 454 tons of marine fish, with a value of Rp 16.2 billion in 2011. Aquaculture production declined to 70 tons, as compared to last year (82 tons). There are 595 non-motorized boats, 2 596 ferry boats, and no motorized boats used in fishery production in 2011.

34. Forestry. There are 5 949 hectares (in Siantan and Jemaja subdistricts) of production forests, and there are no protected forest left as of 2011.

35. Commerce, Trade and Industry. Anambas has 172 small industries that employ 1,544 people, and 4 medium industry that employ 22 people. Mining of granite is being extensively undertaken in 4 subdistricts covering an aggregate area of 14,230 hectares in Jemaja, Siantan Selatan, Siantan and Palmatak and with stock of 35,898 million cu. meters. In 2011, most export of Anambas (99,98%) are mineral fuel amounting to 5,789 million kg and valued at USD 3,751 million, while it imports different products valued at USD14.8 million. There are 4 commercial banks 58 units of cooperatives operating in the islands.

36. Tourism. There are 22 hotels (6 in Jemaja, 8 in Siantan, 2 in Siantan Timur and 6 in Pamatak), 3 restaurants and 19 cafes in Anambas Islands.
37. Water Resources. Water is provided to 3 070 customers by non-state owned water companies in all subdistricts and to 990 customers in Siantan by state-owned water company (PDAM).
38. Communication. Mail/postal service is provided to all subdistricts, except in Jemaja, Jemaja Timur, which delivered 10 627 letters in year 2011. Television and radio stations are also available in Anambas.
39. Electricity. Electricity service is provided by four power stations of PT PLN (Persero) Cab. Tanjungpinang (State Electricity Company of Tanjungpinang) with 9 units of generators, which has a combined installed capacity of 3 395 kw. There are 1 491 customers served in year 2011 selling 2 230 940 kwh.
40. Transportation. Being a group of islands, sea transportation plays an essential role in the life of the people of Anamabas. There are 93 seaports (15 large seaports, 29 medium seaports and 50 small seaports) in 7 subdistricts of Anambas, where domestic ships made 833 calls and international ships made 103 calls in 2011. The regency also recorded 61 cars, 4 074 motorcycle and 2 221 ships. Total of 183 174 meters of roads were also built as of 2011.

D. Social and Cultural Resources

41. Population. The registered population of Anambas in 2011 was 45,003 with 28,452 males and 21 551 females, and the average population density was 70.94 persons/sq. km. This represented an increase of 7 % from population in the year 2010, which was 41 878. The total number of households was 12,282, while average number per household was 3.66. The biggest population was in Siantan (12,784) and the smallest population can be found in Jemaja Timur (2,312).
42. Health Facilities. In 2011, there was only one hospital in Kepulauan Anambas, which is located in Palmatak Subdistrict. The regency also had 7 public health centers, 21 supporting public health centers, and 2 public clinic, and these facilities employed 1 specialists, 35 doctors, 9 dentists, 84 tocologists and 162 nurses.
43. Educational facilities. In 2011, there are an aggregate of 119 units of kindergarten school , elementary school , junior high school , and high school (in all subdistricts of Anambas..
44. Economy. The Gross Regional Domestic Product (GRDP) of Anambas in 2011 was Rp 2 773 714 million in constant 2000 price, with oil and gas contributing Rp 2 053 831 million or 74% of the total GRDP. Without oil and gas, the GRDP was only Rp 719 883 million in constant 2000 price. Per capita GRDP was Rp 7,402 million and the regional income per capita was Rp. 6,141 million, in constant 2000 price. The growth rate was estimated at 2.41% with oil and gas and 7.39% without oil and gas.
45. Religion. There are three religions: Protestant Christian, with 37,510 adherents (49.24%); Catholic Christians, with 23,684 adherents (31.09 %); and. Islamic Religion, with 14,979 adherents (1966 %).

IV. SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Screening and Categorization of Subproject Components

46. This report has been prepared in accordance with the ADB's SPS 2009². The SPS 2009 governs the environmental and social safeguards of ADB's operations. Environmental Safeguard Requirements 1 (SR1) of the SPS outlines the requirements that borrowers/clients are required to meet when delivering environmental safeguards for projects supported by the ADB. These requirements include assessing impacts, planning and managing impact mitigations, preparing environmental assessment reports, disclosing information and undertaking consultation, establishing a grievance mechanism, and monitoring and reporting. SR1 also includes specific environmental safeguard requirements pertaining to biodiversity conservation and sustainable management of natural resources, pollution prevention and abatement, occupational and community health and safety, and conservation of physical cultural resource.

47. The ADB Rapid Environmental Assessment (REA) checklists (See ADB REA Checklists) screening process, as applied to the Anambas MPA Effectiveness Subproject interventions, results in the identification of the following potential impacts (Table 7):

Table 7. Infrastructure and ADB checklist used and corresponding potential impacts

Infrastructure	ADB Checklist Used	Potential Impacts
MPA Office Complex consisting of offices, signage, information center, public washroom, communication tower, solar cells power supply, water supply, and waste water treatment unit	Urban development	<p>The MPA Office Complex may induce</p> <ul style="list-style-type: none"> ▪ wastes generation; ▪ water resource problem; ▪ social conflicts between construction workers from other areas and local workers; ▪ noise and dust from construction activities; ▪ temporary silt runoff due to construction; ▪ water depletion and/or degradation; ▪ contamination of surface and ground waters due to improper waste disposal;
Pier/jetty	Ports	<ul style="list-style-type: none"> ▪ short-term increase in turbidity and sunlight penetration as well as changes in sediment pattern and flows; ▪ removal and disturbance of aquatic flora and fauna at dredging site especially as the structure is within the marine protected areas with rich marine life; ▪ deterioration of water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction; ▪ noise and vibration due to blasting and other civil works; ▪ social concerns relating to local inconveniences associated with port operation (e.g. increased volume of port traffic, greater risk of accidents, communicable disease transmission); ▪ deterioration of water quality due to ship (e.g. ballast water, oil waste, lubricant and fuel spills, sewage) and

² SPS is available at <http://www.adb.org/documents/safeguard-policy-statement?ref=site/safeguards/publications>

Infrastructure	ADB Checklist Used	Potential Impacts
Turtle Hatchery	Fishery	<p>waterfront industry discharge.</p> <ul style="list-style-type: none"> ▪ social problems arising from conflicts with other site uses; ▪ social problems especially when workers from other areas are hired; ▪ pollution of nearby aquatic environments by pond drainage water and inadequate farm management
Gazebo	Urban development	<ul style="list-style-type: none"> ▪ impacts on the sustainability of associated sanitation and solid waste disposal systems and their interactions with other urban services. ▪ social conflicts between construction workers from other areas and local workers?
Security and Remote Surveillance Post	Urban development	<ul style="list-style-type: none"> ▪ impacts on the sustainability of associated sanitation and solid waste disposal systems and their interactions with other urban services. ▪ social conflicts between construction workers from other areas and local workers?
Mooring buoys	Ports	<ul style="list-style-type: none"> ▪ encroachment on precious ecology resulting in loss or damage to fisheries and fragile coastal habitats such as coral reefs, mangroves, and seagrass beds ▪ poor sanitation and solid waste disposal in construction camps and work sites; ▪ social concerns relating to local inconveniences associated with port operation (e.g. increased volume of port traffic, greater risk of accidents, communicable disease transmission; ▪ deterioration of water quality due to ship (e.g. ballast water, oil waste, lubricant and fuel spills, sewage) and waterfront industry discharges; ▪ removal and disturbance of aquatic flora and fauna at the installation site, especially in areas with coral reef.
Solar (PV) Cells Power Supply	customized	<ul style="list-style-type: none"> ▪ Industrial liquid (dielectric fluids, cleaning agents, and solvents) and solid wastes (lubricating oils, compressor oils, and hydraulic fluids) generated during construction and operations likely to pollute land and water resources ▪ Soil/water contamination due to use of hazardous materials or disposal of broken or damaged solar cells ▪ Visual impacts due to reflection from solar collector arrays resulting in glint or glare ▪ Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during construction, installation, operation, and decommission

48. The Indonesian environmental assessment regulations are embodied in the AMDAL - *Analisis Mengenai Dampak Lingkungan Hidup* or the Indonesian EIA system. Based on the

AMDAL project screening criteria shown above, a project categorized by the responsible agency into one of three types: (i) business and/or activity having substantial impacts requiring Environmental Impact Analysis (ANDAL)³; (ii) business and/or activity requiring Environmental Management Efforts (UKL) or Environmental Monitoring Efforts (UPL)⁴; and (iii) business and/or activity with no substantial impact and that does not require ANDAL nor UKL/UPL, but require a statement of readiness to manage and monitor the environment⁵.

49. The initial category/type of the subproject components, under ADB guidelines and based on the Indonesian AMDAL regulations, are presented in the table below.

Table 8. ADB and AMDAL Category of Subproject Intervention

Subproject Intervention	ADB Category	AMDAL Type ⁶
MPA Office Complex consisting of offices, signage, information center, public washroom, communication tower, solar cells power supply, water supply, and waste water treatment unit	B ⁷ – IEE needed (integrated in this IEE)	UKL/UPL is required
Pier/jetty	B - IEE needed (integrated in this IEE)	UKL/UPL is required
Turtle hatchery	C ⁸ – No IEE is required	SPPL is required
Gazebo	C – No EE is required	SPPL is required
Security and Remote Surveillance Post	C – No EE is required	SPPL is required
Mooring buoys	B-IEE needed (integrated in this IEE)	UKL/UPL is required

50. As a subproject with multiple components and interventions, an IEE (being of the highest documentary requirement) compliant with ADB requirements is followed in this assessment. This IEE also substantially conforms with AMDAL guidelines for the Anambas National Marine Protected Area. The individual interventions that require UKL/UPL under AMDAL as listed in Table 8 above, including (i) the MPA Office Complex; (ii) the pier/jetty; and (iii) the mooring

³ Based on the 'positive list' of project/activities that requires EIA/ANDAL under Minister of Environment Regulation No. 11/2006 and Article 23 of the Environmental Protection and Management Law (Law 32/2009).

⁴ Based on Article 43 of Law 32/2009.

⁵ Based on Article 35 of Law 32/2009.

⁶ Subject to the final determination by relevant environmental authority.

⁷ Category B- proposed project's potential environmental impacts are less adverse and fewer in number than those of category A projects; impacts are site-specific, few if any of them are irreversible, and impacts can be readily addressed through mitigation measures. An initial environmental examination (IEE), including an EMP, is required.

⁸ Category C- Projects unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are still reviewed (ADB Environmental Assessment Guidelines (2003))

buoys shall require the development of individual UKL/UPL based on their specific site and context. Other interventions like (i) turtle hatchery, (ii) gazebo; and (iii) surveillance post, will require SPLM (Statement of Management and Environmental Monitoring Ability) under the new AMDAL regulation. These UKL/UPL and SPLM will be developed in both the Bahasa Indonesia and the English languages, and made available to the public on ADB website.

B. Potential Environmental Impacts and Mitigation Measures

51. The potential environmental impacts of the Subproject interventions and the corresponding mitigating measures are to be classified according to the different stages of the Subproject components (Design stage, Construction Stage and Operation Stage).

1. Project Location/Design Stage

52. By design, the subproject is located within the Marine Protected Area as it intends to rehabilitate, protect and sustainably manage this protected area. The Project interventions are designed to enhance the resources of the protected areas, and reverse environmental degradation.

53. *MPA Office Complex consisting of offices, signage, information center, public washroom, communication tower, solar cells power supply, water supply, and waste water treatment unit.* The MPA Office Complex is proposed to be located near Terempa town, in the Antang Fishing Harbor and next to MMAF Surveillance Office, in a property owned by the provincial government. This office complex is expected to improve the management effectiveness of the MPA. The facilities are unlikely to produce significant adverse environmental impacts requiring mitigation at this stage but the following safeguards are recommended to be put in place during the design stage to avoid or prevent any negative environmental effect of the subproject:

- a. To discourage the influx of workers from other areas and social conflicts, local residents, indigenous peoples and women are given priority in hiring.
- b. The siting of the facility should be in compliance with the approved MPA zoning and management plan.
- c. The facility is to be located in an area where no live corals, seagrasses and mangroves or natural habitats would be affected.
- d. Visual impacts due to reflection from solar panels resulting in glare can be reduced by appropriate design and orientation of the building and solar panels.

54. *Pier/jetty.* This will be located adjacent to the MPA Office Complex in Terempa. No significant impacts requiring mitigation is also anticipated for this component at the design stage. Nevertheless, the subproject will incorporate the following additional environmental safeguards in the project design of this component to avoid or preclude any negative environmental effects:

- a. The siting of the pier/jetty should be in compliance with the approved MPA zoning and management plan.
- b. To avoid social conflicts, local laborers will be hired during the construction.
- c. The design of the pier should comply with the standard set by IMO (International Marine Organization);

55. *Turtle Hatchery.* The hatchery is proposed to be located in Durai Island, and intends to increase the survival rate of sea turtles in the wild. No adverse environmental impact is anticipated unless a social problem arises from conflicts with other site users, which can be mitigated by consultation or compensation, and compliance with the approved zoning and management plan of the MPA. Additional safeguards that would be adopted to preclude any other impacts includes

- a. Hiring of local workers, to avoid social conflict;
- b. Adoption of good hatchery management practices to prevent pollution and improve sanitation.

56. *Gazebo.* This will be located in outer islands under conservation and tourism zones. As the size is small, no adverse environmental impacts are expected. However, additional safeguards are still recommended as follows:

- a. Inclusion of waste management plan, to prevent pollution in the pristine area.
- b. Hiring of local laborers to avoid social conflict that may arise.
- c. The siting of gazebo should comply with the approved MPA zoning and management plan.

57. *Security and Remote Surveillance Post.* This is proposed to be located in outer islands, which will be used for monitoring, control and surveillance purposes, and therefore produces general positive impacts to the marine conservation and the environment. There is no significant impact at this stage but additional safeguards are recommended such as:

- a. Hiring of local workers to avoid social conflicts.
- b. The siting of the surveillance post should comply with the approved MPA zoning and management plan

58. *Mooring Buoys.* An unknown number of mooring buoys will be mostly placed near the shores of outer islands and some diving sites, to reduce damages to corals due to the dropping of anchors. Following this principle, it is critical that the mooring system used does not cause more damage to the resource than a boat anchor and chain. There are three most common buoy systems: the Halas, the Manta-Ray, and the traditional system (also called a "mushroom" system). All mooring buoys consist of three elements: a permanent fixture on the sea bottom, a floating buoy on the water surface, and something in between to attach the two. Sea bottom characteristics dictate what type of system is most suitable. The Halas system is most successful in areas with flat, solid bedrock. The Manta-Ray is recommended for areas of sand, coral rubble, or a combination of bottom types. Traditional systems, limited in effectiveness, should only be used in sand or mud, if at all. The following safeguards measures are recommended:

- a. The choice of the mooring buoy system used is based on site survey and the sea bottom condition to avoid damage to corals and other marine life;
- b. The placement of mooring buoys should be in compliance with the approved MPA zoning and management plan;

- c. The design of the mooring buoys should comply with the standard set by IMO (International Maritime Organization);
- d. No mooring buoy shall not equal or exceed 10,000 DWT; and
- e. To avoid mooring buoys from being stolen, the design of the buoys should be color-coded to distinguish these from ordinary buoys, and should embed a notice stating that it is the property of the government and illegal possession thereof is punishable by law (based on the consultation with stakeholders).

2. Construction/Establishment Stage

59. *MPA Office Complex.* The construction of the complex will entail raising of stilts or pillars along the shore as foundation, before the base is built and the complex facilities are finished. Due the relatively small dimension of this complex, the impacts are temporary and minimal and no significant environmental impacts at construction stage are anticipated which would require mitigating measures. All the same, additional safeguards to avert any adverse environmental effect during construction are to be adopted by the subproject, such as but not limited to:

- a. Noise and dust from construction activities can be further minimized by proper use and maintenance of construction equipment, in accordance with the owner's manual and compliant with government's standards;
- b. Temporary silt runoff maybe reduced by scheduling the drilling when the waves are calm;
- c. The contractor shall provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease.
- d. Any chemicals, hazardous and other wastes from solar panel installation will be disposed according to the waste management plan and government regulations.
- e. Only qualified technical service crew will construct and install the solar panels system.

60. *Pier/jetty.* The construction of pier/jetty is expected to generate short-term and minimal environmental impacts in terms of silt, turbidity, wastes, noise and vibration, which require no mitigating measures. However, additional safeguards are recommended to confine the impacts within the threshold level, such as:

- a. Wastes collection, segregation and disposal shall be undertaken in accordance with an approved Waste Management Plan.
- b. Proper scheduling of work
- c. Use only equipment that compliant with the government emission standard and manufacturer's maintenance prescriptions.
- d. The length of the pier shall not equal or exceed 300 meters.

61. *Turtle Hatchery, Gazebo, Security and Remote Surveillance Post, and Mooring buoys* Owing to the small size of these structures, no adverse environmental impacts are expected during the construction. However, as additional safeguards, it is recommended that:

- a. A waste management plan shall be implemented during the construction stage to prevent pollution of the surrounding environment;
- b. Construction activities shall be confined only on the project site, and due diligence shall be exercised so as not to spill activities to adjacent areas or surroundings.
- c. The contractor shall provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease.

3. Operation/Maintenance Stage

62. *MPA Office Complex.* The complex, including the information center, is expected to attract unspecified number of visitors. Its operation will generate wastes, mainly solid wastes, and sewerage/sanitary wastes. The latter will be treated by the wastewater treatment unit, which is part of the complex' structures. The former will be treated under a waste management plan, where solid wastes are collected, segregated and disposed accordingly. There is also a need to identify and assess the water supply requirement of the complex to portend any problems that may arise in the future like water depletion, contamination and degradation. A water conservation measure shall also be implemented. The solar power system will be maintained and operated by designated staff, who will be trained as to the proper operation and maintenance of the system. Decommissioning of solar cells will be done in accordance with the government and manufacturer's specifications

63. *Pier/jetty.* The establishment and operation of the pier/jetty may bring social concerns relating to local inconveniences like increased port traffic volume, increased risk of accidents and communicable disease transmission. It is also likely that the water quality will deteriorate due to ship and waterfront discharges. To mitigate this, rules will be promulgated and approved by relevant government agencies on the use and maintenance of the pier/jetty, and these will be strictly enforced. These rules and regulations will form part of the UKL/UPL to be developed.

64. *Turtle Hatchery, Gazebo, Security and Remote Surveillance Post.* The operation of these structures is expected to generate significant positive impacts to the environment. No adverse impacts are anticipated but additional safeguards are recommended like implementing a wastes management plan throughout the operation stage.

65. *Mooring buoys.* Mooring buoys placed in different islands would likely attract boats and visitors at various time of the year. Just like a pier, it is also likely that buoys may bring social concerns like boat congestion, increase traffic and risks due to accidents and diseases. To mitigate these, rules as to the use and maintenance of mooring buoys will also be promulgated and approved, disseminated and explained, and enforced by relevant government authorities. These rules and regulations will form part of the UKL/UPL to be developed.

V. INSTITUTIONAL REQUIREMENTS AND ENVIRONMENTAL MONITORING PLAN

66. The Directorate General of Marine, Coast, and Small Islands (DG of MCSI) of the Ministry of Marine Affairs and Fisheries (MMAF), as the Executing Agency (EA) of the COREMAP-CTI Project, has responsibility for project management and administration and will host the Project Management Office (PMO).

67. An Environmental Management Unit (EMU), which will be established in the PMO, will play a lead role in implementing the EARF provisions of Project, and will be responsible for ensuring that the environmental requirements and procedures of the government and ADB are complied with, including the preparation of business plan/project activities, Initial Environmental Examination (IEE), Environmental Management Program (Upaya Pengelolaan Lingkungan, UKL) and Environmental Monitoring Program (Upaya Pemantauan Lingkungan, UPL); other AMDAL requirements; and the corresponding mitigation measures, environment management plan are incorporated in every stage of the subproject/MPA activities. Any activity which will require an ANDAL (EIA) by any environmental authority at a later stage will not be selected.

68. The EMU will be manned by a local environmental management specialist and marine and coastal management specialist to ensure that an environmental management system, including mitigating measures, environmental monitoring, and the acquisition of government permits and clearances, is effectively implemented. Capacity-building activities and budget for environmental management, in particular for training and equipment needs related to compliance monitoring, and water quality monitoring, are listed in Appendix 2. Note that the preparation of AMDAL studies and documents like UPL/UKL, if required by local environmental authority (BAPEDALDA or BPLHD), will be contracted to local/district environmental consultants.

69. The Project partners (LIPI, CI, District Fisheries Office, Pokmas) will also assist in the implementation of environmental safeguards and environmental monitoring in their area of responsibility.

70. The responsibilities of parties in environmental management is summarized in the table below.

Table 9. Main Environmental Responsibilities

Level	Institution	Responsibilities
National/ Central	<u>Executing Agency:</u> Marine Coast, and Small Islands, MMAF	Overall Project management and administration
	<u>Implementing Agency:</u> National Marine Conservations Areas (LKKPN)	Technical planning and supervision of national MPAs, including MPA Anambas.
	Project Management Office (PMO)	<ul style="list-style-type: none"> ▪ coordinate overall planning and scheduling (particularly infrastructure related and consultants); ▪ overall supervision and monitoring; and preparation of consolidated monitoring reports; ▪ administer contracts; and submit reports
	Environmental	<ul style="list-style-type: none"> • Oversee implementation of the environmental

Level	Institution	Responsibilities
	Management Unit (EMU)	<p>management and monitoring plan, and ensure that institutional arrangements and responsibilities are followed;</p> <ul style="list-style-type: none"> • Consolidate environmental performance and impact monitoring reports on behalf of the Project, for submission to the central, provincial and district environment units, relevant government ministries, and public information channels; • Advise the PMO on environmental aspects and impacts of projects, including those requiring corrective action during project implementation; • Assist the PMO in coordinating with the MOE, UPT-LKKPN-Pekanbaru and/or provincial/district environment agencies for the AMDAL compliance of projects; • Assist the PMO in drawing up terms of reference for the AMDAL teams/consultants, based on assessment scope agreed with the responsible AMDAL agency; • Update the information system on the MPA's baseline environment conditions,
	National Science Agency (LIPI)	Undertake and document baseline surveys and monitoring data on biodiversity, ecosystem, and socio-economic aspects relating to project impacts.
Provincial	Provincial Coordinating Unit	Coordination and guidance, monitoring and reporting, and handling of issues between districts/municipalities.
District [Kabupaten]	<u>District Project Implementing Unit (PIU):</u> Technical Implementing Unit (UPT) of the National Marine Conservations Areas (LKKPN) of Pekanbaru	<ul style="list-style-type: none"> • Oversee and implement the subproject activities in Anambas. • Prepare AMDAL compliance of subprojects
	The MPA Field Area Management Office (Satker)	Responsible for day-to-day operation of MPA Anambas.
	District Advisory Committee	<ul style="list-style-type: none"> • Guide environmental issues and compliance.
	Marine and Fisheries Resources Supervision (PSDKP), MMAF	Mainly responsible for monitoring and supervising fisheries surveillance
	District Fisheries Office in Anambas	<p>On behalf of the district, responsible for:</p> <ul style="list-style-type: none"> • improving and strengthening management and utilization marine and fisheries resources to be optimal, effective, efficient and sustainable; • empowering economic coastal and small islands communities; • improving and strengthen surveillance and law enforcement for marine and fisheries sector; • preparing database and resource potential data of

Level	Institution	Responsibilities
		marine and fisheries in Anambas; and <ul style="list-style-type: none"> improving quality and quantity marine and fisheries personnel.
	Non-Governmental Organizations (NGOs): Conservation International (CI)	Collaboration in: <ul style="list-style-type: none"> Raising public awareness and dissemination (“socialize”) activities and Monitoring biodiversity and ecosystem
Village [Desa]	Community groups (Pokmas)	<ul style="list-style-type: none"> Collaboration in fisheries surveillance of MPA Participate in the preparation of AMDAL compliance of subprojects (UKL/UPL) Monitor the implantation of the UKL/UPL of subprojects

71. The potential environmental impacts, mitigation measures, institutional arrangement to implement the mitigation measures are summarized below.

Table 10: Summary of Environmental Impacts, Mitigation Measures and Institutional Arrangement

Stage/Intervention/ Environmental Impacts	Mitigation Measures	Institutional Arrangements
Project Location/Design Stage		
<i>MPA Office Complex Pier/jetty Gazebo Security and Remote Surveillance Post Turtle Hatchery Mooring Buoys</i>		
impacts to coral reefs, mangroves and seagrasses.	site selection criteria in EARF to be followed.	EMU-PMO and District PIU's to coordinate and supervise.
Construction/Establishment Stage		
<i>MPA Office Complex Pier/jetty Gazebo Security and Remote Surveillance Post Turtle Hatchery Mooring Buoys</i>		
impacts to coral reefs, mangroves and seagrasses.	Construction activity will be supervised so that impacts to surrounding is minimized including transfer of waste and debris into surrounding areas. Construction should not conducted during rainy days as there are potential for silt runoff.	EMU-PMO to coordinate and supervise.
Operation/Maintenance Stage		

Stage/Intervention/ Environmental Impacts	Mitigation Measures	Institutional Arrangements
<i>MPA Office Complex</i>		
Waste Generation (solid and sanitary)	<ul style="list-style-type: none"> • Solid wastes will be treated in accordance with approved Waste Management Plan (WMP), where solid wastes will be collected, segregated and disposed appropriately; • Compliance monitoring 	The WMP will be prepared and implemented by MPA Anambas Office (Satker), which will submit report on compliance to EMU-PMO; LKKPN will evaluate and approve the WMP, and supervise the implementation the WMP.
	Sanitary wastes will be treated in a wastewater treatment unit, which is part of the complex structures.	MPA Anambas will ensure that the wastewater treatment facility is operating well; and shall report any sanitation problem to EMU-PMO.
Water supply problem	identify and assess the water supply requirement of the complex	MPA Anambas to identify and assess the water supply of the complex, and report to EMU-PMO
	<ul style="list-style-type: none"> • water conservation measures • Compliance monitoring 	MPA Anambas to propose and implement water conservation measures, and submit report on compliance to EMU-PMO
<i>Pier/jetty</i>		
social concerns relating to local inconveniences like increased port traffic volume, increased risk of accidents and communicable disease transmission	<ul style="list-style-type: none"> • Promulgation of rules on the use and maintenance of the pier/jetty, after consultation with affected parties; • Compliance Monitoring 	Rules on the use and maintenance of the pier/jetty will be promulgated and approved by LKKPN, which will also ensure public consultation. These rules will be strictly implemented by MPA Anambas, which will submit report on compliance to EMU-PMO.
water quality will deteriorate due to ship and waterfront discharges		
<i>Turtle Hatchery, Gazebo, Security and Remote Surveillance Post</i>		
No significant impact	Nothing to mitigate but additional environmental safeguards are recommended	EMU-PMO to coordinate and supervise the implementation of additional environmental safeguards
<i>Mooring buoys.</i>		
Social concerns like boat congestion, increase traffic and risks due to accidents and diseases	<ul style="list-style-type: none"> • Promulgation of rules on the use and maintenance of the mooring buoys, after consultation with affected parties; • Compliance monitoring 	Rules on to the use and maintenance of mooring buoys will be promulgated and approved by LKKPN, and enforced by MPA Anambas Office, which will submit report on compliance to EMU-PMO

Table 10: Summary of Environmental Impacts, Mitigation Measures and Institutional Arrangement (continuation)

72. Environmental monitoring will be integrated in the GIS-based monitoring and evaluation (M&E) decision support system (DSS) of the Project. At the subproject level, the items to be monitored include environmental impacts, mitigation and environmental safeguards implemented, and environmental parameters/indicators on the condition of the environment like Temperature, Salinity, Water flow, Chlorophyll, Turbidity, pH, Dissolved Oxygen (DO), Biological Oxygen Demand (BOD), Ammonia (NH₃ -N), Nitrite (NO₂ -N), Nitrate (NO₃ -N), Total Phosphate (PO₄-P), Mercury (Hg) Lead (Pb) Cadmium (Cd) , Fecal coliform, Oil and grease in water. Water sampling shall be undertaken every quarter and the results will be compiled by EMU-PMO for evaluation.

73. The Environmental Monitoring Plan describes the impacts that will be monitored, monitoring activities and frequency, monitoring party and the resources needed to carry out monitoring. These are presented below.

Table11: Environmental Monitoring Plan

Impacts to be Monitored and parameters	Monitoring Activity and Frequency	Monitoring Party	Resources and Budget
Monitoring	Site inspection 2x per year	EMU-PMO and LKKPN(as PIU)	Rp 10 million
Preparation and Surveys, permitting	Preparation of environmental documents, surveys and permitting	MPA Anambas; PIU; EMU-PMO	Rp 10 million
consultations	Documentation on consultations	PIU and EMU-PMO	5 million

VI. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

74. The ADB team conducted a series of public consultation to refine the project concept and design, selection criteria used, and sub-project component coverage.

75. Between May 27 and June 7, 2013, an ADB field team conducted meetings/interviews/consultation and focus-group discussions with officials or representatives of Directorate General of Marine Coast, and Small Islands (MCSI)-Ministry of Marine Affairs and Fisheries (MMAF), Directorate for Conservation of Area and Fish Species (*Direktorat Konservasi Kawasan Dan Jenis Ikan-KKJI*), Badan Perencanaan Pembangunan Nasional (BAPPENAS) or National Development Planning Agency, National Science Agency (*Lembaga Ilmu Pengetahuan Indonesia-LIPI*), Badan Perencanaan Pembangunan Daerah (Regional Development Planning Agency), National Marine Conservation Areas (LKKPN or *Kawasan Konservasi Perairan Nasional*), Marine Protected Area *Kawasan Konservasi Laut Daerah (KKLD)*, and from project stakeholders like the Kepulauan Anambas Regency, and some of its villages. They were briefed on the proposed project, and clarifications, questions and comments were raised.

76. Draft copies of the IEE will be provided to the MCSI-MMAF, KKJI and LKKPN as well as to the Regency of Kepulauan Anambas, for comments and suggestions, as part of public consultation of the proposed Subproject.

77. The final IEE will be made available to the public on ADB website. Subsequent UKL/UPLs will also be developed in both the Bahasa Indonesia and the English languages and made available to the public on ADB website.

VII. FINDINGS AND RECOMMENDATION

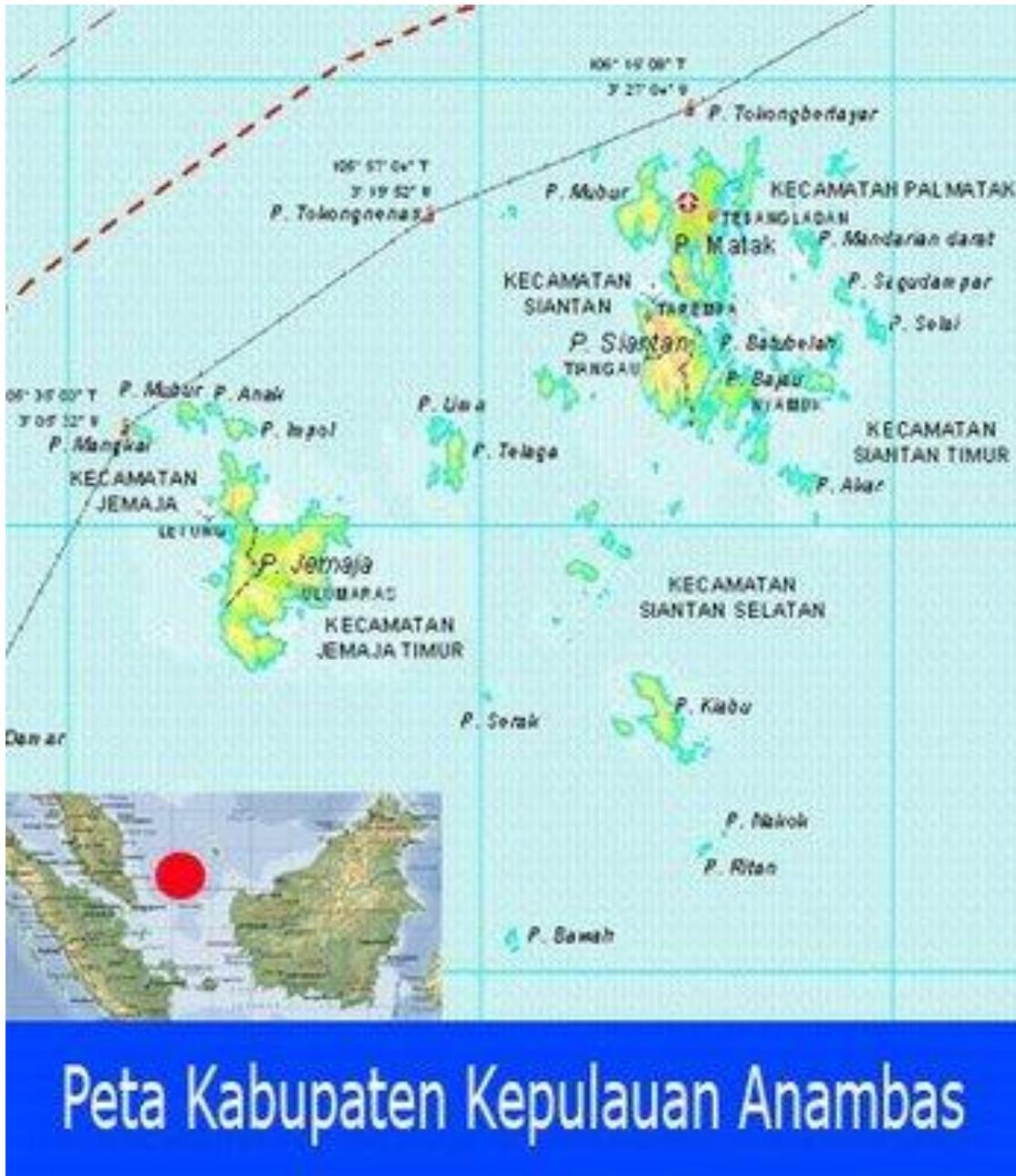
78. Based on the evaluation of the different interventions under Anambas Subproject, and its possible impacts on the environment, this IEE finds that their impacts on the environment are generally positive, and that the potential adverse impacts can be easily mitigated by adoption of specific measures as outlined in this report, including additional environmental safeguards to confine the impacts below threshold level or at the minimum. This IEE is adequate and there is no need further detailed study or EIA. UKLs-UPLs will be developed for specific interventions/activities under the subproject at the design stage of the activities as recommended in Table 8.

VIII. CONCLUSIONS

79. This IEE finds that the proposed Anambas MPA Sub-project will create no significant adverse environmental impacts and substantial and positive environmental benefits are expected for improved MPA effectiveness.. This IEE, with the recommended institutional and monitoring program, is sufficient for the sub-project.. UKLs/UPLs will be developed for specific interventions/activities under the subproject at the design stage of the activities in line with the recommendations in Table 8.

APPENDIXES

Appendix 1: Location Map of Anambas Islands Subproject area



Appendix 2: ADB REA Checklists

Rapid Environmental Assessment (REA) Checklist

Urban Development:
MPA Office Complex

Instructions:

- This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional and Sustainable Development Department.
- This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department.
- This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.
- Answer the questions assuming the “without mitigation” case. The purpose is to identify potential impacts. Use the “remarks” section to discuss any anticipated mitigation measures.

Country/Project Title:

Coral Reef Rehabilitation and Management: Coral Triangle Initiative (COREMAP-CTI)

Sector Division:

Environment, Natural Resources and Agriculture Division

Subproject:

Anambas MPA Effectiveness Subproject

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SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting			
Is the project area...			
▪ Densely populated?		<input checked="" type="checkbox"/>	
▪ Heavy with development activities?		<input checked="" type="checkbox"/>	
▪ Adjacent to or within any environmentally sensitive areas?			
- Cultural heritage site		<input checked="" type="checkbox"/>	
- Protected Area	<input checked="" type="checkbox"/>		This is a project to support Anambas marine protected area. Its establishment and operation shall be guided by the Zoning and Management Plan of the MPA
- Wetland		<input checked="" type="checkbox"/>	
- Mangrove	<input checked="" type="checkbox"/>		The location of MPA station may be adjacent to mangrove areas but care will be done to avoid mangroves.
- Estuarine		<input checked="" type="checkbox"/>	
- Buffer zone of protected area	<input checked="" type="checkbox"/>		The project supports marine protected area
- Special area for protecting biodiversity	<input checked="" type="checkbox"/>		The project supports biodiversity conservation in the Coral Triangle

SCREENING QUESTIONS	Yes	No	REMARKS
- Bay		<input checked="" type="checkbox"/>	
B. Potential Environmental Impacts			
Will the Project cause...			
<ul style="list-style-type: none"> ▪ impacts on the sustainability of associated sanitation and solid waste disposal systems and their interactions with other urban services. 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ deterioration of surrounding environmental conditions due to rapid urban population growth, commercial and industrial activity, and increased waste generation to the point that both manmade and natural systems are overloaded and the capacities to manage these systems are overwhelmed? 	<input checked="" type="checkbox"/>		The station may induce waste generation. Wastes will be collected, segregated and disposed in accordance with Waste Management Plan.
<ul style="list-style-type: none"> ▪ degradation of land and ecosystems (e.g. loss of wetlands and wild lands, coastal zones, watersheds and forests)? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ dislocation or involuntary resettlement of people 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ degradation of cultural property, and loss of cultural heritage and tourism revenues? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ occupation of low-lying lands, floodplains and steep hillsides by squatters and low-income groups, and their exposure to increased health hazards and risks due to pollutive industries? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ water resource problems (e.g. depletion/degradation of available water supply, deterioration for surface and ground water quality , and pollution of receiving waters? 	<input checked="" type="checkbox"/>		Water sources will be assessed and water conservation measures will be practiced
<ul style="list-style-type: none"> ▪ air pollution due to urban emissions? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ social conflicts between construction workers from other areas and local workers? 	<input checked="" type="checkbox"/>		Local workers will be given priority in hiring
<ul style="list-style-type: none"> ▪ road blocking and temporary flooding due to land excavation during rainy season? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ noise and dust from construction activities? 	<input checked="" type="checkbox"/>		Temporary and minimal disturbance during working hours; maybe reduced by proper maintenance of equipment.
<ul style="list-style-type: none"> ▪ traffic disturbances due to construction material transport and wastes? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ temporary silt runoff due to construction? 	<input checked="" type="checkbox"/>		Minimal and temporary impacts and no need for mitigating measure.
<ul style="list-style-type: none"> • hazards to public health due to ambient, household and occupational pollution, thermal inversion, and smog formation? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> • water depletion and/or degradation? 	<input checked="" type="checkbox"/>		Water conservation measures will be practiced

SCREENING QUESTIONS	Yes	No	REMARKS
<ul style="list-style-type: none"> overpaying of ground water, leading to land subsidence, lowered ground water table, and salinization? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> contamination of surface and ground waters due to improper waste disposal? 	<input checked="" type="checkbox"/>		Waste management plan will be implemented
<ul style="list-style-type: none"> pollution of receiving waters resulting in amenity losses, fisheries and marine resource depletion, and health problems? 		<input checked="" type="checkbox"/>	

Rapid Environmental Assessment (REA) Checklist

PORTS AND
HARBORS: Pier

Country/Project Title: Coral Reef Rehabilitation and Management: Coral Triangle Initiative (COREMAP-CTI)

Sector Division: Environment, Natural Resources and Agriculture Division

Subproject: Anambas MPA Effectiveness Subproject

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting			
Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		<input checked="" type="checkbox"/>	
▪ Protected Area	<input checked="" type="checkbox"/>		This is a project to support Anambas marine protected area. Its operation
▪ Wetland		<input checked="" type="checkbox"/>	
▪ Mangrove	<input checked="" type="checkbox"/>		The location of pier/jetty may be adjacent to mangrove areas but care will be done to avoid mangroves.
▪ Estuarine		<input checked="" type="checkbox"/>	
▪ Buffer zone of protected area	<input checked="" type="checkbox"/>		The project supports marine protected area
▪ Special area for protecting biodiversity	<input checked="" type="checkbox"/>		The project supports biodiversity conservation in the Coral Triangle.
B. Potential Environmental Impacts			
Will the Project cause...			
• encroachment on precious ecology resulting in loss or damage to fisheries and fragile coastal habitats such as coral reefs, mangroves, and seagrass beds?		<input checked="" type="checkbox"/>	
• short-term increase in turbidity and sunlight penetration as well as changes in sediment pattern and flows at dredging site?	<input checked="" type="checkbox"/>		Temporary and small impact only.
• removal and disturbance of aquatic flora and fauna at dredging site?	<input checked="" type="checkbox"/>		Very short term and small-scale disturbance;
• deterioration of water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?	<input checked="" type="checkbox"/>		Temporary impacts. Sanitary wastes and used chemicals will be disposed properly in accordance with Waste Management Plan
• alteration of bottom surface and modifications to bathymetry, causing changes in tidal bore, river circulation, species diversity, and salinity?		<input checked="" type="checkbox"/>	
• changes in sediment pattern and littoral drift that may cause beach erosion of neighboring areas?		<input checked="" type="checkbox"/>	
• modification of terrestrial habitat by upland disposal of dredged material or covering of potential archaeological sites with dredge spoil?		<input checked="" type="checkbox"/>	

SCREENING QUESTIONS	Yes	No	REMARKS
<ul style="list-style-type: none"> short-term air quality degradation due to dredging-related operations? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> noise and vibration due to blasting and other civil works? 	<input checked="" type="checkbox"/>		Minimal and temporary noise from civil works. Operations will be avoided at night.
<ul style="list-style-type: none"> dislocation or involuntary resettlement of people? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> other social concerns relating to inconveniences in living conditions in the project areas? 	<input checked="" type="checkbox"/>		Workers will be provided adequate billeting facilities if needed.
<ul style="list-style-type: none"> social conflicts if construction depletes local fishery resources on which communities depend for subsistence? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations? 	<input checked="" type="checkbox"/>		Wastes will be segregated and disposed according to the Waste Management Plan
<ul style="list-style-type: none"> social concerns relating to local inconveniences associated with port operation (e.g. increased volume of port traffic, greater risk of accidents, communicable disease transmission)? 	<input checked="" type="checkbox"/>		Rules will be promulgated in the use of the pier/jetty, and these will be strictly enforced to facilitate traffic, avoid accidents and communicable disease transmission.
<ul style="list-style-type: none"> deterioration of water quality due to ship (e.g. ballast water, oil waste, lubricant and fuel spills, sewage) and waterfront industry discharges? 	<input checked="" type="checkbox"/>		Rules will be promulgated and enforced to prevent water quality deterioration
<ul style="list-style-type: none"> increased noise and air pollution resulting from airborne emissions (e.g. gas, smoke, fumes) from maneuvering and berthing ships and the waterfront industry? 		<input checked="" type="checkbox"/>	

Rapid Environmental Assessment (REA) ChecklistFISHERIES:
Turtle Hatchery**Country/Project Title:** Coral Reef Rehabilitation and Management: Coral Triangle Initiative (COREMAP-CTI)**Sector Division:** Environment, Natural Resources and Agriculture Division**Subproject:** Anambas MPA Effectiveness Subproject

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting			
Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		<input checked="" type="checkbox"/>	
▪ Protected Area	<input checked="" type="checkbox"/>		This is a project to support Anambas marine protected area. Its establishment and operation shall be guided by the Zoning and Management Plan of the MPA
▪ Wetland		<input checked="" type="checkbox"/>	
▪ Mangrove		<input checked="" type="checkbox"/>	
▪ Estuarine		<input checked="" type="checkbox"/>	
▪ Buffer zone of protected area	<input checked="" type="checkbox"/>		The project supports biodiversity conservation in the Coral Triangle.
▪ Special area for protecting biodiversity	<input checked="" type="checkbox"/>		The project supports biodiversity conservation in the Coral Triangle.
B. Potential Environmental Impacts			
Will the Project cause...			
▪ overexploitation of fish stocks and long-term degradation of resource base?		<input checked="" type="checkbox"/>	
▪ capture of non-target species and habitat damage through use of destructive fishing methods and gears?		<input checked="" type="checkbox"/>	
▪ accidental damage to coral reefs by divers and fishing vessel anchors?		<input checked="" type="checkbox"/>	
▪ pollution from oil and fuel spills and bilge flushing?		<input checked="" type="checkbox"/>	
▪ ecological protection resulting from clearing for conversion of coastal wetlands to fishponds?		<input checked="" type="checkbox"/>	
▪ social problems arising from conflicts with other site uses?	<input checked="" type="checkbox"/>		The site might be withdrawn from other uses. This should comply with the zoning and management plan of the MPA. Prior consultation is needed.

SCREENING QUESTIONS	Yes	No	REMARKS
<ul style="list-style-type: none"> ▪ downstream water pollution from discharge of pond effluents with drain water? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ reduction of water supplies for competing uses (e.g., irrigation or domestic)? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ restriction of water circulation, obstruction to navigation by fish pens/cages, and reduction of stream capacity from siltation? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ dislocation or involuntary resettlement of people 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ social problems due to land tenure and use conflicts? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ soil erosion and siltation during construction? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ noise and dust from construction? 	<input checked="" type="checkbox"/>		Minimal and temporary noise from civil works. Operations will be avoided at night.
<ul style="list-style-type: none"> ▪ social problems especially when workers from other areas are hired? 	<input checked="" type="checkbox"/>		Minimal impact. Local workers will be hired.
<ul style="list-style-type: none"> ▪ reduction of water available to downstream users during peak seasons? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ pollution of nearby aquatic environments by pond drainage water and inadequate farm management? 	<input checked="" type="checkbox"/>		Minimal impact
<ul style="list-style-type: none"> ▪ depletion of local fish populations by stocking of wild fry/fingerlings in ponds? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ spread of diseases and parasites from exotic cultured species or escape of pond fish to the wild? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ increased public health risks due to the increased incidence or introduction of waterborne or water-related diseases? 		<input checked="" type="checkbox"/>	

Rapid Environmental Assessment (REA) ChecklistUrban Development:
Gazebo**Country/Project Title:**

Coral Reef Rehabilitation and Management: Coral Triangle Initiative (COREMAP-CTI)

Sector Division:

Environment, Natural Resources and Agriculture Division

Subproject:

Anambas MPA Effectiveness Subproject

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting			
Is the project area...			
▪ Densely populated?		<input checked="" type="checkbox"/>	
▪ Heavy with development activities?		<input checked="" type="checkbox"/>	
▪ Adjacent to or within any environmentally sensitive areas?			
- Cultural heritage site		<input checked="" type="checkbox"/>	
- Protected Area	<input checked="" type="checkbox"/>		This is a project to support Anambas marine protected area. Its establishment and operation shall be guided by the Zoning and Management Plan of the MPA
- Wetland		<input checked="" type="checkbox"/>	
- Mangrove	<input checked="" type="checkbox"/>		The location of MPA station may be adjacent to mangrove areas but care will be done to avoid mangroves.
- Estuarine		<input checked="" type="checkbox"/>	
- Buffer zone of protected area	<input checked="" type="checkbox"/>		The project supports marine protected area
- Special area for protecting biodiversity	<input checked="" type="checkbox"/>		The project supports biodiversity conservation in the Coral Triangle
- Bay		<input checked="" type="checkbox"/>	
B. Potential Environmental Impacts			
Will the Project cause...			
▪ impacts on the sustainability of associated sanitation and solid waste disposal systems and their interactions with other urban services.	<input checked="" type="checkbox"/>		Minimal impact. Solid wastes will be collected, segregated and disposed according to an approved Waste Management Plan

SCREENING QUESTIONS	Yes	No	REMARKS
<ul style="list-style-type: none"> ▪ deterioration of surrounding environmental conditions due to rapid urban population growth, commercial and industrial activity, and increased waste generation to the point that both manmade and natural systems are overloaded and the capacities to manage these systems are overwhelmed? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ degradation of land and ecosystems (e.g. loss of wetlands and wild lands, coastal zones, watersheds and forests)? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ dislocation or involuntary resettlement of people 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ degradation of cultural property, and loss of cultural heritage and tourism revenues? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ occupation of low-lying lands, floodplains and steep hillsides by squatters and low-income groups, and their exposure to increased health hazards and risks due to pollutive industries? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ water resource problems (e.g. depletion/degradation of available water supply, deterioration for surface and ground water quality , and pollution of receiving waters? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ air pollution due to urban emissions? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ social conflicts between construction workers from other areas and local workers? 	<input checked="" type="checkbox"/>		Minimal impact. Local workers will be given priority in hiring
<ul style="list-style-type: none"> ▪ road blocking and temporary flooding due to land excavation during rainy season? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ noise and dust from construction activities? 	<input checked="" type="checkbox"/>		Minimal and temporary noise from civil works. Operations will be avoided at night.
<ul style="list-style-type: none"> ▪ traffic disturbances due to construction material transport and wastes? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ temporary silt runoff due to construction? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> • hazards to public health due to ambient, household and occupational pollution, thermal inversion, and smog formation? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> • water depletion and/or degradation? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> • overpaying of ground water, leading to land subsidence, lowered ground water table, and salinization? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> • contamination of surface and ground waters due to improper waste disposal? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> • pollution of receiving waters resulting in amenity losses, fisheries and marine resource depletion, and health problems? 		<input checked="" type="checkbox"/>	

Rapid Environmental Assessment (REA) Checklist

Urban Development:
Security and Remote
Surveillance Post

Country/Project Title:

Coral Reef Rehabilitation and Management: Coral Triangle Initiative (COREMAP-CTI)

Sector Division:

Environment, Natural Resources and Agriculture Division

Subproject:

Anambas MPA Effectiveness Subproject

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting			
Is the project area...			
▪ Densely populated?		<input checked="" type="checkbox"/>	
▪ Heavy with development activities?		<input checked="" type="checkbox"/>	
▪ Adjacent to or within any environmentally sensitive areas?			
- Cultural heritage site		<input checked="" type="checkbox"/>	
- Protected Area	<input checked="" type="checkbox"/>		This is a project to support Anambas marine protected area. Its establishment and operation shall be guided by the Zoning and Management Plan of the MPA
- Wetland		<input checked="" type="checkbox"/>	
- Mangrove	<input checked="" type="checkbox"/>		The location of MPA station may be adjacent to mangrove areas but care will be done to avoid mangroves.
- Estuarine		<input checked="" type="checkbox"/>	
- Buffer zone of protected area	<input checked="" type="checkbox"/>		The project supports marine protected area
- Special area for protecting biodiversity	<input checked="" type="checkbox"/>		The project supports biodiversity conservation in the Coral Triangle
- Bay		<input checked="" type="checkbox"/>	
B. Potential Environmental Impacts			
Will the Project cause...			
▪ impacts on the sustainability of associated sanitation and solid waste disposal systems and their interactions with other urban services.	<input checked="" type="checkbox"/>		Minimal impact. Solid wastes will be collected, segregated and disposed according to an approved Waste Management Plan

SCREENING QUESTIONS	Yes	No	REMARKS
<ul style="list-style-type: none"> ▪ deterioration of surrounding environmental conditions due to rapid urban population growth, commercial and industrial activity, and increased waste generation to the point that both manmade and natural systems are overloaded and the capacities to manage these systems are overwhelmed? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ degradation of land and ecosystems (e.g. loss of wetlands and wild lands, coastal zones, watersheds and forests)? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ dislocation or involuntary resettlement of people 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ degradation of cultural property, and loss of cultural heritage and tourism revenues? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ occupation of low-lying lands, floodplains and steep hillsides by squatters and low-income groups, and their exposure to increased health hazards and risks due to pollutive industries? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ water resource problems (e.g. depletion/degradation of available water supply, deterioration for surface and ground water quality , and pollution of receiving waters? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ air pollution due to urban emissions? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ social conflicts between construction workers from other areas and local workers? 	<input checked="" type="checkbox"/>		Minimal impact. Local workers will be given priority in hiring
<ul style="list-style-type: none"> ▪ road blocking and temporary flooding due to land excavation during rainy season? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ noise and dust from construction activities? 	<input checked="" type="checkbox"/>		Minimal and temporary noise from civil works. Operations will be avoided at night.
<ul style="list-style-type: none"> ▪ traffic disturbances due to construction material transport and wastes? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ temporary silt runoff due to construction? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> • hazards to public health due to ambient, household and occupational pollution, thermal inversion, and smog formation? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> • water depletion and/or degradation? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> • overpaying of ground water, leading to land subsidence, lowered ground water table, and salinization? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> • contamination of surface and ground waters due to improper waste disposal? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> • pollution of receiving waters resulting in amenity losses, fisheries and marine resource depletion, and health problems? 		<input checked="" type="checkbox"/>	

Rapid Environmental Assessment (REA) Checklist

PORTS AND HARBORS: Mooring Buoy
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Country/Project Title:

Coral Reef Rehabilitation and Management: Coral Triangle Initiative (COREMAP-CTI)

Sector Division:

Environment, Natural Resources and Agriculture Division

Subproject:

Anambas MPA Effectiveness Subproject

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting			
Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		<input checked="" type="checkbox"/>	
▪ Protected Area	<input checked="" type="checkbox"/>		This is a project to support Anambas marine protected area. Its establishment and operation shall be guided by the Zoning and Management Plan of the MPA
▪ Wetland		<input checked="" type="checkbox"/>	
▪ Mangrove		<input checked="" type="checkbox"/>	
▪ Estuarine		<input checked="" type="checkbox"/>	
▪ Buffer zone of protected area	<input checked="" type="checkbox"/>		The project supports marine protected area
▪ Special area for protecting biodiversity	<input checked="" type="checkbox"/>		The project supports biodiversity conservation in the Coral Triangle.
B. Potential Environmental Impacts			
Will the Project cause...			
• encroachment on precious ecology resulting in loss or damage to fisheries and fragile coastal habitats such as coral reefs, mangroves, and seagrass beds?	<input checked="" type="checkbox"/>		Temporary and localized impacts only.
• short-term increase in turbidity and sunlight penetration as well as changes in sediment pattern and flows at dredging site?		<input checked="" type="checkbox"/>	
• removal and disturbance of aquatic flora and fauna at dredging site?	<input checked="" type="checkbox"/>		Selection of the mooring buoy system based on the sea bottom conditions. Adoption of the Halas system in areas with flat, solid bedrock. Adoption of the Manta-Ray system for areas of sand, coral rubble or a combination of bottom types. Avoidance of the traditional system except in sand or mud sea bottom areas.
• deterioration of water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?		<input checked="" type="checkbox"/>	

SCREENING QUESTIONS	Yes	No	REMARKS
• alteration of bottom surface and modifications to bathymetry, causing changes in tidal bore, river circulation, species diversity, and salinity?	<input checked="" type="checkbox"/>		See mitigation measures to 'removal and disturbance of aquatic flora and fauna' above.
• changes in sediment pattern and littoral drift that may cause beach erosion of neighboring areas?		<input checked="" type="checkbox"/>	
• modification of terrestrial habitat by upland disposal of dredged material or covering of potential archaeological sites with dredge spoil?		<input checked="" type="checkbox"/>	
• short-term air quality degradation due to dredging-related operations?		<input checked="" type="checkbox"/>	
• noise and vibration due to blasting and other civil works?	<input checked="" type="checkbox"/>		Minimal and temporary noise during installation. Thorough survey and planning to reduce installation time.
• dislocation or involuntary resettlement of people?		<input checked="" type="checkbox"/>	
• other social concerns relating to inconveniences in living conditions in the project areas?		<input checked="" type="checkbox"/>	
• social conflicts if construction depletes local fishery resources on which communities depend for subsistence?		<input checked="" type="checkbox"/>	
• poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?	<input checked="" type="checkbox"/>		Wastes segregation and disposal will be done in accordance with an approved Waste Management Plan
• social concerns relating to local inconveniences associated with port operation (e.g. increased volume of port traffic, greater risk of accidents, communicable disease transmission)?	<input checked="" type="checkbox"/>		Rules will be promulgated in the use of the pier/jetty, and these will be strictly enforced to facilitate traffic, avoid accidents and communicable disease transmission.
• deterioration of water quality due to ship (e.g. ballast water, oil waste, lubricant and fuel spills, sewage) and waterfront industry discharges?	<input checked="" type="checkbox"/>		Rules will be promulgated and enforced to prevent water quality deterioration
• increased noise and air pollution resulting from airborne emissions (e.g. gas, smoke, fumes) from maneuvering and berthing ships and the waterfront industry?		<input checked="" type="checkbox"/>	

Rapid Environmental Assessment (REA) Checklist

SOLAR CELLS (PHOTOVOLTAIC)

Country/Project Title: Coral Reef Rehabilitation and Management: Coral Triangle Initiative (COREMAP-CTI)

Sector Division: Environment, Natural Resources and Agriculture Division

Subproject: Anambas MPA Effectiveness Subproject

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting			
Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		<input checked="" type="checkbox"/>	
▪ Protected area	<input checked="" type="checkbox"/>		This is a project to support Anambas marine protected area. Its establishment and operation shall be guided by the Zoning and Management Plan of the MPA
▪ Wetland		<input checked="" type="checkbox"/>	
▪ Mangrove		<input checked="" type="checkbox"/>	
▪ Estuarine		<input checked="" type="checkbox"/>	
▪ Buffer zone of protected area	<input checked="" type="checkbox"/>		The project supports marine protected area
▪ Special area for protecting biodiversity	<input checked="" type="checkbox"/>		The project supports biodiversity conservation in the Coral Triangle
B. Potential Environmental Impacts			
Will the Project cause...			
▪ Large scale land disturbance and land use impacts especially due to diversion of productive lands?		<input checked="" type="checkbox"/>	
▪ Involuntary resettlement of people? (physical displacement and/or economic displacement)		<input checked="" type="checkbox"/>	
▪ Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		<input checked="" type="checkbox"/>	
▪ Noise, vibration and dust from construction activities?		<input checked="" type="checkbox"/>	
▪ An increase in local traffic during construction?		<input checked="" type="checkbox"/>	
▪ Environmental disturbances such as soil erosion, land contamination, water quality deterioration, air pollution, noise and vibrations during construction phase?		<input checked="" type="checkbox"/>	
• Aesthetic degradation and property value loss due to establishment of plant and ancillary facilities?		<input checked="" type="checkbox"/>	
▪ Changes in flow regimes of the water intake from surface water or underground wells due to abstraction for cooling purposes?		<input checked="" type="checkbox"/>	
▪ Pollution of water bodies and aquatic ecosystem from wastewater treatment plant, from cooling towers, and wash-water during operation?		<input checked="" type="checkbox"/>	
▪ A threat to bird or bat life from colliding with the project facilities and/or being burned by concentrated solar rays?		<input checked="" type="checkbox"/>	
▪ Industrial liquid (dielectric fluids, cleaning agents, and solvents) and solid wastes (lubricating oils, compressor oils, and hydraulic fluids) generated during construction and operations likely to pollute land and water resources?	<input checked="" type="checkbox"/>		Any chemical wastes will be disposed in accordance with waste management plan

SCREENING QUESTIONS	Yes	No	REMARKS
<ul style="list-style-type: none"> ▪ Soil/water contamination due to use of hazardous materials or disposal of broken or damaged solar cells (photovoltaic technologies contain small amounts of cadmium, selenium and arsenic) during installation, operation and decommissioning? 	<input checked="" type="checkbox"/>		Hazardous wastes will be disposed according to waste management plan and government regulations
<ul style="list-style-type: none"> ▪ Noise disturbance during operation due to the proximity of settlements or other features? 			
<ul style="list-style-type: none"> ▪ Visual impacts due to reflection from solar collector arrays resulting in glint or glare? 	<input checked="" type="checkbox"/>		Any glare could be corrected by the proper design and alignment of solar panels.
<ul style="list-style-type: none"> ▪ Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)? 		<input checked="" type="checkbox"/>	
<ul style="list-style-type: none"> ▪ Social conflicts between local laborers and those from outside the area? 	<input checked="" type="checkbox"/>		Local laborers will be hired preferably.
<ul style="list-style-type: none"> ▪ Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during construction, installation, operation, and decommissioning? 	<input checked="" type="checkbox"/>		Only qualified technical service crew will construct and install the solar panels system. The office staff will be oriented as to the proper operation and maintenance of the system. Decommissioning will be done in accordance with the government and manufacturer's specifications.
<ul style="list-style-type: none"> ▪ Risks to community health and safety due to the transport, storage, and use and/or disposal of materials and wastes such as explosives, fuel and other chemicals during construction, and operation? 	<input checked="" type="checkbox"/>		Chemicals and other wastes will be disposed according to the waste management plan
<ul style="list-style-type: none"> ▪ Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning? 		<input checked="" type="checkbox"/>	

Climate Change and Disaster Risk Questions The following questions are not for environmental categorization purposes. However, the questions are included in this checklist to help the project team identify the potential climate and disaster risks of the project.	Yes	No	Remarks
<ul style="list-style-type: none"> ▪ Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix I)? 	<input checked="" type="checkbox"/>		Sumatra is one of the highest risk areas in world for a major earthquake (>8.0) and subsequent tsunami in next 30-50 years. Due to its inland mountains, there are landslides as well. Storm surge and sea level rise are other hazards that need to be considered in implementing activities. (Coastal buffer zone, building codes, evacuation routes, accessible sustainable materials for building, etc.)
<ul style="list-style-type: none"> ▪ Could changes in precipitation, temperature, salinity, or extreme events over the Project lifespan affect its sustainability or cost? 		<input checked="" type="checkbox"/>	Unlikely extreme weather conditions would affect its sustainability or cost. EQ is the primary risk.
<ul style="list-style-type: none"> ▪ Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g. high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)? 	<input checked="" type="checkbox"/>		Women and children still have low levels of safety and security, as well as little power, particular in Non-COREMAP villages. IP are dominant in only one place: Mentawai, and they are the majority ethnic group there.
<ul style="list-style-type: none"> ▪ Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., increasing traffic or housing in areas that will be more prone to flooding, by encouraging settlement in earthquake zones)? 		<input checked="" type="checkbox"/>	The project will discourage expensive buildings or activities in earthquake zones, and encourage coastal setback and other practices to minimize impacts of coastal hazards. Sumatra has received a lot of EQ preparedness, and this awareness should be sustained.

Environments, Hazards and Climate Change

Environment	Natural Hazards and Climate Change
Arid/Semi-arid and desert environments	Low erratic rainfall of up to 500 mm rainfall per annum with periodic droughts and high rainfall variability. Low vegetative cover. Resilient ecosystems & complex pastoral and systems, but medium certainty that 10–20% of drylands degraded; 10-30% projected decrease in water availability in next 40 years; projected increase in drought duration and severity under climate change. Increased mobilization of sand dunes and other soils as vegetation cover declines; likely overall decrease in agricultural productivity, with rain-fed agriculture yield reduced by 30% or more by 2020. Earthquakes and other geophysical hazards may also occur in these environments.
Humid and sub-humid plains, foothills and hill country	More than 500 mm precipitation/yr. Resilient ecosystems & complex human pastoral and cropping systems. 10-30% projected decrease in water availability in next 40 years; projected increase in droughts, heatwaves and floods; increased erosion of loess-mantled landscapes by wind and water; increased gully erosion; landslides likely on steeper slopes. Likely overall decrease in agricultural productivity & compromised food production from variability, with rain-fed agriculture yield reduced by 30% or more by 2020. Increased incidence of forest and agriculture-based insect infestations. Earthquakes and other geophysical hazards may also occur in these environments.
River valleys/deltas and estuaries and other low-lying coastal areas	River basins, deltas and estuaries in low-lying areas are vulnerable to riverine floods, storm surges associated with tropical cyclones/typhoons and sea level rise; natural (and human-induced) subsidence resulting from sediment compaction and ground water extraction; liquefaction of soft sediments as result of earthquake ground shaking. Tsunami possible/likely on some coasts. Lowland agri-business and subsistence farming in these regions at significant risk.
Small islands	Small islands generally have land areas of less than 10,000km ² in area, though Papua New Guinea and Timor with much larger land areas are commonly included in lists of small island developing states. Low-lying islands are especially vulnerable to storm surge, tsunami and sea-level rise and, frequently, coastal erosion, with coral reefs threatened by ocean warming in some areas. Sea level rise is likely to threaten the limited ground water resources. High islands often experience high rainfall intensities, frequent landslides and tectonic environments in which landslides and earthquakes are not uncommon with (occasional) volcanic eruptions. Small islands may have low adaptive capacity and high adaptation costs relative to GDP.
Mountain ecosystems	Accelerated glacial melting, rockfalls/landslides and glacial lake outburst floods, leading to increased debris flows, river bank erosion and floods and more extensive outwash plains and, possibly, more frequent wind erosion in intermontane valleys. Enhanced snow melt and fluctuating stream flows may produce seasonal floods and droughts. Melting of permafrost in some environments. Faunal and floral species migration. Earthquakes, landslides and other geophysical hazards may also occur in these environments.
Volcanic environments	Recently active volcanoes (erupted in last 10,000 years – see www.volcano.si.edu). Often fertile soils with intensive agriculture and landslides on steep slopes. Subject to earthquakes and volcanic eruptions including pyroclastic flows and mudflows/lahars and/or gas emissions and occasionally widespread ashfall.

