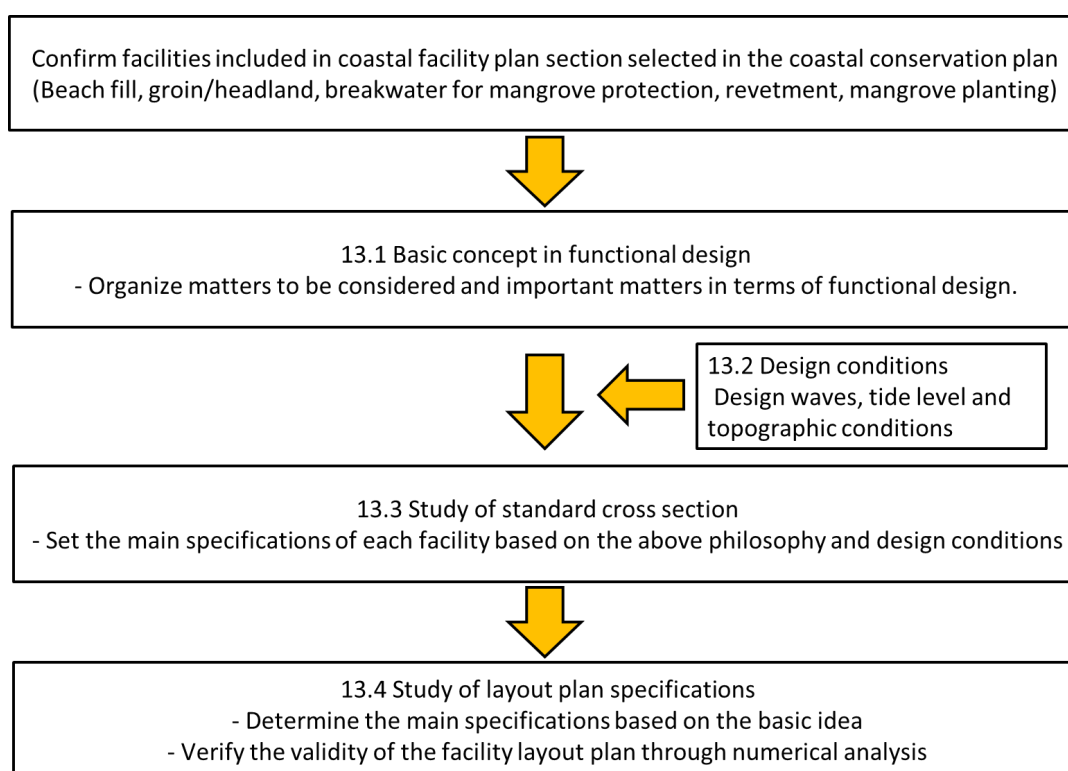


CHAPTER 13 Coastal Facility Plan in Selected Sections

13.1 Basic Concepts of Functional Design

The coastal protection facilities proposed in the Project include five facilities: beach nourishment, groin/headland, breakwater for mangrove protection, revetment and mangrove plantation. As shown in Figure 13.1.1 at first the basic concept of functional design of coastal protection facilities are shown and then standard cross section and plan layout specifications are studied based on each design condition. Note that the draft of Basic Coastal Management Plan shown in Chapter 10 includes several areas set as Action-3 (improvement of existing coastal facilities). The necessity of improvement will be determined in consultation with PUPR and each BBWS but Action-3 (improvement of existing coastal facilities) is also included as target area in addition to Action-4 (new coastal facilities).



Source: JICA Study Team

Figure 13.1.1 Flow of Study on Cross-Section and Layout Plan

Coastal protection facilities will be designed to fulfill three functions of protection, utilization and environment required for each coast as shown in Chapter 10. The following are the points to be considered and emphasized in the design of each proposed facility.

(1) Beach Nourishment

- It applies when the required functions are “protection + environment”, “protection + utilization” or “protection + environment + utilization”. (Category-2, Category-3 and Category-4)
- When the required functions are “protection + utilization”, the coast is designed to satisfy the following two functions: protection function is to prevent waves from running up into hinterland and utilization function is to ensure a beach width that does not interfere with coastal utilization. These two functions are maintained during the required period.
- When the required functions are “protection + environment” or “protection + utilization + environment”, design specifications are considered so that the improvement effects of beach creation such as water quality and marine biological environment can be realized.
- The decision of whether to apply static beach nourishment with or without groins or headlands is made after considering the cost, utilization and environmental aspects, including coastal mechanisms and maintenance.
- Considering the beach stability after beach nourishment, the grain size of material should be coarse enough that it does not interfere with beach use, and it is desirable for it to be at least the same size as the grain size of the local beach sand.
- The color of the beach nourishment material will be determined taking into consideration beach use and landscape but there is no need to place any particular restrictions on color in the case of the northern Java coast, since it is basically a black sand beach.

(2) Groin/Headland

- Groins and headlands are basically used as facilities to control longshore sand transport that causes topographical changes such as erosion and sedimentation. In this project, they will be used as supplementary facilities for static beach nourishment.
- The design and selection of the main specifications such as length, crown height, crown width and slope and materials to be used must be done based on the functions required for the coast.
- In Area-I and Area-II, the bottom sediment is composed of fine sand and sand mixed with silt. So, there is concern about subsidence due to consolidation, liquefaction and sliding due to the installation of structures. Therefore, as a basic policy, the total weight will be reduced by constructing the facilities as small as possible within the scope of the specified functions. In addition, subsidence measures will be taken as necessary.
- Regarding subsidence measures, considering the uncertainty of subsidence prediction and the fact that these are coastal facilities that are different from important infrastructure facilities since subsidence does not directly affect economic activities or human lives. A method that is adaptive and economical will be adopted including the effort and cost of maintenance.

(3) Mangrove Plantation

- It applies when the required functions are “protection”, “protection + environment”, “protection + utilization”, or “protection + environment + utilization”. (Category-1, Category-2, Category-3 and Category-4)
- It applies on coastal areas where the hinterland is mainly used for primary industries such as farmland and fisheries-related land where there is no direct damage to human life, people's daily lives, or infrastructure facilities due to high wave inundation, overtopping or coastal erosion. In other words, it is assumed that a certain degree of high wave inundation and overtopping will be tolerated under unusual oceanographic conditions.
- The area to be planted will be considered based on the expected wave reduction effect and sedimentation effect. In addition, the selection and placement of appropriate mangrove species will be considered based on wave conditions and soil conditions.
- Basically, coastal areas where mangrove forests once existed and were subsequently cut down during development will be selected as a priority. When proposing mangrove plantation newly, whether there are any mangrove forests on nearby coasts should be checked for stable growth of mangrove.
- If there is concern that damage from waves may occur during the growth of mangrove after planting, the combination with wave breakers will be used as described below. Also, if the seabed ground level is not high enough for plantation, it is necessary to add soil and ensure that the water is deep enough for planting.

(4) Breakwater for Mangrove Protection

- If there are concerns that external forces such as waves may have an impact on mangrove growth and maintenance until the mangroves have grown steadily or even after they have grown, facilities with wave breaking functions will be used as supplementary facilities.
- The structural type and main specifications of the breakwater such as length, crown height, crown width and slope will be determined taking into account the necessary period and cost required as breakwater.
- As breakwater are supplementary facilities for mangrove growth, a structural type will be considered that is cheaper than hard facilities such as revetments and offshore breakwaters used as normal protection measures, taking into account their purpose and the necessity of preventing subsidence.

(5) Revetment

- It applies when the required function is only “protection” function, or when it is necessary to supplement the insufficient protective function in “protection + utilization” or “protection + environment + utilization”.
- The crown height is determined by the allowable overtopping volume or wave run-up height based on the design tide level and wave conditions and the utilization situation of hinterland. If subsidence occurs, it is

considered and estimated as the design height along with the planned height (subsidence is mentioned in described below in (6)).

- Although the revetment has the function of protecting the land behind it, it does not restore the decreased sand supply. Therefore, erosion continues to occur in front of the revetment offshore side. When applying the revetment as a coastal erosion countermeasure, it is necessary to fully understand that point and to decide alignment and the structural type based on the impact on the surrounding coast and the impact of scouring due to reflected waves in front of the revetment. Since the permeable revetment reduces the loss of sand beach in front due to scouring compared to concrete impermeable revetments, the permeable revetment is considered as a priority. Additionally, subsidence measures must be considered, if necessary, by both setting the initial cross-section and maintenance.
- When improvements of protection function, hydrophilicity and usability are required compared to conventional revetments, revetment as an integrated shore protection that provides a certain width as buffer zone behind the revetment should be selected.
- When the revetment is damaged due to subsidence or scouring and its protective function is decreased, whether there is a need to improve the existing revetment should be determined after the deterioration of its function is evaluated. When improving an existing revetment, it is necessary to consider raising the crown height, changing the alignment of revetment, and changing the structural type.

(6) Common Matters Among Each Coastal Facility

How to deal with subsidence

- In target areas where it is already clear that land subsidence is occurring, the top elevation will be raised to take this into consideration. However, as there are uncertainties regarding the amount of future subsidence, an initial period for raising the elevation will be set and subsequent measures will be handled through maintenance while monitoring the situation.
- Regarding measures to deal with subsidence due to the installation of structures such as subsidence due to consolidation and liquefaction, past cases on the north coast of Java Island will be utilized as a reference to determine whether or not measures are necessary. Also, if necessary, a freeboard will be considered as the construction height in addition to the planned height.

How to deal with sea level rise due to climate change

- Regarding sea level rise due to climate change, the actual long-term water level changes based on observed values are unknown on the northern Java coast and since it is not a sudden phenomenon, it will be dealt with through maintenance and management while monitoring water level changes. Therefore, it is not studied in the Project.

13.2 Design Condition

13.2.1 Design Wave

In the Coastal Facility Design, the equivalent deepwater waves for 50-year probability in each section were set according to the following procedure.

- The maximum annual wave heights are extracted from the 1981~2021 data of the wave estimation data (ERA5) estimated offshore the coast of each area.
- The significant wave height for each probability year is set by extreme value statistical analysis (the wave period is set from the correlation with the wave height).
- The wave height ratio distribution along the coast of each area is obtained by wave deformation calculation (using the wave energy equilibrium equation model).
- The equivalent deepwater wave height is calculated by the wave height ratio under the wave direction condition in which the annual maximum wave height is estimated.

The detail of the review process and results is shown in Appendix 6-2.

The equivalent deepwater wave condition at each of the selected sections or sites are shown in Table 13.2.1.

Table 13.2.1 Equivalent Deep Water Wave Condition in Selected Sections

Area	Section	Wave Height (m)	Wave Period (s)
Area-I: Indramayu	Section-1	1.1~1.7	5.8
	Section-6	1.5~1.6	5.8
Area-II: Pemalang-Pekalongan	Section-4	2.2~2.3	6.6
Tuban	Site-1	1.8	6.7
	Site-3	2.0~2.4	6.7

Source: JICA Study Team

13.2.2 Design Tide Level

The design tide level is set to the mean monthly-highest water level (HWL), which is the same as the design examples of coastal protection facilities in Japan and in northern Java. In setting the HWL, two types of data were used as reference: observation data from multiple tide gauges and estimated data based on harmonic analysis of a random location, both of which are published online by the Indonesian Geospatial Information Agency (BIG, Badan Infomai Geospasial). Since the observation data is more reliable than the estimated data, the observed data was used for Pekalongan and Tuban, where the observation data is available, and the estimated data was used for Indramayu West and Indramayu East. Since the BIG data does not include the HWL for each location, the tide data from Bali, where there are many design examples of coastal protection facilities, was used to verify the BIG data. As a result, it was confirmed that the difference between the lowest astronomical tide (LAT) and the mean high tide (MHWL) almost coincides with the HWL. Therefore, HWL is set to MHWS published by BIG, LWL is set to LAT (= 0.0 m) published by BIG and MSL is set to the average of both. In addition, for the flooding calculations in Chapter 16, the highest water level (HHWL) was used estimated from the

forecasted tide level data by Navy and the design documents of past coastal projects by BBWS. Table 13.2.2 summarizes the tidal conditions in each area.

Table 13.2.2 Tidal Conditions in Each Area

Area	HHWL (m)	HWL (m)	MSL (m)	LWL (m)
Area-I: Indramayu West	1.30	0.71	0.36	0.00
Area-I: Indramayu East	1.00	0.71	0.36	0.00
Area-II: Pekalongan	1.20	0.68	0.34	0.00
Tuban	1.90	1.65	0.83	0.00

Source: JICA Study Team

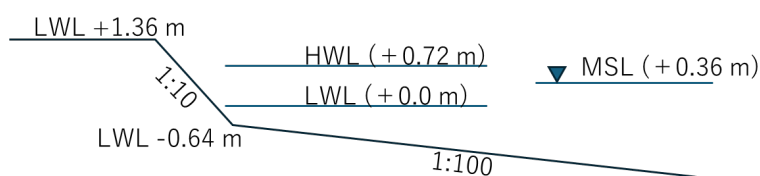
13.2.3 Topographic Condition

Based on the results of coastal survey and bathymetric survey conducted in each Area, the specifications of the standard topographical cross section in each area to be used in coastal facility design were set as shown in Table 13.2.3. As the survey results showed some variation in shape depending on the survey line, the berm top, foreshore slope, offshore tip position of the foreshore slope and seabed slope were read from each measurement line and these average values were applied to the standard topographical cross section to be used in coastal facility design.

Table 13.2.3 Standard Topographical Cross Section in Each Area

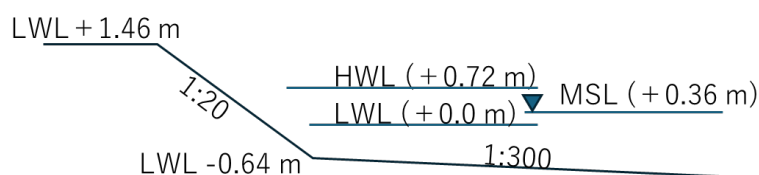
Area	Elevation of Berm Top (m)	Foreshore Slope	Elevation of Edge of Foreshore Slope (m)	Seabed Slope
Area-I: Indramayu West	1.36	1:10	- 0.64	1:100
Area-I: Indramayu East	1.46	1:20	- 0.64	1:300
Area-I: Pekalongan	1.54*	_*	- 0.66	1:100
Tuban	2.03	1:10	- 0.34	1:100

Source: JICA Study Team



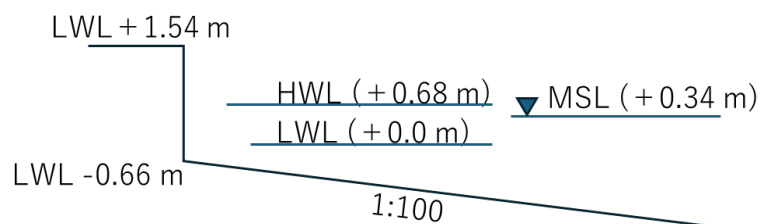
Source: JICA Study Team

Figure 13.2.1 Standard Cross Section in Indramayu West



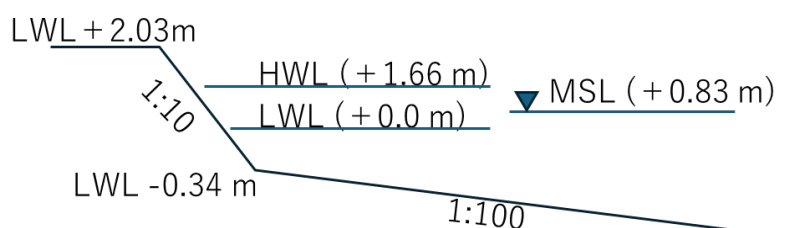
Source: JICA Study Team

Figure 13.2.2 Standard Cross Section in Indramayu East



Source: JICA Study Team

Figure 13.2.3 Standard Cross Section in Pekalongan



Source: JICA Study Team

Figure 13.2.4 Standard Cross Section in Tuban

13.3 Standard Cross Section

Based on the basic concept of functional design in Section 13.1, the specifications of each facility are studied below. Regarding the crown height of the facility, the design height is set to the planned height required for the function added the height raised to account for the expected future wide area ground subsidence and subsidence due to the installation of the structure.

13.3.1 Beach Nourishment

(1) Crown Height

The crown height of the natural beach is the maximum wave height that the sandy beach in the area has ever experienced due to the tide and wave conditions, so the crown height of the nourished beach was set at the same height as the berm height of natural beach. As for Pekalongan, since widespread land subsidence is expected, the design construction crown height was set at a height 25 cm higher than the planned crown height to represent the expected subsidence over a five-year period.

(2) Sand Quality

The natural beach on site contained some silt and it was mostly composed of very fine silt and fine sand with a median grain size of 0.20 mm. To keep the nourished sand, the grain size of the nourished sand was set to be 0.20 mm which is

the same as the grain size of the natural beach or slightly larger. Generally, it is desirable that the color of the nourished sand be the same as that of the natural beach on site considering its use and landscape.

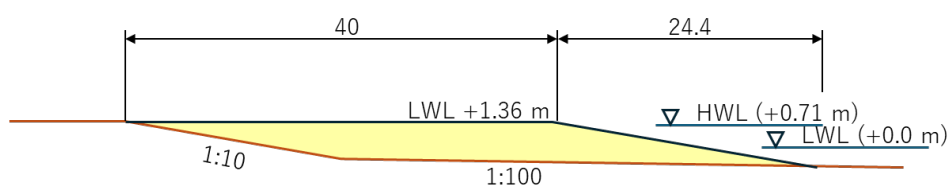
(3) Foreshore Slope

It is known that the foreshore slope depends on the grain size of the sand that makes up the beach. In order to set the grain size of the nourishing sand to be the same as or larger than the grain size of the natural beach, it was set to 1:10, which is the same as the representative area of the natural beach slope.

(4) Beach Width

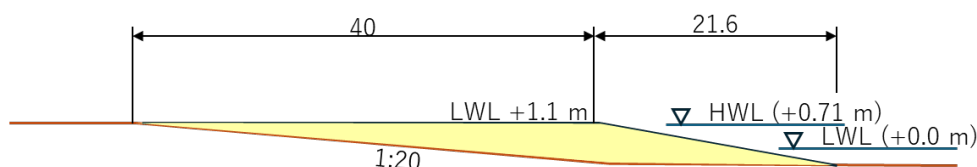
Taking into account the function of coastal use and the function of preventing run up waves, the minimum beach width of the beach nourishment on the crown was set at 10 m and the average beach width was set at 40 m.

Figure 13.3.1 to Figure 13.3.4 show standard cross section of beach nourishment in each area determined based on (1) to (4) above.



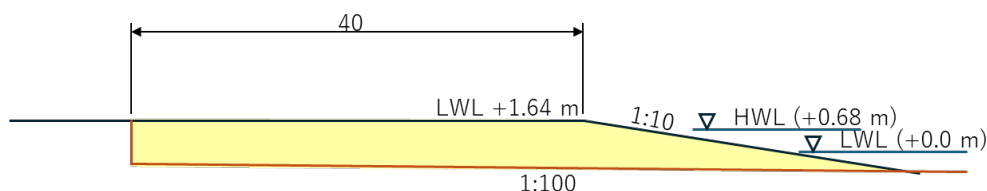
Source: JICA Study Team

Figure 13.3.1 Typical Cross Section of Beach Nourishment in Indramayu West



Source: JICA Study Team

Figure 13.3.2 Typical Cross Section of Beach Nourishment in Indramayu East



Source: JICA Study Team

Figure 13.3.3 Typical Cross Section of Beach Nourishment in Pekalongan

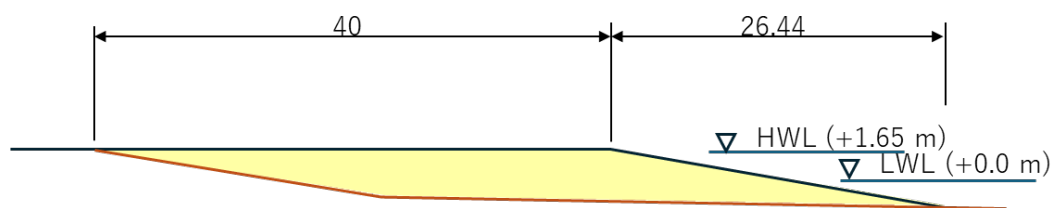


Figure 13.3.4 Typical Cross Section of Beach Nourishment in Tuban

13.3.2 Groin and Headland

(1) Structural Type

Groins and headlands are installed in combination with beach nourishment. In order to increase the effectiveness of retaining beach nourishment sand, the structure is constructed using two to three layers of stones of different sizes. The rubble mound type is adopted because the presence of voids is expected to suppress reflected waves and prevent scouring considering utilization.

(2) Crown Height

While ensuring a height that controls sand movement over the groin and headland, the crown height is set higher than the crown height of beach nourishment which is equivalent to berm height of a natural beach in consideration of cost reduction and impact on the landscape. It is set to 30 cm higher than the crown height of beach nourishment. At both ends of the area where facilities are located, it is necessary to design so that sand does not flow out of the area. On the other hand, sand movement can be allowed to some extent at facilities other than both ends so the crown height is designed to be lowered to MSL toward the tip of structure at offshore.

In addition, for Indramayu, Pekalongan and Tuban, the planned crown height is added by 50 cm as freeboard to compensate for the subsidence due to structure's weight. Only for Pekalongan, since land subsidence is expected over a wide range, the design crown height is added more by 25 cm based on the estimated annual subsidence rate.

(3) Crown Width

The length of the groin and headland vertical embankment was set at 2 m considering utilization. Since the head part of the headland does not require much utilization function, it is set at 1.5 m which is the minimum width that would ensure the stability of the facilities while taking economic efficiency into account.

(4) Slope

Considering the utilization aspect, the gentle slope is desired but on the other hand, since the cost increases, the slope was set at 1:2. As for the trunk part of the headland, the slope was set at 1:1.5 considering economic efficiency, since there is not much demand for utilization functions.

(5) Required Weight of Armor Stone

The required weight of the armor stone was determined using the following Hudson formula, which is generally used to calculate the required weight of the armor stone for sloped structures that are subject to wave forces. The weight and layer thickness of the armor layer in each area are shown in the table.

Hudson formula:

$$W = \frac{\gamma_r H^3}{K_D (S_r - 1)^3 \cot \theta}$$

Here,

W	:	Minimum weight of armor stone (ton)
γ_r	:	Unit weight of armor stone (ton/m ³)
S _r	:	Specific gravity of armor stone = (W / W _w)
W _w	:	Specific gravity of seawater (1.03 ton/m ³)
θ	:	Slope gradient of structure (degrees)
H	:	Design wave height (m)
K _D	:	Stability coefficient

Thickness of Armor Layer:

$$r = n \cdot K_D \left(\frac{W}{W_r} \right)^{1/3} \text{ (Eq.2)}$$

Here,

r	:	Average thickness of the armor layer, or underlayer (m)
n	:	Number of armor units in the layer (n = 2 in this study)
W	:	Mass of individual armor unit in the layer (Ton)
W _r	:	Mass density of armor unit (Ton/m ³)
K _D	:	Stability coefficient

Table 13.3.1 Required Weight and Thickness of Armor Stone of Headland and Groin

Area	Indramayu West		Indramayu East		Pekalongan		Tuban Groin
	Headland Trunk Part	Headland Head Part	Headland Trunk Part	Headland Head Part	Headland Trunk Part	Headland Head Part	
Weigh (kg)	323	431	236	315	875	1167	816
Thickness (m)	0.48	0.53	0.43	0.47	0.67	0.73	0.67

Source: JICA Study Team

(6) Subsidence Measures

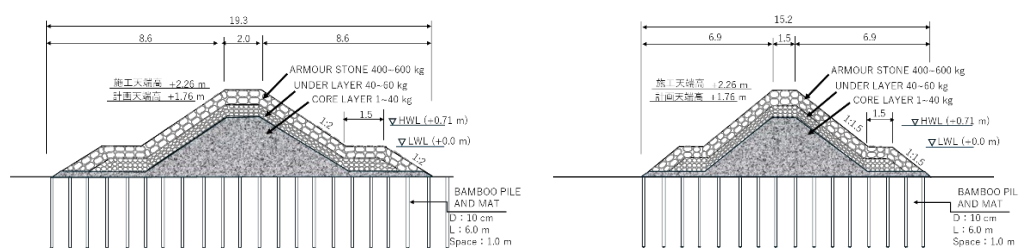
Subsidence damage of existing structures in the coastal area or offshore of north Java has been reported and some kind of countermeasure against subsidence is necessary. Therefore, bamboo piles and bamboo mats are applied, which are commonly used as countermeasures against subsidence in north Java. Since there are no design standards for the specifications of bamboo piles and bamboo mats used to prevent the subsidence of structures and there is little research data related to them, the dimensions is based on existing facilities in north Java, The diameter of the bamboo piles is set at 10 cm, the length of them is set at 4 m and the pitch between the piles at 1.0 m. Unlike Indramayu and Pekalongan, there are no cases of subsidence damage have been reported and no countermeasures against subsidence have been taken for existing structures in Tuban. Therefore, countermeasures against subsidence are not considered in this study.

Figure 13.3.5 shows the illustrated images before and after the implementation of beach nourishment and headland. b Figure 13.3.6 to Figure 13.3.9 show typical cross-sections of the headland in each area determined based on (1) to (6) above.



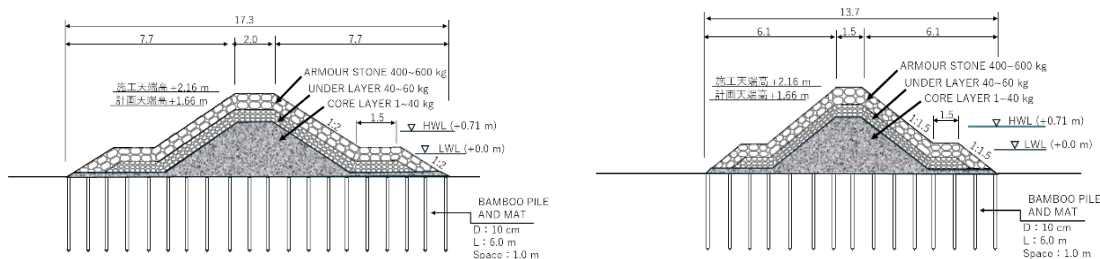
Source: JICA Study Team

Figure 13.3.5 Implementation Image of Beach Nourishment with Headland (Area-I, S-1a)



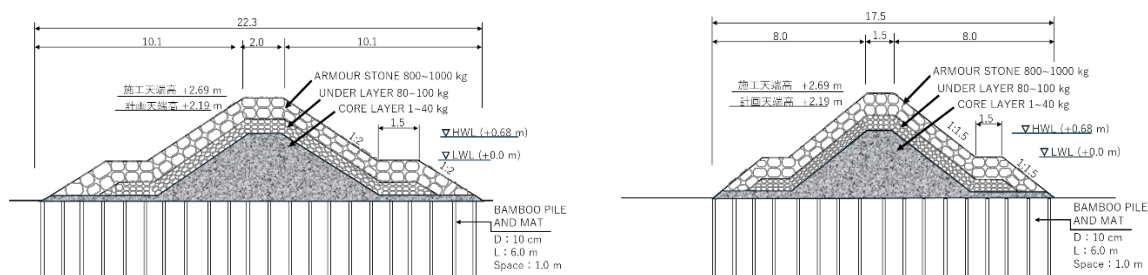
Source: JICA Study Team

Figure 13.3.6 Typical Cross Section of Headland in Indramayu West
(Right: Trunk Part, Left: Head Part)



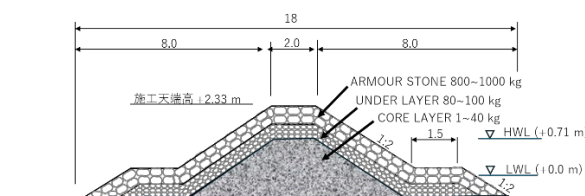
Source: JICA Study Team

**Figure 13.3.7 Typical Cross Section of Headland in Indramayu East
(Right: Trunk Part, Left: Head Part)**



Source: JICA Study Team

**Figure 13.3.8 Typical Cross Section of Headland in Pekalongan
(Right: Trunk Part, Left: Head Part)**



Source: JICA Study Team

Figure 13.3.9 Typical Cross Section of Groin in Tuban

13.3.3 Mangrove Plantation

(1) Ground Elevation

Based on interviews with a research institute (BRIN, National Research and Innovation Agency) that is implementing mangrove planting and on past examples in Indonesia, the area to be planted has soil piled up 1 m above the original ground elevation so that mangrove can habitat there.

(2) Planting Width

Referring the existing case of mangrove planting in northern Java, the planting width is 100-300 m, in this study set the planting width is set at 150 m.

(3) Planting Species

It is necessary to choose a species that is suitable for wave and soil conditions and a common species from an economical perspective.

13.3.4 Breakwater for Mangrove Protection

(1) Structural Type

In the Project, rubble mound type is applied similar to other structures. Breakwater is a supplementary facility that reduces waves until the mangroves grow sufficiently stably. Since the requirements are not high compared to other facilities, the appropriate structure is studied economic efficiency in future detailed studies.

(2) Crown Height

Since the breakwater for mangrove protection installed offshore is a facility that reduces wave, the design method of the offshore breakwater can be followed. Based on the method of determining the crown height of the offshore breakwater in the “Technical Standard for Shore Protection Facilities in Japan” commonly used for the design of coastal protection facilities in Japan. HWL+1.0 m as crown height is adopted considering economic efficiency which is the lowest crown height.

In addition, sufficient wave-dissipating function is required especially in the early stages of afforestation. On the other hand, since it is a supplementary facility, a decrease in wave-dissipating function is allowed as the mangroves grow and stabilize, subsidence due to the installation of the structure.

(3) Crown Width

Since the utilization function is not required, the crown width is set at 1.5 m which is the minimum width that ensures stability with considering economy.

(4) Slope

Since the utilization function is not required, the slope is set at 1:1.5 with considering economy.

(5) Required Weight of Armor Stone

As with the headland, required weight and thickness of armor stone is set as in Table 13.3.2 using the Hudson method.

Table 13.3.2 Required Weight and Thickness of Armor Stone of Breakwater for Mangrove Plantation

Area	Indramayu West	Pekalongan
Weight (kg)	767	735
Thickness (m)	0.67	0.73

Source: JICA Study Team

(6) Subsidence Measures

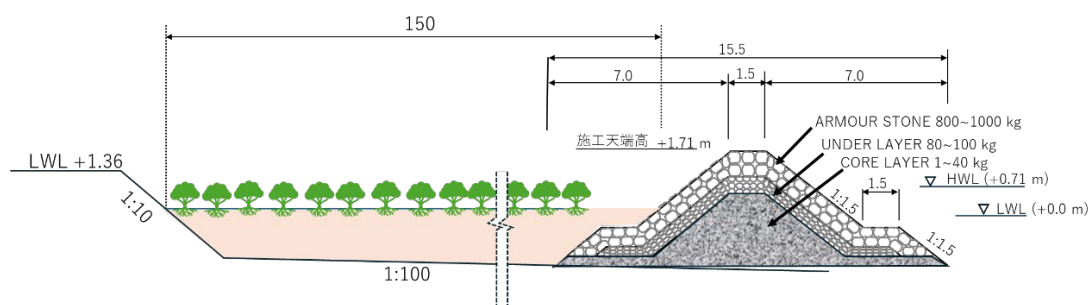
Since the breakwater is a supplementary facility only for maintaining its function of reducing wave action until the mangroves grow up, the measures to prevent subsidence is applied by using bamboo piles and bamboo mats at the bottom of the mound.

Figure 13.3.10 shows, the illustrated images before and after implementation of mangrove plantation and breakwater for mangrove protection based on (1) to (3) in section 13.3.3 and (1) to (6) in section 13.3.4 and the typical cross sections in each area are shown in Figure 13.3.11 and Figure 13.3.12.



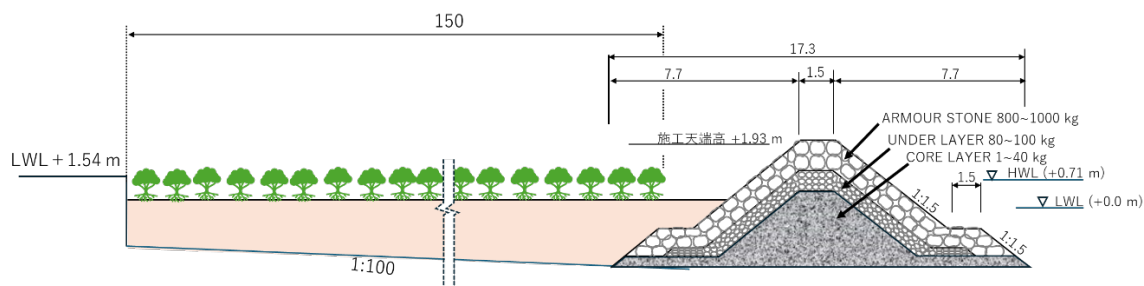
Source: JICA Study Team

Figure 13.3.10 Implementation Image of Mangrove Plantation and Breakwater for Mangrove Protection (Area-II, S-4a)



Source: JICA Study Team

Figure 13.3.11 Typical Cross Section of Mangrove Plantation and Breakwater for Mangrove Protection in Indramayu West



Source: JICA Study Team

Figure 13.3.12 Typical Cross Section of Mangrove Plantation and Breakwater for Mangrove Protection in Pekalongan

13.3.5 Revetment of Action-4 (new coastal facilities)

(1) Structural Type

As a coastal erosion countermeasure, a permeable rubble-sloping revetment was adopted, which is preferable considering the impact on the surrounding coast and the scouring caused by reflected waves at the front of the revetment. In addition, to reduce overtopping damage during high waves and high tides and to consider the utilization aspect, an integrated protection by revetment is adopted which provides a buffer zone from the coastal area. In some areas of Tuban Section, existing revetments are projecting to the offshore, causing the shoreline uneven. Depending on the existing condition, the width of buffer zone is arranged from 5 m to 15 m.

(2) Crown Height

The required crown height of the revetment was set at LWL +3.0 m, based on the evaluation of the allowable overtopping rate for the design tide and wave conditions. Details of the evaluation are discussed in the later of this section. The allowable overtopping rate is summarized in the table format, and most of the values ranged from 0.01 to 0.05 ($m^3/s/m$). In the Project, considering the cost-effectiveness, the values of 0.05 ($m^3/s/m$) was selected. Additionally, to prevent overtopping, a parapet of 60 cm height was designed at the top of the revetment, and a parapet of 50 cm height was designed behind the buffer zone.

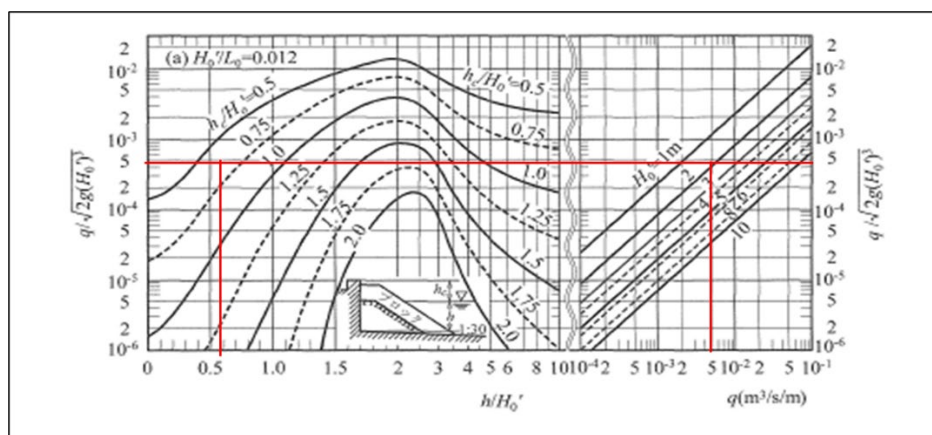
Table 13.3.3 Reference of Wave Overtopping Rate

Regions with residential areas or public facilities in the hinterland, due to which critical damage may arise by overtopping	0.01
Other important regions	0.02
Other regions	0.02 – 0.06

Source: Japanese Technical Standard for Coastal Conservation Facilities (2018)

Determination of Crown Height of Revetment in Tuban

Crown height		3.00	m
Design water level		0.93	m
Crown height above water level	hc	2.07	m
Seabed slope		1/30	
Elevation	Z	-0.21	m
Water depth	h	1.14	m
Converted offshore wave height	H0'	1.94	m
Wave period	T	6.7	s
Offshore wave length	L0	70	m
Wave profile gradient	H0'/L0	0.028	
	hc/H0'	0.64	
	h/H0'	0.59	
Allowable overtopping rate	q0	5.0.E-02	m ³ /s/m
	$q/\sqrt{2g(H_0')^3}$	4.2.E-03	m ³ /s/m



Source: Japanese Technical Standard for Coastal Conservation Facilities (2018)

Figure 13.3.13 Wave Overtopping Calculation Diagram Used for Evaluating the Required Crown Height of Revetment

(3) Crown Width

In the proposed revetment with backfill, a buffer zone of 5 to 10 meters was to be secured behind the revetment. Thus, the use of the top of the revetment was not considered. Therefore, from the perspectives of cost-effectiveness and stability, the crown width was set to the minimal necessary width of 2.1 meters.

(4) Slope Gradient

The coasts where coastal utilization is anticipated (included in Site-2, Tuban) were set with a slope gradient of 1:2 (referred to as Type-1). The coasts where coastal utilization is not anticipated (included in Sites 2, 3, and 4, Tuban) are considered for cost-effectiveness, and the revetment slope gradient is set to 1:1.5 (referred to as Type-2).

Based on the considerations from points (1) to (4), implementation images of revetment Types 1 and 2 are shown from Figure 13.3.14 to Figure 13.3.15, and typical cross-section images from Figure 13.3.16 to Figure 13.3.17.



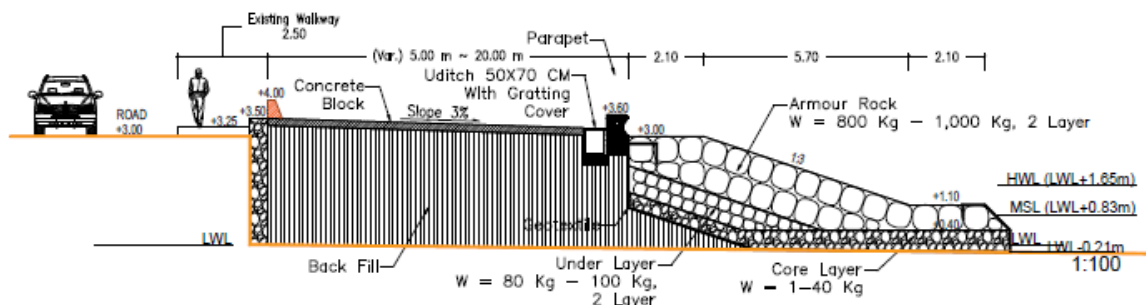
Source: JICA Study Team

Figure 13.3.14 Image of Before-and After-Implementation of Type-1 Revetment in Tuban (T-b)



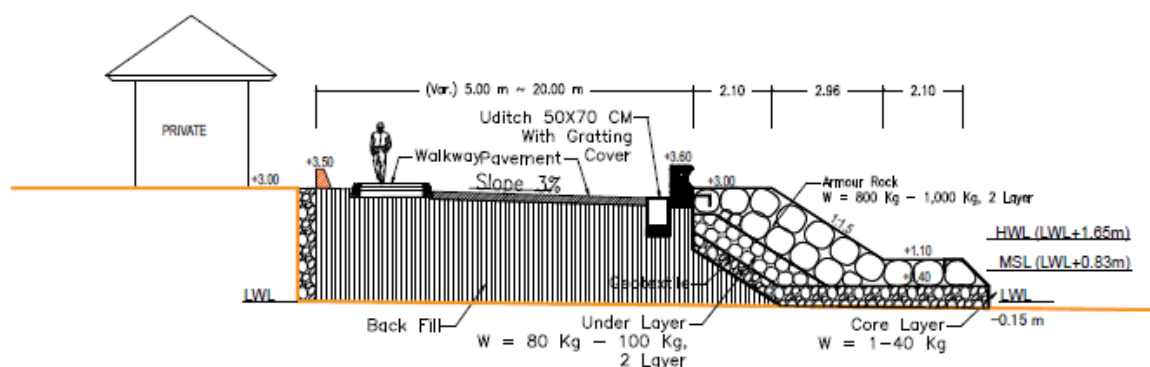
Source: JICA Study Team

Figure 13.3.15 Image of Before-and After-Implementation of Type-2 Revetment in Tuban (T-c)



Source: JICA Study Team

Figure 13.3.16 Typical Cross Section of Type-1 Revetment in Tuban



Source: JICA Study Team

Figure 13.3.17 Typical Cross Section of Type-2 Revetment in Tuban

13.3.6 Revetment of Action-3 (Improvement of Existing Facilities)

(1) Structural type

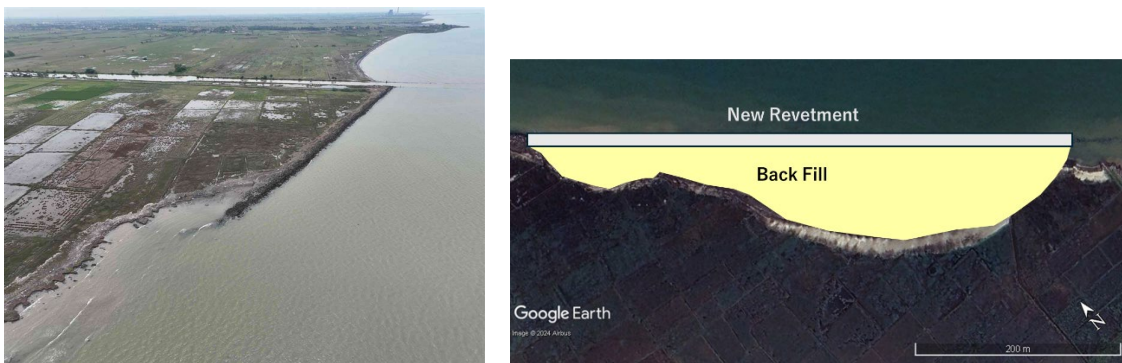
At the coast of Action-3 in Indramayu West shown as shown in Figure 13.3.18, rubble mound revetment was already constructed, but it was confirmed that the protection function was decreased due to subsidence and the existing revetment needs to be improved. For the revetment after improvement, permeable rubble-sloping revetment was adopted, which is preferable considering the impact on the surrounding coast and the scouring caused by reflected waves at the front of the revetment. However, in Indramayu West, there are some cases where concrete blocks are used by BBWS, so in future detailed studies, the optimal structure will be reconsidered in consideration of economic efficiency.

In addition, as shown in Figure 13.3.19, there is a section in Action-3 where the shoreline has largely retreated between two revetment and the policy of countermeasures here is to be carried out backfill sand behind the new revetment.



Source: JICA Study Team

Figure 13.3.18 An Example of Coast of Action-3 (Indramayu West)



Source: JICA Study Team

Figure 13.3.19 Retreated Shoreline (Right) and Image of Countermeasures (Left) (Indramayu West)

(2) Crown Height

In this study it is assumed that when the crown height of the existing revetment sinks to the height of HWL, it will be raised to prevent waves from overtopping and the planned top height after raising the height will be $\text{HWL} + 1.0 \text{ m}$ based on the same concept as for the breakwater for mangrove protection described above. In addition, the design crown height was set to be 50 cm higher than the planned crown height considering the subsidence due to structure weight.

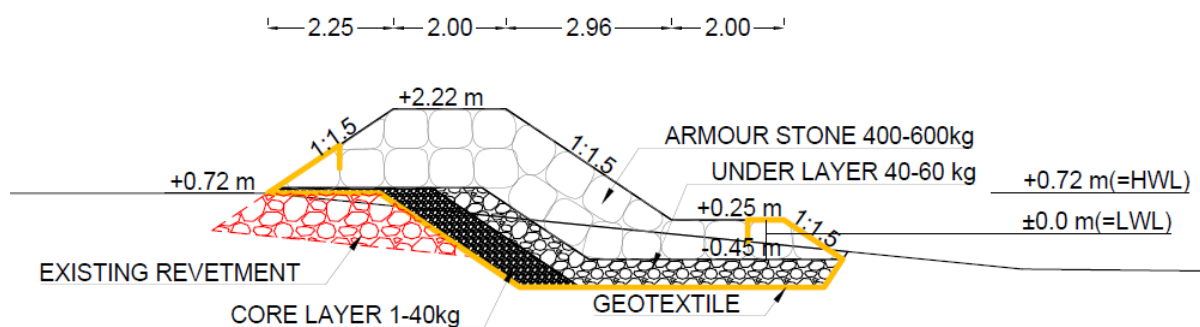
(3) Crown Width

Since the utilization function is not required, from the perspectives of cost-effectiveness and stability, the crown width was set to the minimal necessary width of 2.0 meters.

(4) Slope Gradient

Since beach utilization is not anticipated in target site, the revetment slope gradient is set to 1:1.5 considering for cost-effectiveness.

Based on the considerations from points (1) to (4), typical cross-section image is shown in Figure 13.3.20.



Source: JICA Study Team

Figure 13.3.20 Typical Cross-Section of New Revetment in Indramayu West

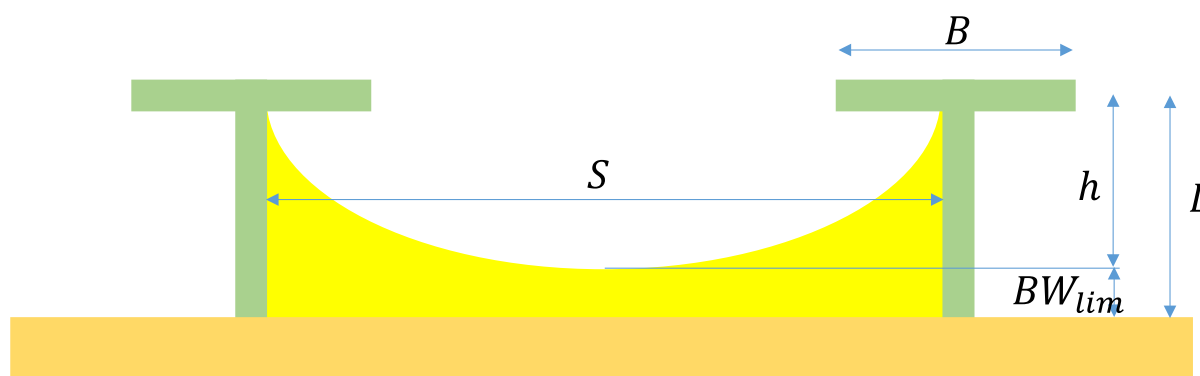
13.4 Layout Specification of Coastal Facility Plan

13.4.1 Basic Concept of Facility Layout

The basic layout concept of facilities such as headland with beach fill and also offshore breakwater protects mangrove is shown below, taking into account the local topographic changes.

(1) Headland

There are various types of headlands. We selected the T-type headland, which is consist of a longitudinal embankment (groin) and a horizontal embankment (offshore breakwater) at the tip, as shown in Figure 13.4.1. This structure is effective in stabilizing the beach between the headlands and is a construction method for the artificial beaches in combination with beach fill. The layout specifications are “extension of longitudinal embankment”, “extension of horizontal embankment”, and “spacing of longitudinal embankment” (Figure 13.4.1). BW_{lim} is the minimum sandy beach width for need.



Source: JICA Study Team

Figure 13.4.1 Definition of Layout for Headland

The basic idea of headland is to control the movement of littoral drift in the coastal direction with longitudinal embankments, and to create a stable beach that curves between longitudinal embankments by providing deposition effect behind horizontal embankments due to wave diffraction. In considering the specifications of the headland, we will refer to the changes in the local topography. At Indramayu, a stone embankment has been installed on the shoreline as a countermeasure against erosion, but there are some defects that seem to be caused by subsidence, etc., and the shoreline retreats in that part. Although the retreat of the shoreline initially progressed, it was relatively stable after changing to a curved beach shape supported on both ends of the embankments. One example is shown in Figure 13.4.2. Including the other two cases, the relationship between the space width S and the maximum shoreline retreat amount h is shown in Figure 13.4.3 (see Appendix 13 for other examples). From these results, the following can be estimated.

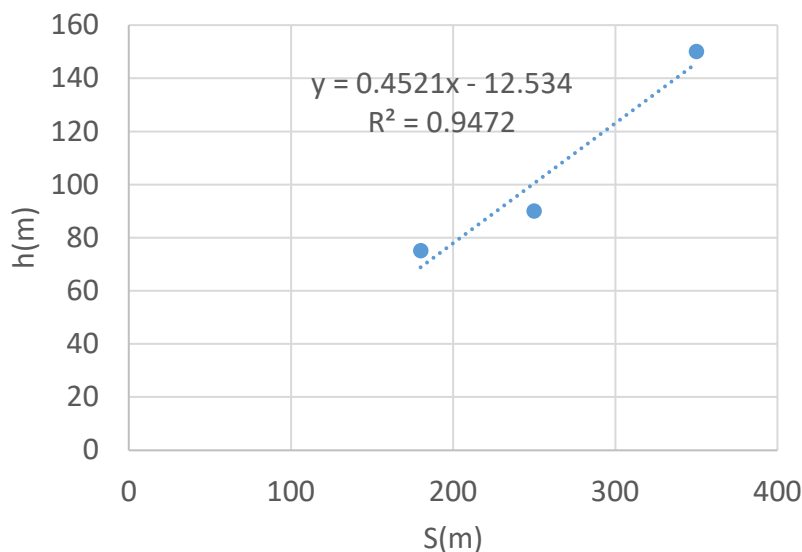
- If the shoreline position is fixed at both ends by structures such as embankments, a curved stable beach is formed between them.
- The scale of the curved topography expressed by the opening distance (S) and the maximum shoreline retreat (h) is determined by the relationship between them shown in Figure 13.4.3, $h = 90$ m correspond to $S = 250$ m.

Therefore, the basic specifications of the headland are with an opening width of 250 m and a longitudinal embankment length of 100 m, assumed to be about 10 m in the minimum beach width. In addition, the horizontal embankment length is about 100 m because the embankment length is almost the same as the offshore distance as the basic specifications of the offshore breakwater. Furthermore, as the example shown in Figure 13.4.2, it is estimated that the horizontal embankment with the length of 100 m can be the supported point of the curved shoreline shape.



Source: Edited by JICA Study Team using Google earth

Figure 13.4.2 Example of Stable Curvature Topography (Indramayu)



Source: JICA Study Team

**Figure 13.4.3 Relationship Between Open space and Maximum Retreat Shoreline in Curvature
Topography**

(2) Offshore Breakwater

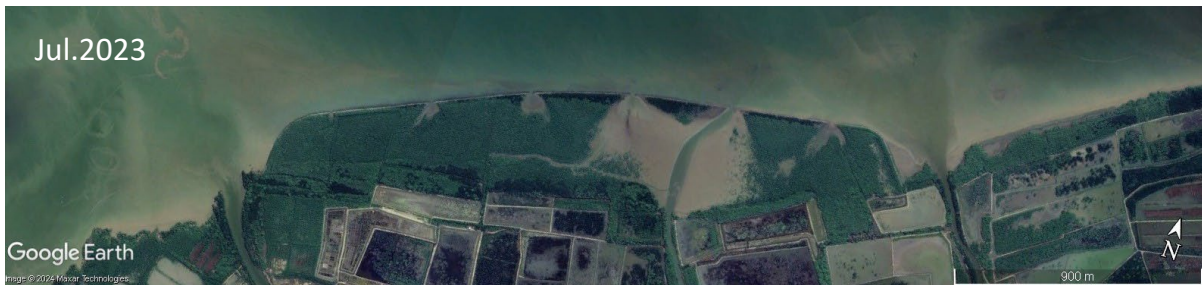
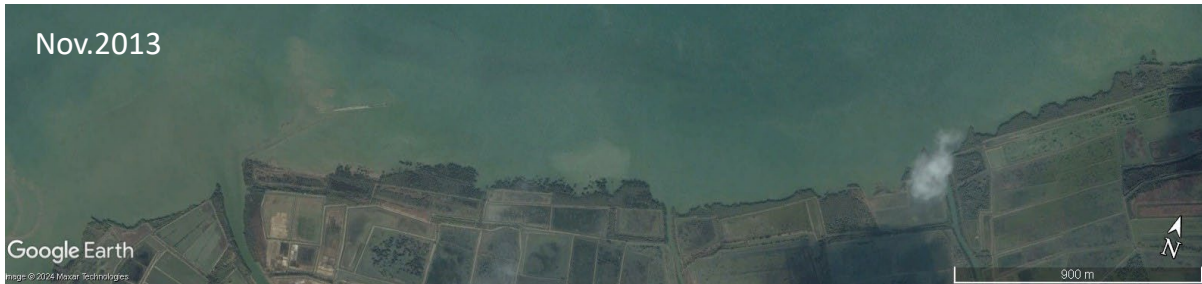
The breakwater featured here is designed for mangrove plantation, and is a coastal facility that assists the cultivation of mangroves. Green infrastructure, such as mangroves, is implemented on several coasts, and it was summarized in Section 2.7.2. Here, according to these examples, the basic specifications of the layout of the breakwater were set. For example, the case of Indramayu (Figure 13.4.4), mangrove is planted behind the stone breakwater. The stone breakwater is arranged with a length of about 350 m, an opening width of about 20 m, and an offshore distance of 200~400 m (Figure 13.3.5). In Cirebon, there is an example of a construction method called the Hybrid Engineering method (H.E.), in which a wave absorbing facility is constructed from bamboo and other materials and mangroves are planted behind it (see Appendix 6-2).

Table 13.4.1 shows the specifications of the facilities in Indramayu and Cirebon. From these, it seems that a length of the breakwater and the offshore distance from the shore are about the same, and the opening is narrow at 10~20 m. Such layout specifications were set as a reference.

Table 13.4.1 Layout of Offshore Breakwater

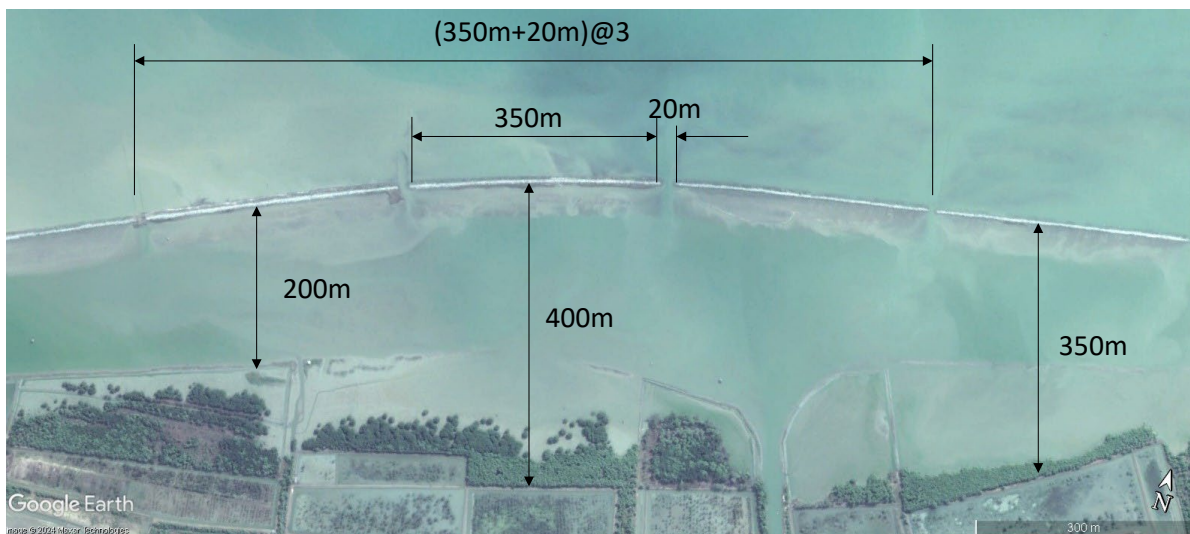
Area	Type of Facility	Length (m)	Open Space (m)	Offshore Distance (m)
Area I: Indramayu	Stone	350	20	200~400
Cirebon	Hybrid Engineering	200~500	10~20	250~450

Source: JICA Study Team



Source: Edited by JICA Study Team based on Google Earth

Figure 13.4.4 Example of Green Infrastructure (Indramayu)



Source Edited by JICA Study Team based on Google Earth

Figure 13.4.5 Example of Layout of Stone Breakwater (Indramayu)

13.4.2 Layout Specifications by Numerical Simulation

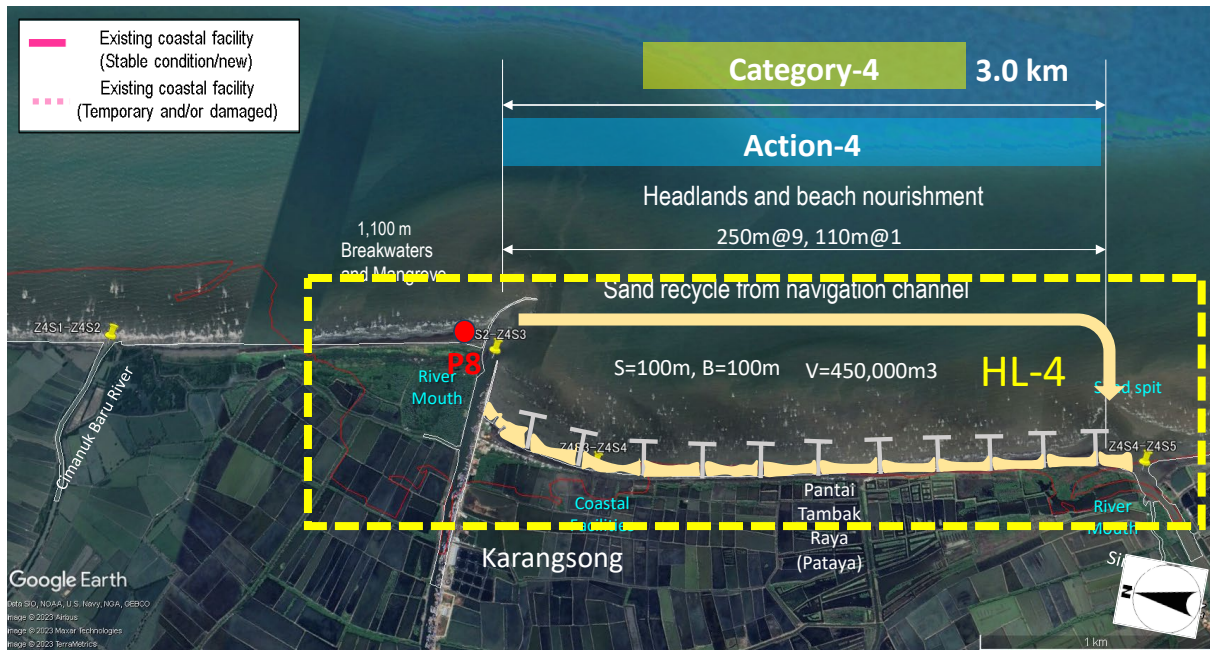
The validity of the Coastal Facility Plan layout including the beach fill in each section proposed in Section 13.5 was investigated by numerical model for the prediction of beach evolution, comparing with the case without countermeasures. The target facilities are groins (so called groin-type headlands) or facilities that combine longitudinal and horizontal embankments (so called T-type headlands). In addition, such facilities were arranged in combination with the beach fill work. The beach deformation prediction model calculates the littoral drift generated by waves and predicts changes in coastal topography, including shoreline changes, by solving the conservation equation of sediment. Details of the model are shown in Appendix-13. In applying the model, the validity of the parameters and wave conditions in the model is verified by reproducing past topographic changes on the target coast. The verification method and the results are shown in Appendix-13.

As a result of the study, it was shown that the layout of the facilities is appropriate, and the estimated beach fill volume is also generally appropriate, as summarized in Section 13.4.3. In this section, the calculation results for Section-6a of Indramayu as a representative section are shown. The results for the other sections are shown in Appendix-13.

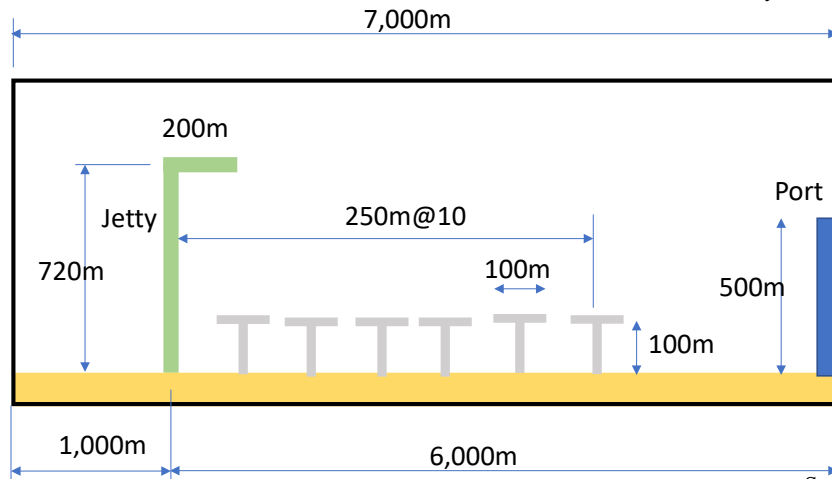
The T-type headland and beach fill planned in Section-6a of Indramayu are shown in top of Figure 13.4.6, the calculation area is shown in the middle of Figure 13.4.6 and the modeled topography and facility are shown in the bottom of Figure 13.4.6. In the northern end of calculation area, the jetties of 720 m long have been constructed at a river mouth, where littoral drift was almost blocked. In the southern end of calculation area, there is a port where the littoral drift was almost blocked.

The results of prediction for shoreline change in the case without countermeasures is shown in Figure 13.4.7. The local topography change in the coast is characterized as follows. Near the base of the jetty the shoreline advances by littoral drift toward the base of the jetty due to the shielding effect of the jetty. On the other hand, the direction of the littoral drift reverses eastward from westward as it moves eastward, so there is a range where the shoreline retreats. In addition, there are several small groins on the east side, and the eastward littoral drift is controlled by them. As the result, the stepped shoreline shape was formed. Under the initial topography reproduces such characteristics of topography changes, the topography change in the next 10 years is shown in Figure 13.4.7. The shoreline at the base of the jetty at the western end of the river is expected to advance by about 30 m in the next 10 years, and the shoreline is expected to retreat by up to about 6 m at 1~1.5 km to the east from jetty.

Figure 13.4.8 shows the result of shoreline prediction with the countermeasures proposed in the Coastal Facility Plan. The amount of beach fills of about 100,000 m³ maintain the beach, which is the average width of about 41 m, and the minimum width of about 22 m. The amount of beach fill was slightly smaller than previous amount estimated about 136,000 m³. In addition, since there is no significant shoreline retreat even on the eastern side of the headlands, it is considered that there is no impact on the surrounding coast of the countermeasure facilities.

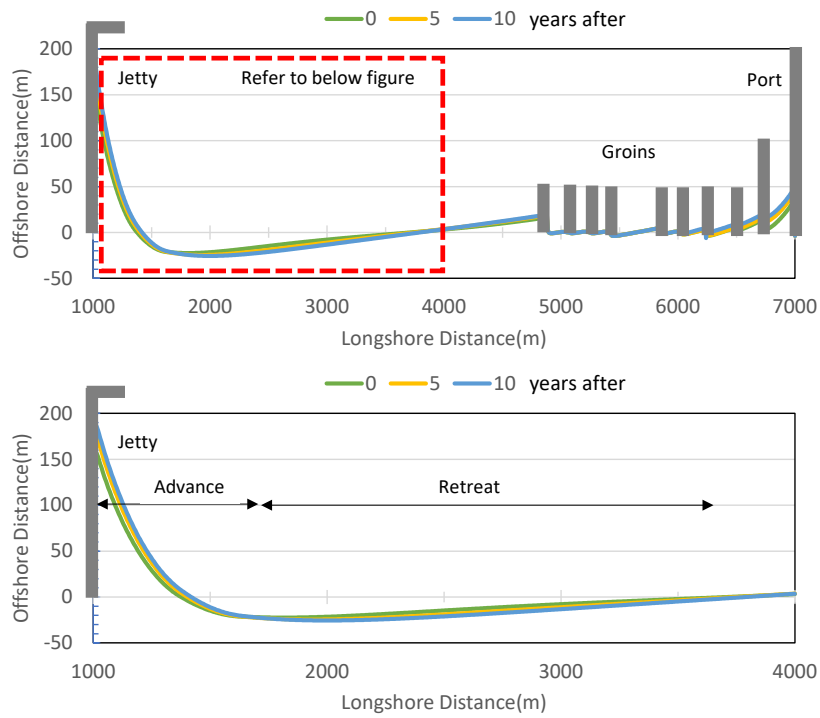


Source: Edited by JICA Study Team using Googleearth



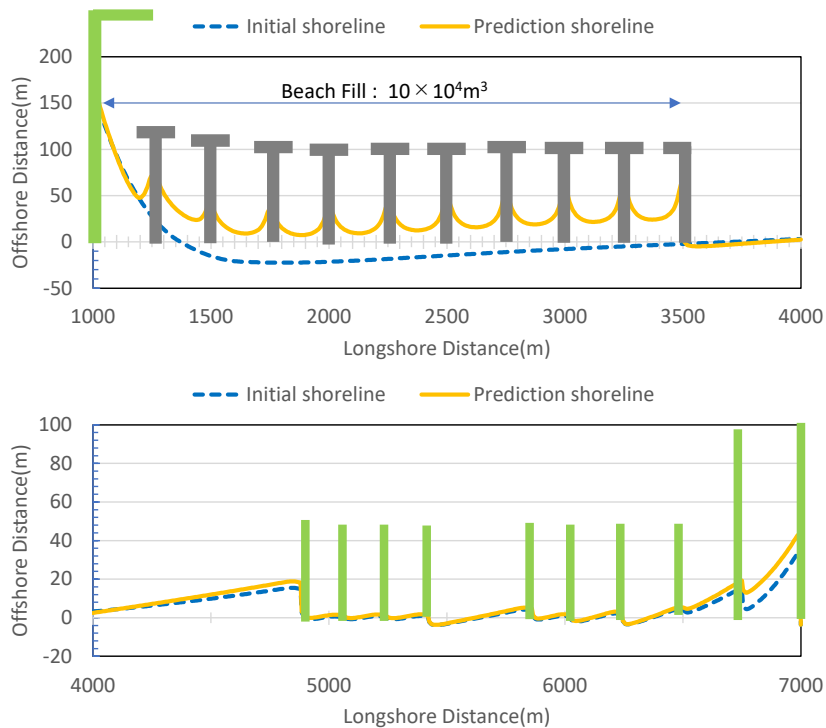
Source: JICA Study Team

Figure 13.4.6 Modeled Topography and Coastal Facility Plan (Indramayu S-6a)



Source: JICA Study Team

Figure 13.4.7 Projected Topography at Present (No Countermeasures, Indramayu S-6a)



Source: JICA Study Team

Figure 13.4.8 Numerical Prediction of Shoreline Change for the Coastal Facility Plan (Indramayu S-6a)

13.4.3 Amount of Beach Fill

The amount of beach fill obtained by numerical simulation is summarized below, compared with estimation values.

Table 13.4.2 Comparison of Amount for Beach Fill

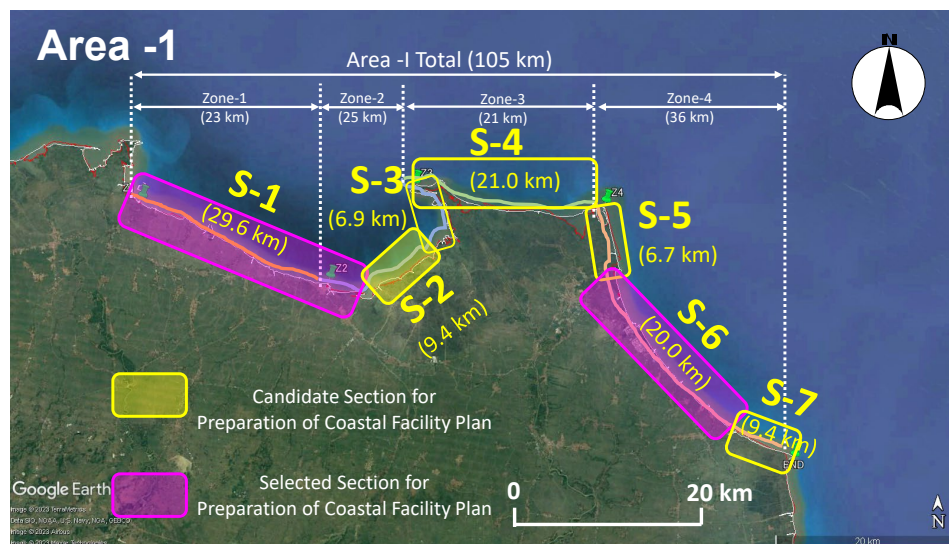
Area	Section or Site No.	Amount of beach fill ($\times 10^4 \text{m}^3$)		Facility
		Estimation	Numerical	
Indramayu	Section-1	21.5	26.4	T-type headlands
	Section-6a	13.6	10.0	T-type headlands
	Section-6d	11.0	11.4	T-type and groin headlands
Pemalang-Pekalongan	Section-4a	17.0	21.0	T-type headlands
	Section-4b	13.8	15.0	T-type headlands
Tuban	Site-1	12.0	16.0	Groins
	Site-3	2.9	3.5	Groins
Total		91.8	101.9	

Source: JICA Study Team

13.5 Output of Coastal Facility Plan

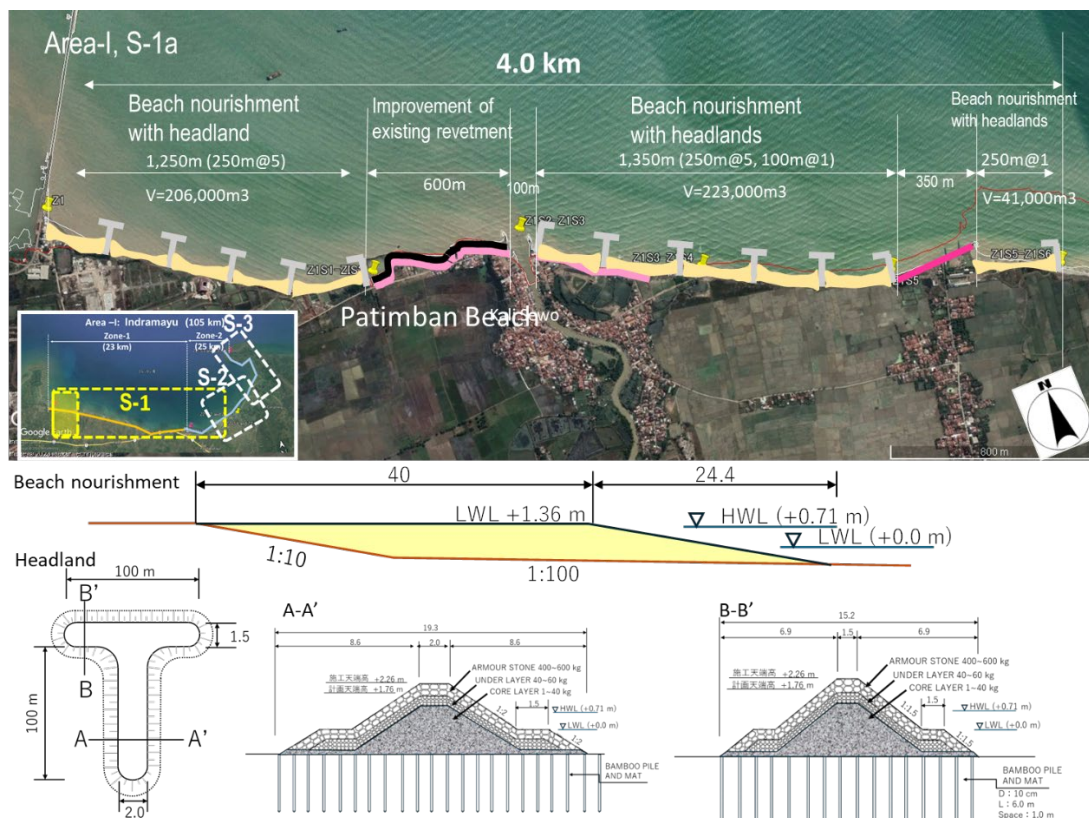
13.5.1 Indramayu

Figure 13.5.1 shows the selected Sections for Coastal Facility Plan. Coastal Facility Plans at each coast are shown from Figure 13.5.2 to Figure 13.5.12.



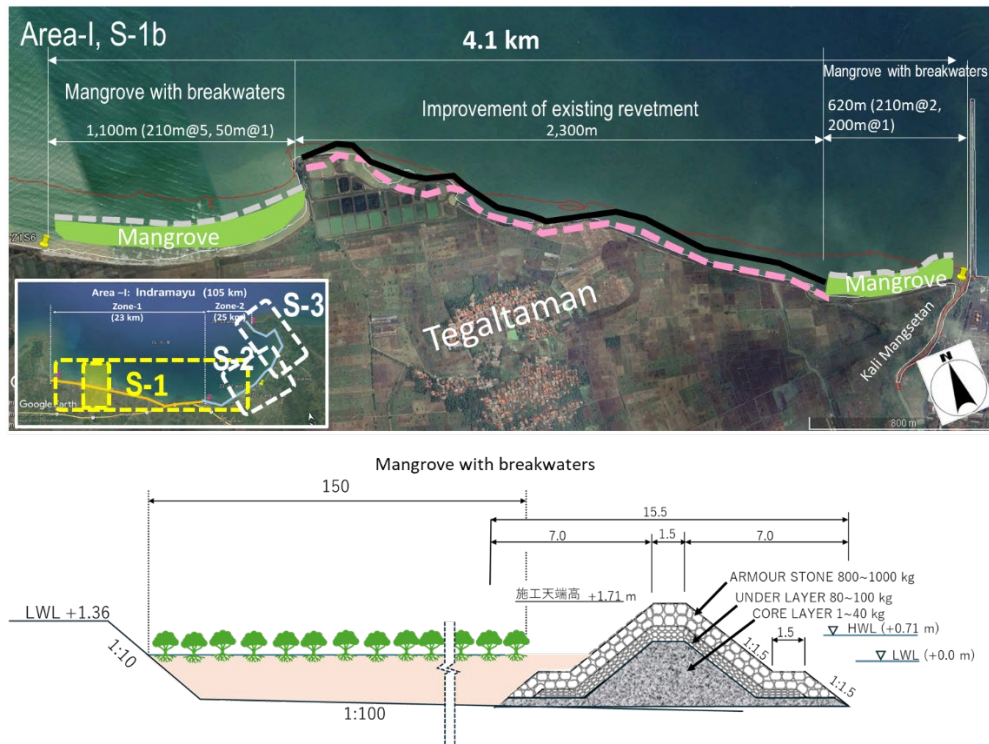
Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.1 Selected Sections for Coastal Facility Plan



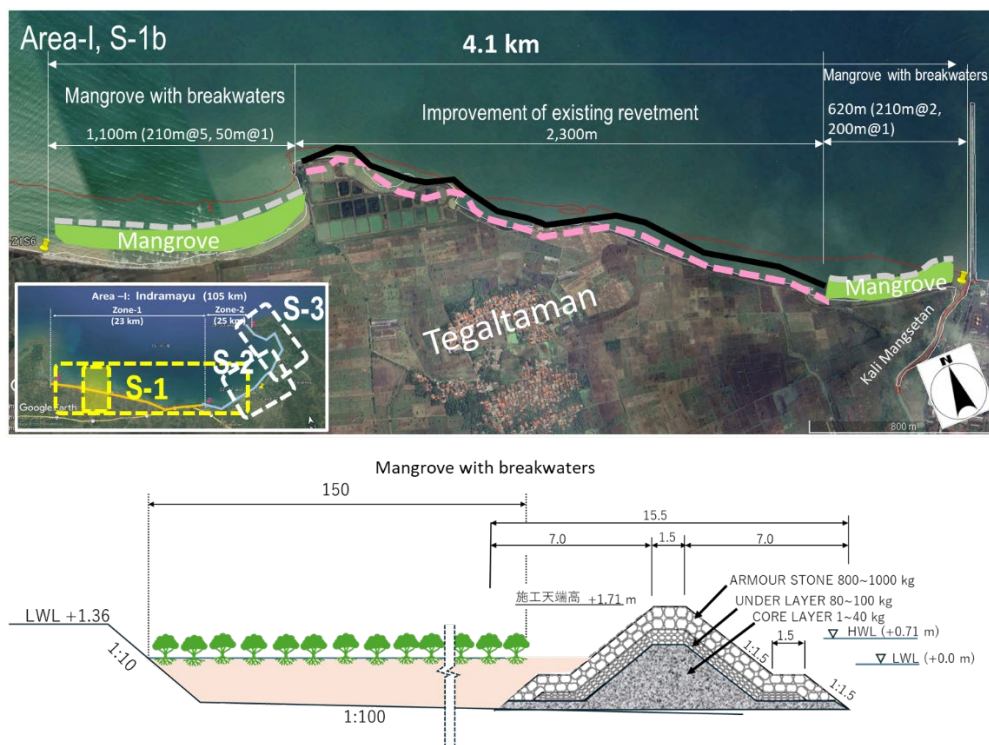
Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.2 Coastal Facility Plan at Indramayu Section-1a



Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.3 Coastal Facility Plan at Indramayu Section-1b



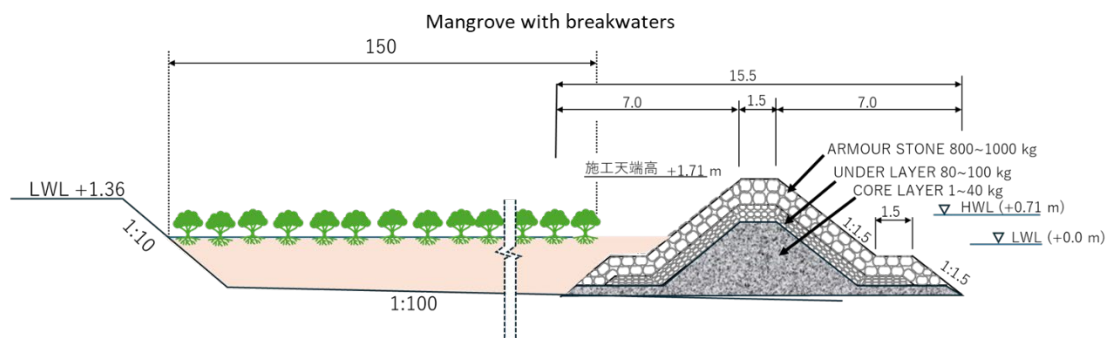
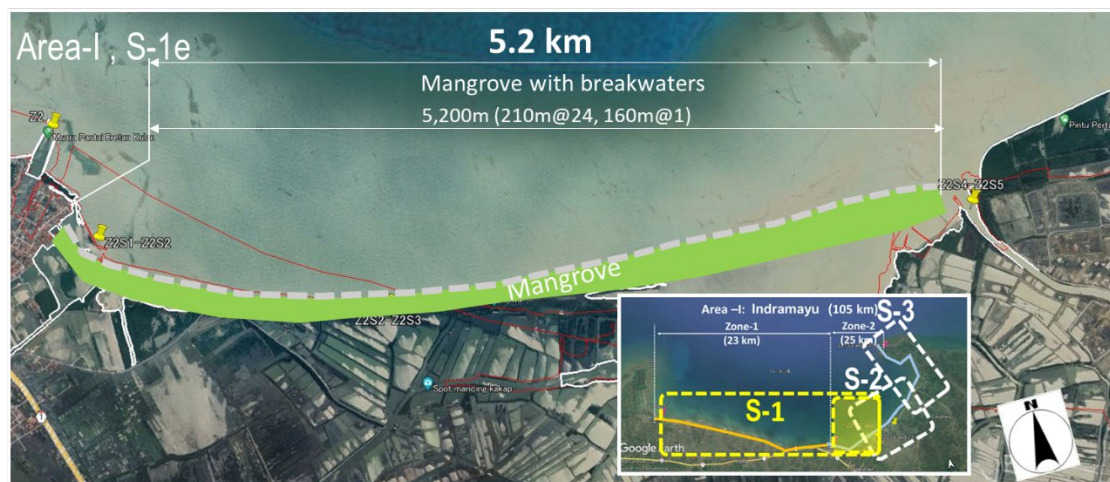
Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.4 Coastal Facility Plan at Indramayu Section-1c



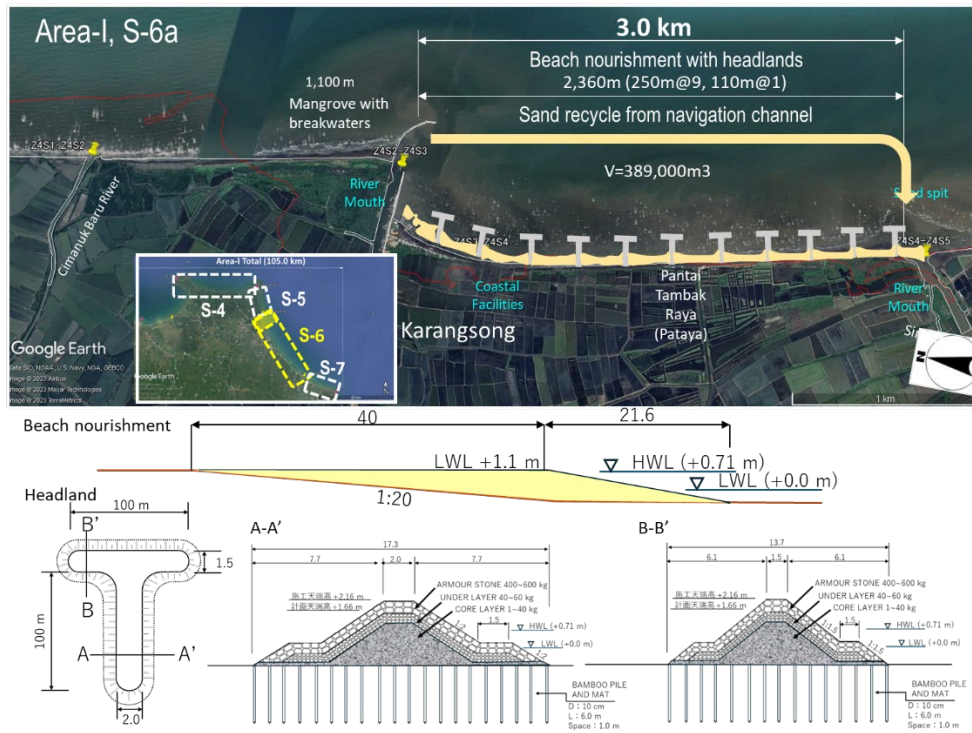
Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.5 Coastal Facility Plan at Indramayu Section-1d



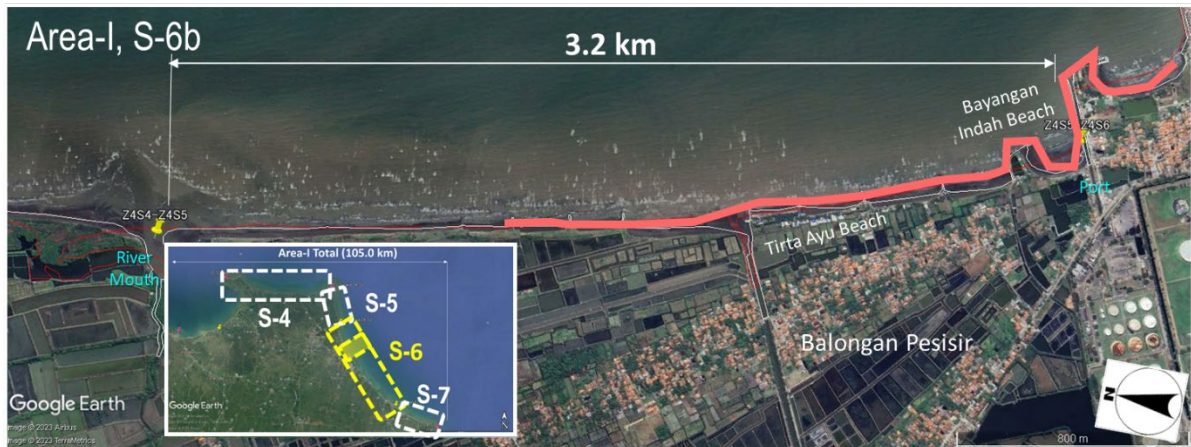
Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.6 Coastal Facility Plan at Indramayu Section-1e



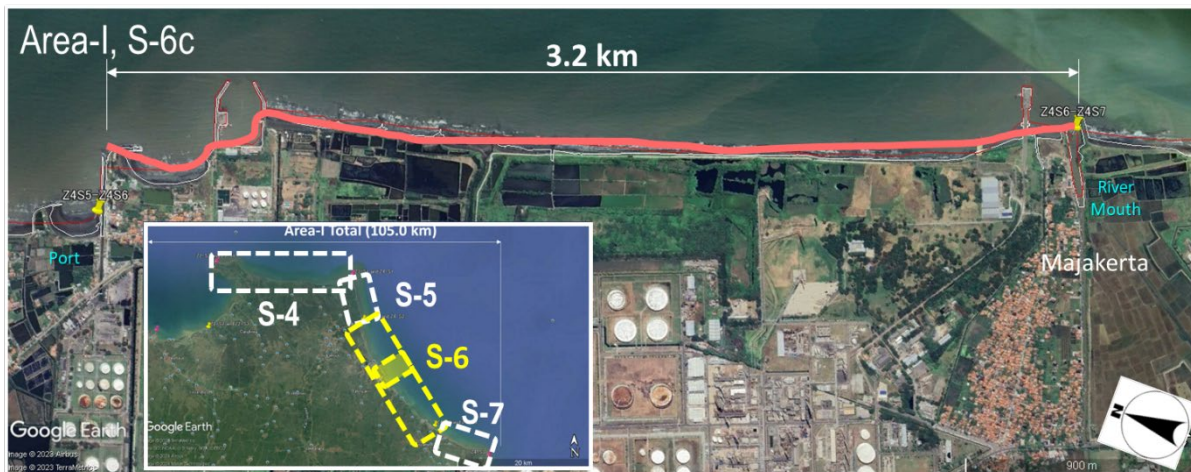
Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.7 Coastal Facility Plan at Indramayu Section-6a



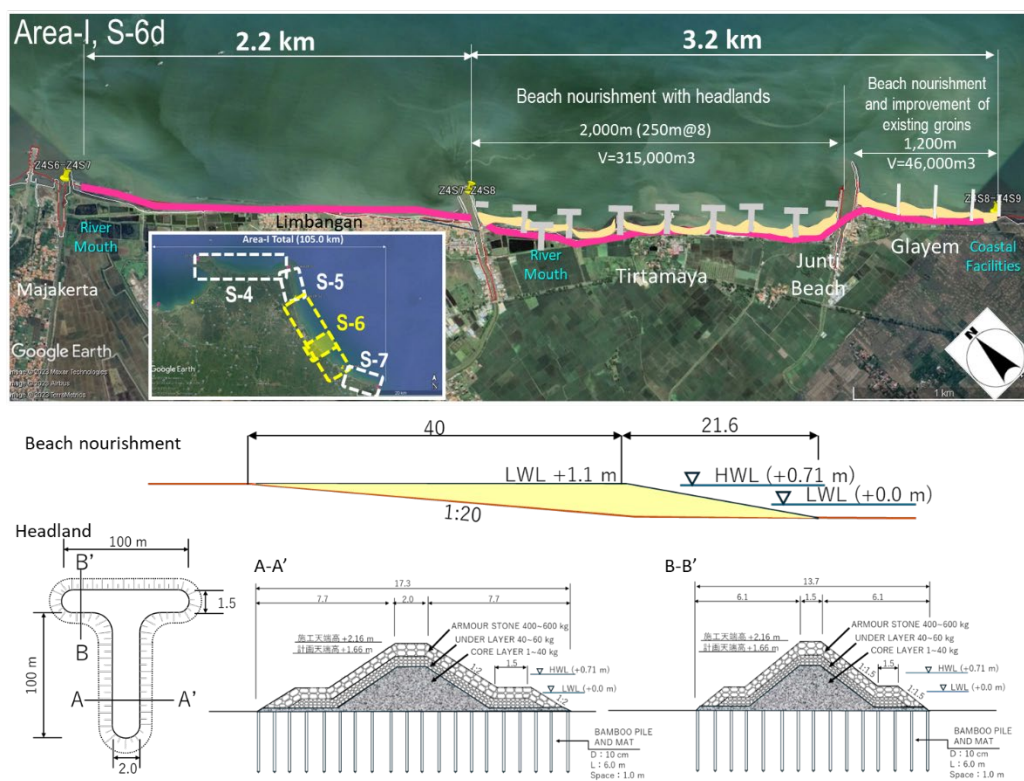
Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.8 Coastal Facility Plan at Indramayu Section-6b



Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.9 Coastal Facility Plan at Indramayu Section-6c



Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.10 Coastal Facility Plan at Indramayu Section-6d



Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.11 Coastal Facility Plan at Indramayu Section-6e

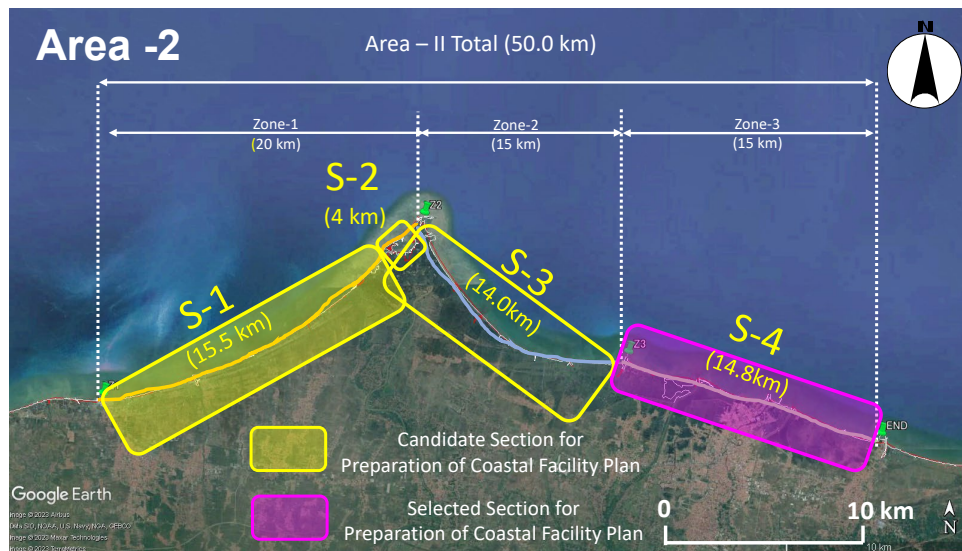


Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.12 Coastal Facility Plan at Indramayu Section-6f

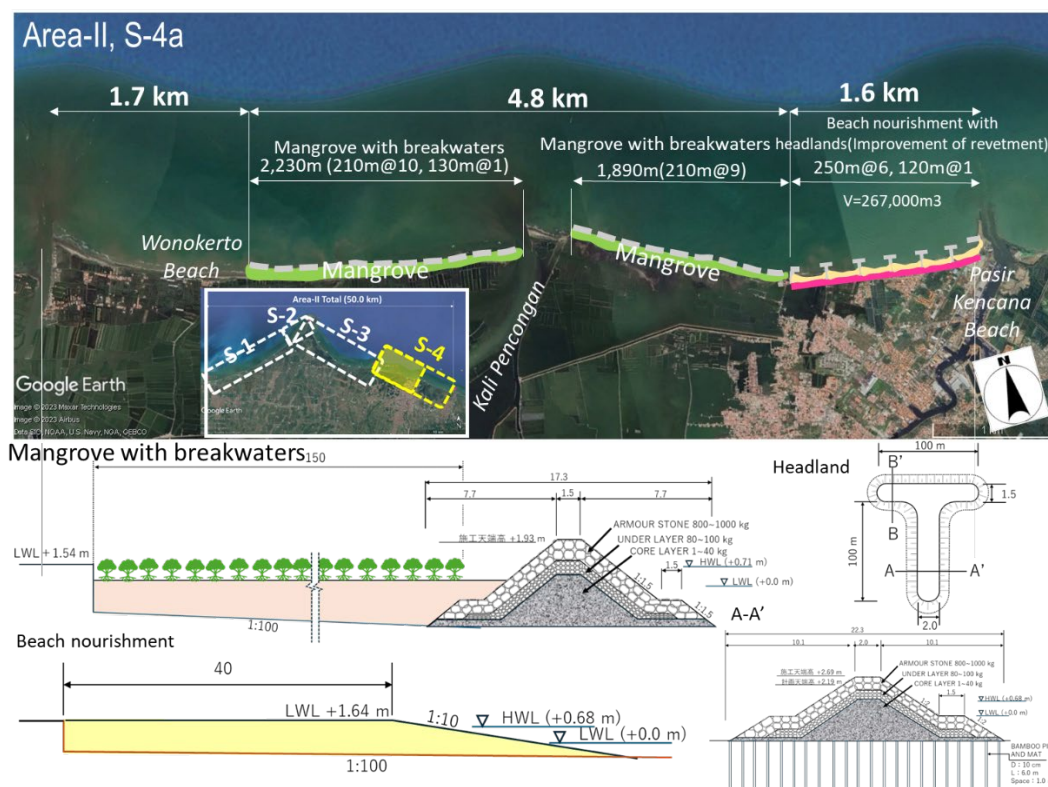
13.5.2 Pekalongan

Figure 13.5.13 shows the Selected Sections for Coastal Facility Plan. Coastal Facility Plans at each coast are shown from Figure 13.5.14 to Figure 13.5.15.



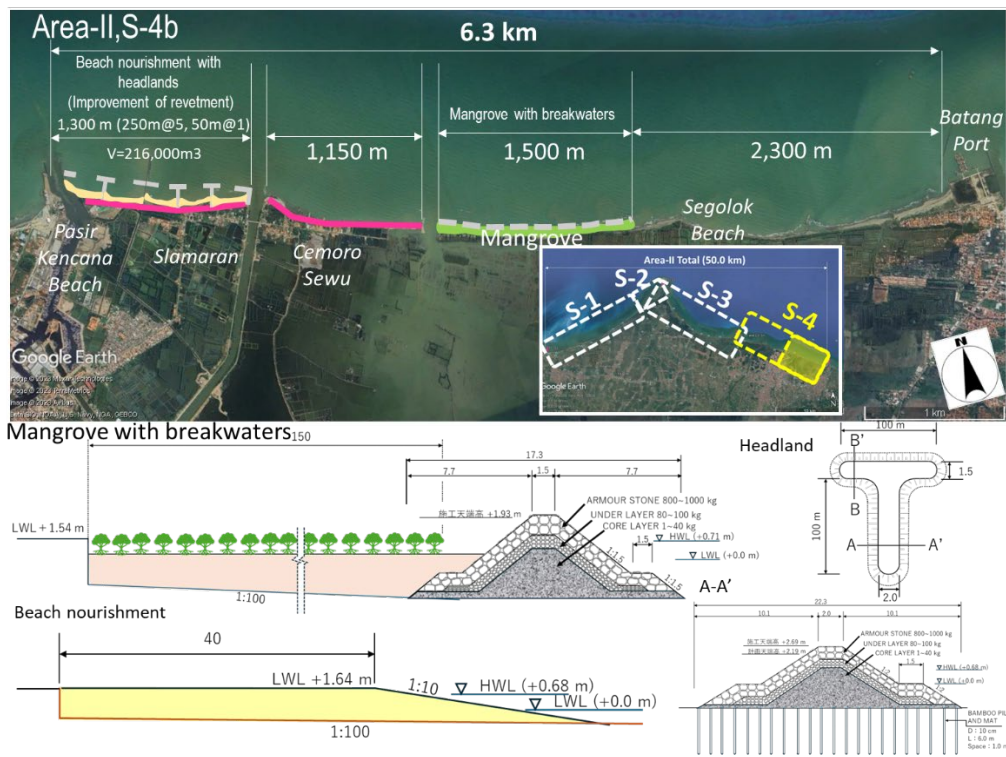
Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.13 Selected Sections for Coastal Facility Plan



Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.14 Coastal Facility Plan at Pekalongan Section-4a

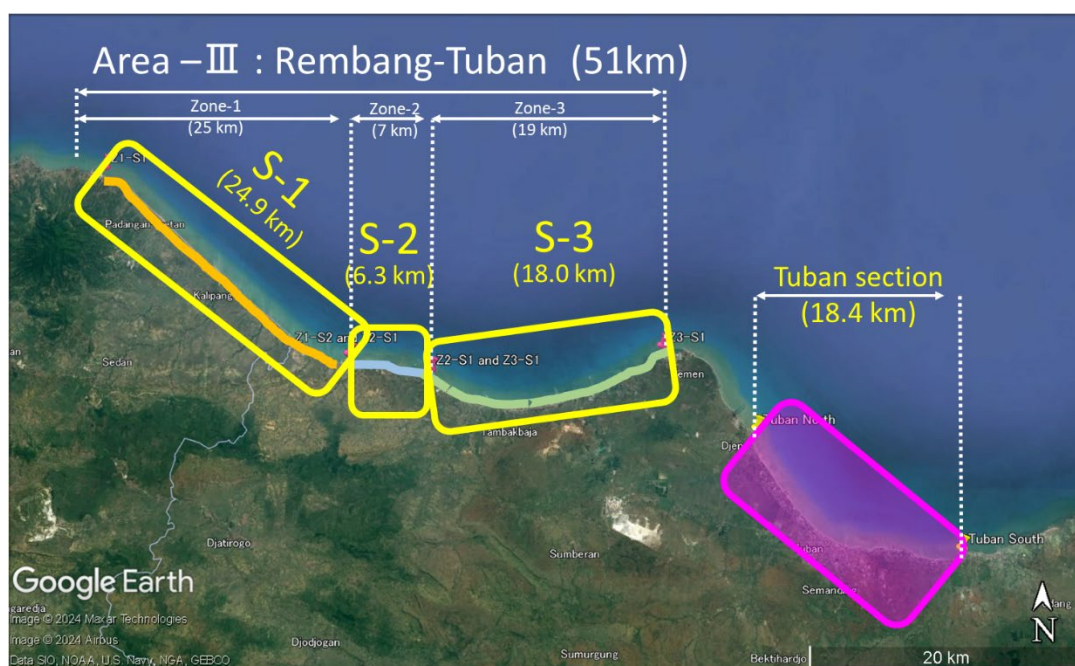


Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.15 Coastal Facility Plan at Pekalongan Section-4b

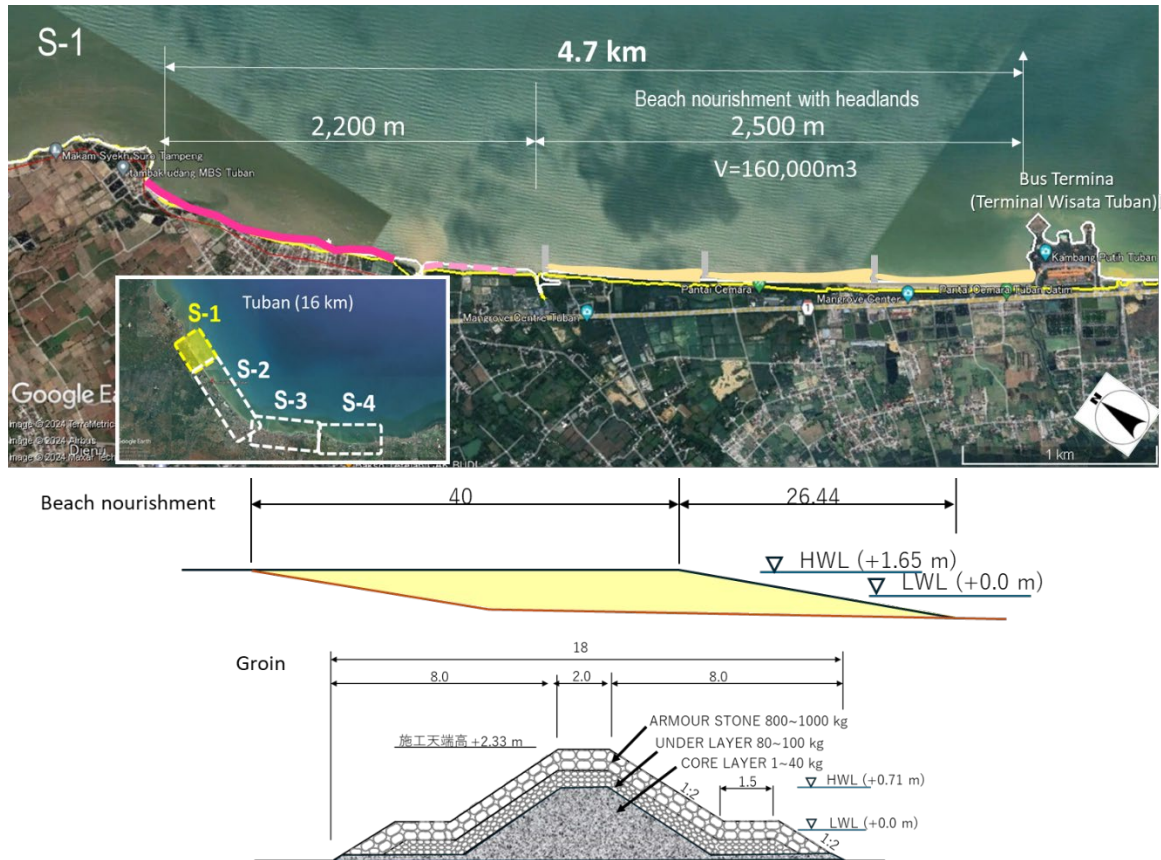
13.5.3 Tuban

Figure 13.5.16 shows the Selected Sections for Coastal Facility Plan. Coastal Facility Plans at each coast are shown from Figure 13.5.17 to Figure 13.5.20.



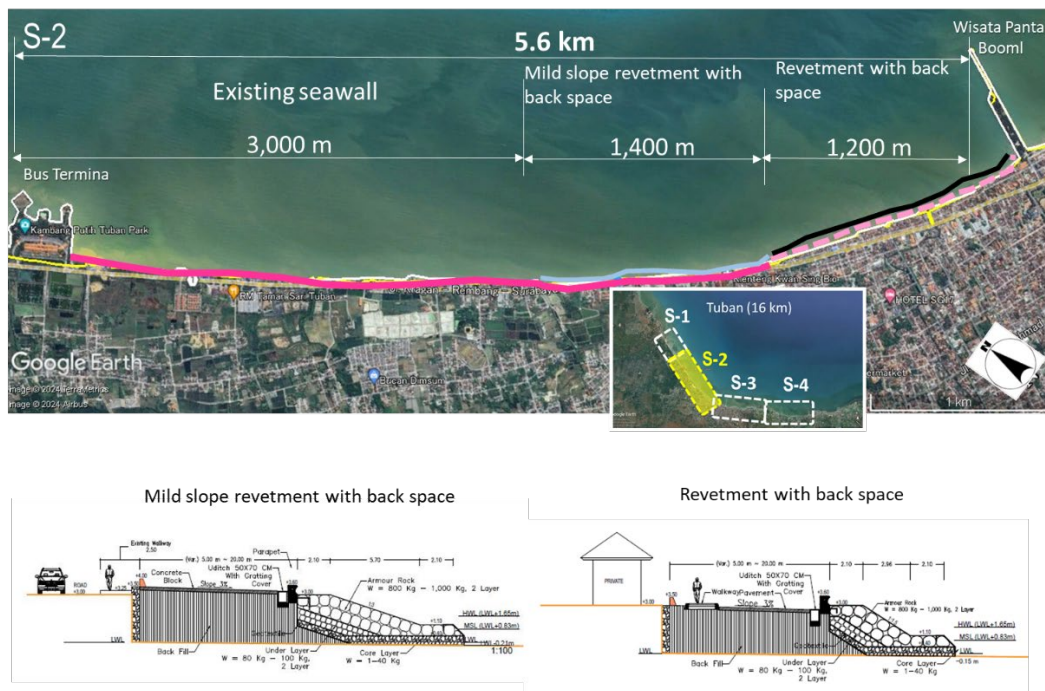
Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.16 Selected Sections for Coastal Facility Plan



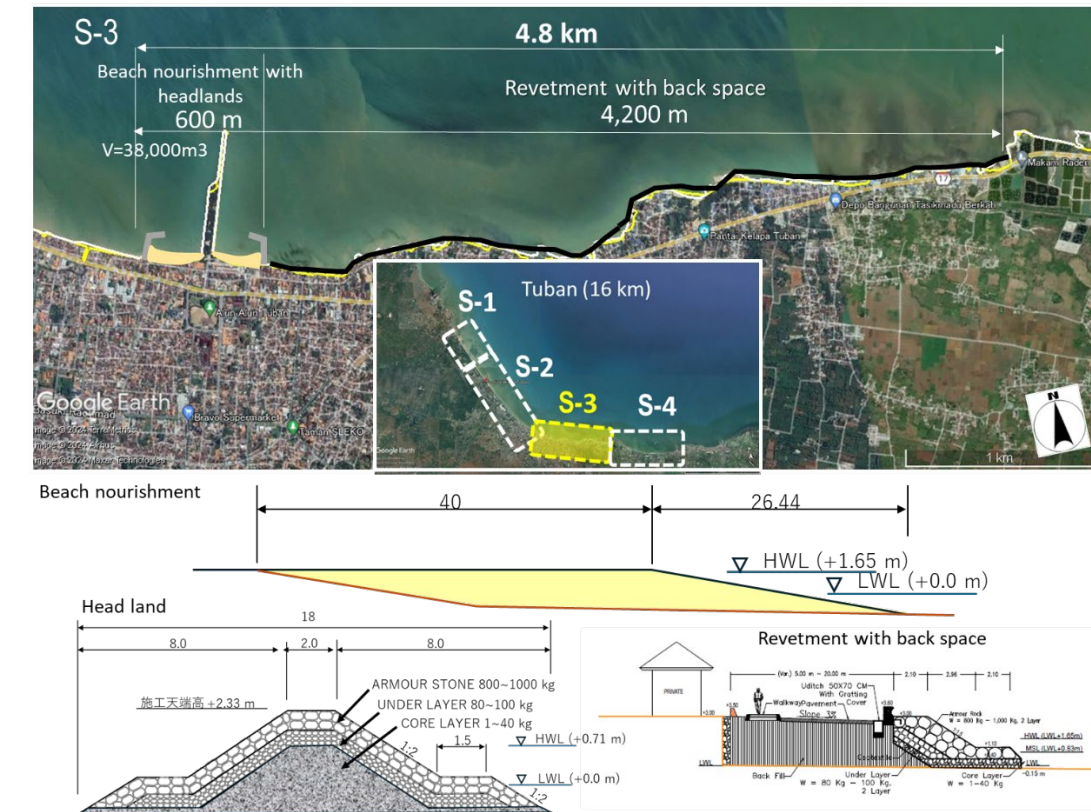
Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.17 Coastal Facility Plan at Tuban Site-1



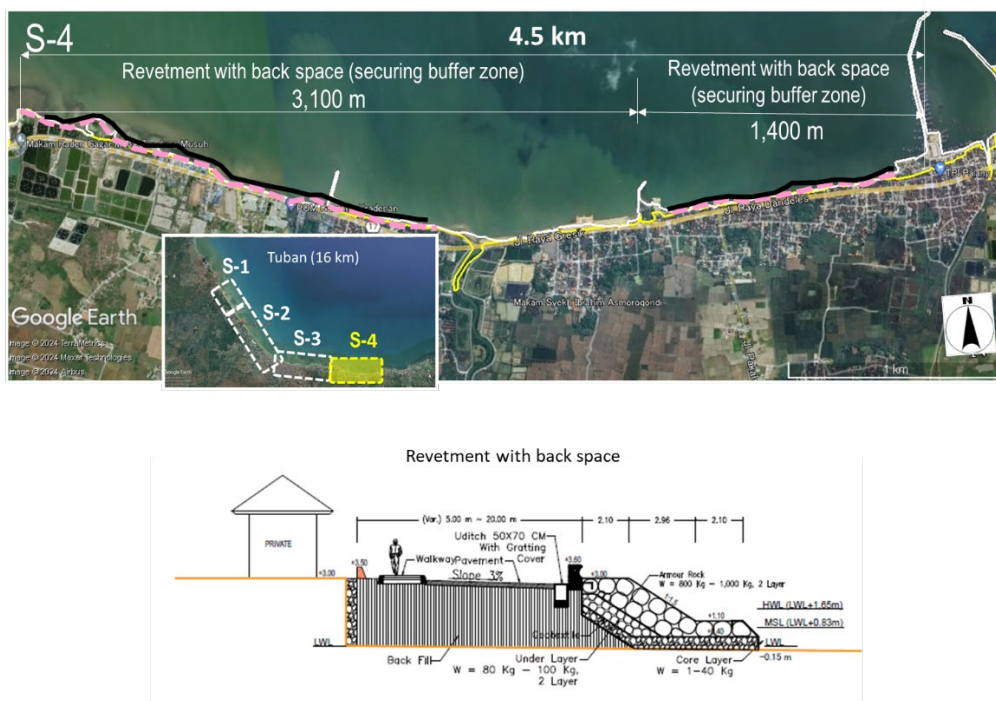
Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.18 Coastal Facility Plan at Tuban Site-2



Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.19 Coastal Facility Plan at Tuban Site-3



Source: Edited by JICA Study Team based on Google Earth

Figure 13.5.20 Coastal Facility Plan at Tuban Site-4

13.6 Study of Non-Structural Measures

Hard structural measures generally require labor cost and maintenance cost in addition to the initial construction cost, but non-structural measures can be implemented sustainably at relatively low cost and can manage disaster risks while minimizing the impact on the natural environment. Therefore, more effective coastal disaster prevention measures can be realized by implementing non-structural measures in combination with structural measures.

Table 13.6.1 summarizes the non-structural measures expected to prevent disasters (high waves and storm surges, coastal erosion, and land subsidence) in the northern areas of Java Island. Note that implementing these measures in combination is more effective than implementing them individually.

Table 13.6.1 Non-Structural Measures against Coastal Disasters in North Java

High waves and storm surge	Land use regulation	Establish regulations to restrict development in coastal areas at high risk of high waves and storm surges. For facilities and residences already existing in high-risk areas, regulations will be put in place to encourage setbacks and to move them to safer area.
	Preparation of evacuation system	Establish a system for rapid and safe evacuation in preparation for expected high waves and storm surges that exceed the protection targets of hard structure. Secure evacuation routes, set up signs, prepare evacuation shelters, etc.
	Education and awareness-raising	Raise residents' understanding on the mechanisms of high waves and storm surges, expected damage, evacuation methods, etc. Create hazard maps, provide information about high waves and storm surges, and hold workshops to raise residents' awareness of disaster prevention.
Coastal erosion	Land use regulation	Establish regulations to restrict development in coastal areas at high risk of coastal erosion For facilities and residences already existing in high-risk areas, regulations will be put in place to encourage setbacks and to move them to safer area.
	Integrated comprehensive zone management	Manage for controlling sediment from upstream rivers and ensure the supply of sediment to the coast. Regulates sand mining activities upstream of rivers and on the upstream side of coastal sand drift.
	Education and awareness-raising	Raise residents' understanding on the mechanisms of coastal erosion and feature of countermeasures. Create hazard maps, provide information about coastal erosion and hold workshops to raise residents' awareness of disaster prevention.
	Monitoring and evaluation	Monitor the location of the coastline and the shape of the beach regularly and evaluate using topographical surveys and satellite images to prevent damage from spreading.
Land subsidence	Land use regulation	If the cause of settlement is consolidation settlement due to the load of a structure, building and development regulations will be established.
	Restrictions on groundwater withdrawal	If the cause of subsidence is groundwater withdrawal, regulations on groundwater withdrawal will be established and alternative water sources will be secured.
	Education and awareness	Raise residents' understanding on the mechanisms of land subsidence and feature of countermeasures. Create hazard maps, provide information about land subsidence and hold workshops to raise residents' awareness of disaster prevention.
	Monitoring and Evaluation	Understand the extent of land subsidence regularly using topographical surveys and satellite images and continuous monitoring and evaluation will be carried out to prevent the damage from spreading.

Source: JICA Study Team

13.7 Maintenance and Management Plan

This section presents the concept and plan for the maintenance and management of the coastal facilities. The term “maintenance and management” generally refers to measures taken after the completion of a project. However, in this study, it is considered that this term “maintenance and management” covers not only post construction stage but also the design and construction stages as far as it will contribute to maintenance and management matters. Therefore, the maintenance and management plans in this study are presented at each stage of design/construction, during project implementation, and after project completion.

The following sections show the concept of the maintenance and management plan for each coastal protection facility and each section of the coastal facility plan.

13.7.1 Beach Nourishment

A summary of the maintenance and management plan for beach nourishment is shown in Table 13.7.1, and the maintenance details at each stage are shown in the following sentences.

Table 13.7.1 Main Maintenance and Management Plan for Beach Nourishment by Sections

Stage	Indramayu West	Indramayu East	Pekalongan	Tuban
1. Design	-	-	Margin height against land subsidence (5 years)	-
2. During Construction	Secure sand stockpile (35 % of initial sand fill volume) Implementation of sand fill as initial maintenance (5 % of initial sand fill volume)			
3. Post Construction	Implementation of sand fill as periodic maintenance (5 % of initial sand fill volume x 6 times)			

Source: JICA Study Team

Design stage:

In areas where extensive land subsidence has occurred, the amount of expected future subsidence is considered as a margin of the crown height. However, in order to avoid an excessive design, the amount of land subsidence is estimated only for 5 years (25 cm: 5 cm/year x 5 years), and land subsidence during post construction stage will be monitored then additional sand fill is considered if necessary. This margin height is considered only in Pekalongan, where wide-area land subsidence is continuously occurring.

During construction stage:

Sand stockpiles will be constructed in the vicinity of the project area to allow for periodic sand fill as periodic maintenance against possible future sand loss. The stockpile is assumed to secure the amount of maintenance sand for approximately 30 years after the completion of the project, and the frequency of maintenance work is assumed to be once during the construction stage and once every 5 years after the completion of the project. Therefore, total amount of stockpiles was assumed to be 35 % of the initial sand fill volume. The purpose of conducting the first maintenance work

during the construction period is to conduct technical transfer on beach maintenance to the agency (assumed to be BBWS) that is responsible for the maintenance work in future.

Post construction stage:

After completion of the construction, maintenance and management of the beach will be conducted once every 5 years (5 % of the initial sand fill volume). The period of the project is assumed to be 30 years, and the maintenance work is planned for 6 times in total. In this phase, it is assumed that BBWS will secure its own budget and implement the project.

13.7.2 Headland/ Groin

A summary of the maintenance and management plan for headland/groin is shown in Table 13.7.2, and the maintenance details at each stage are shown in the following sentences.

Table 13.7.2 Main Maintenance and Management Plan for Headland/Groin by Sections

Stage	Indramayu West	Indramayu East	Pekalongan	Tuban
1. Design	Margin height against subsidence due to structure weight on soft ground (50 cm) Bamboo pile and mat		Same as left Margin height against land subsidence (5 years)	-
2. During Construction	-			
3. Post Construction	-	-	Increase of elevation against land subsidence (once every 5 years)	-

Source: JICA Study Team

Design stage:

In areas with soft ground, Indramayu and Pekalongan, bamboo piles and bamboo mats are installed to prevent settlement due to structures' self-weight, and a uniform 50 cm margin height is added for design of the crown height. In Pekalongan, where extensive land subsidence has occurred, the expected subsidence for the next five years (25 cm: 5 cm/year x 5 years) is included as a margin for design crown height. On the other hand, Tuban has a sandy ground unlike these three sections, neither the margin for subsidence nor ground improvement works such as bamboo piles are implemented.

During construction stage:

No specific maintenance plan is considered

Post construction stage:

In Pekalongan, where extensive land subsidence has occurred, monitoring of subsidence will be conducted and elevation of structure will be raised according to the amount of subsidence occurred. Since Project evaluation period is assumed to be 30 years, a total of six times of maintenance work will be conducted with frequency of every 5 years. In this phase, it is assumed that BBWS will secure its own budget and implement the maintenance work.

13.7.3 Breakwaters for Mangrove Protection

Breakwaters are installed to reduce incoming waves and to promote the growth and stabilization of the mangroves planted behind breakwaters. For this purpose, it was considered that the wave reduction function should be sufficient, especially in the initial stage of the plantation, while a gradual reduction in the function is acceptable as the mangroves grow and become more stable. Therefore, it was assumed that no special maintenance would be required at any stage of the Project (i.e., no consideration was given to the margin height, ground improvement work, raising of elevation).

13.7.4 Mangrove Plantation

A summary of the maintenance and management plan for mangrove plantation is shown in Table 13.7.3, and the maintenance details at each stage are shown in the following sentences.

Table 13.7.3 Main Maintenance and Management Plan for Mangrove Plantation by Sections

Stage	Indramayu West	Indramayu East	Pekalongan	Tuban
1. Design	–	Soil fill for ground (1m thickness)		–
2. During Construction	–	Re-plantation (same scale of initial plantation)		–
3. Post Construction	–	Implement 10 % of initial soil fill and plantation (once every 5 years)		–

Source: JICA Study Team

Design stage:

A certain amount of soil will be filled in areas where the ground level is low to achieve a sufficient ground level that mangroves can grow. In this study, the layer thickness of additional soil fill is assumed to be 1m.

During construction stage:

Based on interviews with the research institute (BRIN, National Research and Innovation Agency) that is conducting mangrove replantation, it is assumed that stabilization of mangroves is particularly difficult in the initial stage of plantation, and that a certain considerable amount of re-plantation will be required after the initial implementation. Here, it is assumed that the first re-plantation will be conducted during the construction period. The quantity of re-plantation was assumed, on the safe side, to be equivalent to the quantity of initial plantation. The purpose of conducting the first re-plantation during the construction period is to transfer technology to organizations (KKP, KLHK, NGOs, communities, etc.) that will conduct maintenance and management after the project is completed.

Post construction stage:

After the completion of the construction, maintenance re-plantation and soil fill (assumed to be 10 % of the initial amount per each time) will be carried out once every 5 years. The period of the project is assumed to be 30 years, and the total number of implementations will be 6 times. In this phase, it is assumed that the implementation period (KKP, KLHK, etc.) will secure its own budget and implement the maintenance work.

CHAPTER 14 Construction Work and Cost Estimate

In this chapter, construction work and project costs were studied based on the Coastal Facility Plan prepared at each Section. For construction work, material and equipment procurement were studied. Based on these, pay items for construction work and their unit costs are evaluated to estimate rough construction and project cost.

14.1 Material Procurement

The main two materials that will need to be procured for the project are as follows.

Table 14.1.1 Main Materials Required for the Project

Material	Purpose	General Specifications
Sand	Material for beach nourishment	D50 = about 0.2 mm V=200,000 – 500,000 m ³ /section (4 sections in total)
Stone	➤ Coastal structure such as rubble type headlands, groins and breakwaters	Armor layer : W = 1,000 kg/pc Under layer : W = 100 kg/pc Core : W = 1 -40 kg/pc

Source: JICA Study Team

14.1.1 Stone Material

Stone will be procured mainly from quarries in the northern part of Java, and andesite is assumed to be a common stone material that can be procured in the area. Figure 14.1.1 shows the candidate quarry locations at present, and Table 14.1.2 shows reference unit prices obtained by quotations and interviews from vendors. If the quarry is located near the target project site (within 50 km -100 km distance as reference), it is assumed to be transported overland by dump trucks (10 ton class). If the quarry is located far away, it is loaded onto barges (1,000 to 8,000 ton class) from a port or loading dock near the quarry and transported by sea to the target project site. In either transportation method, it is assumed that the stone will be delivered to the site by vendors, and the corresponding unit price will be used in the cost estimate (the unit price includes the cost of materials at the quarry and transportation to the site).



Source: Edited by JICA Study Team based on Google Earth

Figure 14.1.1 Location of Candidate Quarries for Stone Material

Table 14.1.2 Reference Unit Price (On-Site Delivery) of Stone Materials (Quotation and Interview from Vendors)

Location No.	Vendor	Quarry Site	Unit Price (Rp/m ³)			Note
			Indramayu	Pemalang - Pekalongan	Rembang - Tuban	
No.1	CV Inti Mandiri Sadaya	Greged, Cirebon	210,000	-	-	Information provided by BBWS Cimanuk- Cisanggarung
No.2	PT. Bumi Tambang Indonesia	Jepara,	220,000	200,000	200,000	Including transportation by barge (300 ft)
No.3	PT. Amir Hajar Kilsa	Pemotan, Rembang	250,000	-	-	Material 130,000 Rp/m ³ + barge transportation 120,000 Rp/m ³

Source: JICA Study Team

In addition, the standard unit price for target provinces in North Java is summarized in Table 14.1.3. The unit price includes the transportation cost from the quarry to site located within the same Regency.

Table 14.1.3 Standard Unit Price for Stone Material (Andesite)

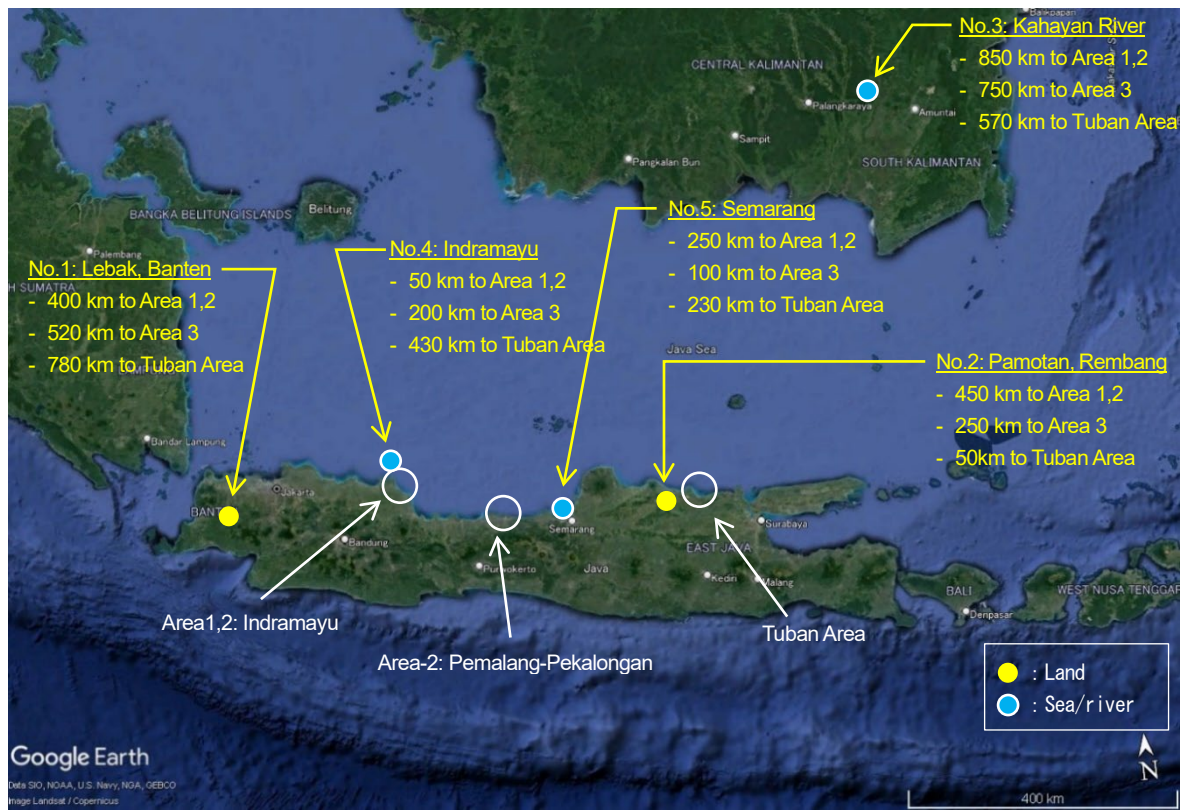
Stone Type	Unit Price (Rp/m3)			Note
	Indramayu Regency	Pekalongan Regency/Pekalongan City	Rembang - Tuban Regency	
Andesite	260,000	260,000	233,900	Price of Pemalang Regency applied to that of Indramayu as being no data

Source: Harga Satuan Pekerjaan Konstruksi Harga Satuan Dasar Bahan Bangunan Dan Upah, 2022, Pemerintah Provinsi Jawa Tengah Dinas PU Bina Marga Dan Cipta Karya

From the above, the price of each Regency is slightly higher than the amount of the contractor's estimate and hearing, but there is no significant difference. The standard unit price is adopted as the safe side of price setting in the work. Although Rembang – Tuban Regency has a lower unit price in the standard unit price than other Regencies, 260,000 Rp/m³ is adopted for all Regencies in the Project.

14.1.2 Sand for Beach Nourishment

Candidate sources of sand for beach nourishment are: 1) quarry site on land (quarry sand), 2) rivers and estuaries (river sand), and 3) the ocean floor (sea sand). Tentative specifications for the sand are D50 (median grain diameter) of 0.2 mm and a silt content of 10 % or less. The color of the sand should be close to the color of the natural sand at the target beach nourishment site or slightly lighter in color, which is desirable from a landscape perspective. Figure 14.1.2 shows the current candidate sites for beach sand, and Table 14.1.4 shows reference unit prices obtained through quotations and interviews from vendors.



Source: Google Map Modified by JICA Study Team

Figure 14.1.2 Location of Candidate Borrow Sites for Sand

Table 14.1.4 Reference Unit Price (On-Site Delivery) of Sand (Quotation and Interview from Venders)

Loc. No.	Vendor	Quarry site/ Extraction site	Type	Median diameter r D50 mm	Unit Price (Rp/m ³)			Note
					Indramayu	Pemalang - Pekalongan	Rembang - Tuban	
No.1	PT. Arta Kurnia Dirgantara	Lebak, Banten	Quarry sand (Silica)	0.30~ 0.40	564,000	605,000	776,000	
No.2	PT. Amir Hajar Kilsil	Pemotan, Rembang	Quarry sand (Silica)	-	220,000	-	-	Material: 100,000 Rp/m ³ +Barge transportation: 120,000 Rp/m ³ (tug boat excluded)
No.3	PT. Sancaka Mitra Jaya (CV. Pasir Mas Persada)	Tumbang Nusa Village and Djambiren District, Pulang Pisau Region*	River sand (Silica) Kahyan River	0.15 - 4.75	500,000	480,000	450,000	
No.4	PT. Bumi Tambang Indonesia	Indramayu Dredging Site	Sea sand	0.20 - 1.05	200,000	230,000	260,000	Transportation by barge (300 ft)
		Seribu Island	Sea sand (Silica)	-	230,000	260,000	280,000	
No.5	PT Anugerah Ragil Perkasa (ARP)	Semarang, Bofri River	River sand	-	265,000	250,000	265,000	River mouth

* Central Kalimantan

Source: JICA Study Team

In addition, the standard unit price for target provinces in North Java is summarized in Table 14.1.5.

Table 14.1.5 The Standard Unit Price for Sand

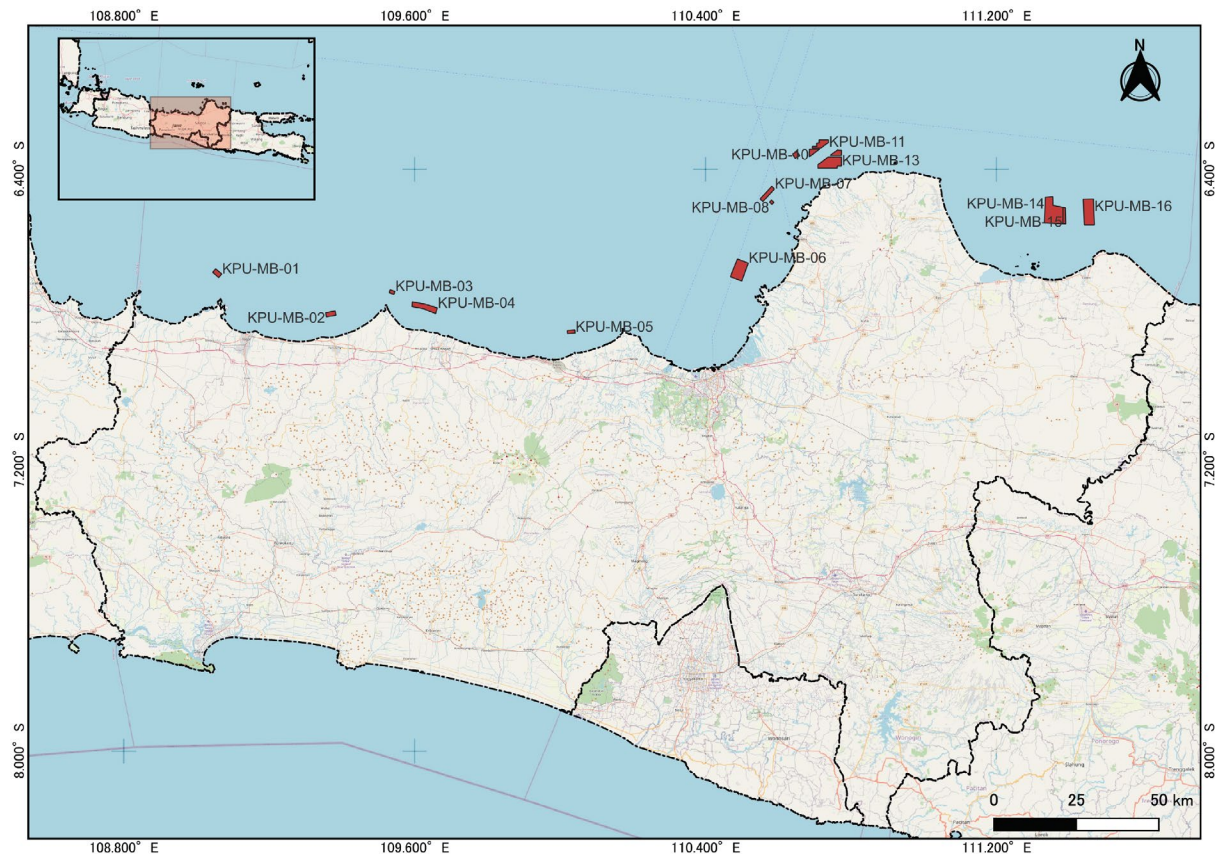
Type	Unit Price (Rp/m ³)			Note
	Indramayu Regency	Pekalongan Regency/Pekalongan City	Rembang - Tuban Regency	
Sand	180,000	130,000 - 265,000	114,000 – 224,000	Unit price of sand for reclamation applied

Source: Harga satuan pekerjaan konstruksi harga satuan dasar bahan bangunan dan upah, 2022, Pemerintah Provinsi Jawa Tengah Dinas PU Bina Marga dan Cipta Karya

As shown above, there was a large variation in the prices quoted by the contractors and in the hearings. Unit prices ranged from 200,000 Rp/m³ to 600,000 Rp/m³, and tended to be high, especially when long-distance transportation was involved, as in the case of No. 3. In addition, the standard unit price of sand (for reclamation) in each state is lower than that estimated by the contractor and interviewed. The beach sand assumed in the Project does not have strict regulations on color tone and grain size, and relatively fine black sand (D50 is about 0.2 mm) can be used, so it is assumed that inexpensive sand will be procured from nearby areas as much as possible. Based on the above, this cost estimation adopted 180,000 Rp/m³, which is a mean value of the standard unit price and is the minimum side value of the vendor's estimate and hearing.

< Restrictions and points to note regarding the acquisition of sea sand >

Regulations pertaining to the use of the sea area are shown in the Marine Spatial Plan (RZWP3K, 2018) issued by the KKP. In all the target areas of the Project, Central, West, and East Java, the said plans are currently being updated on a provincial basis, and the final version is not yet available. Figure 14.1.3 and Table 14.1.6 show the mineral mining zones based on the information in the draft version that is currently being updated. In the Project, only the map of the Central Java Province was available, while others for West and East Java Provinces were not available.



Source: Organized by JICA Study Team based on draft Marine Spatial Plan

Figure 14.1.3 Mineral Mining Zone (Draft) in Central Province of Java (Red Areas, as of March 2023)

Table 14.1.6 Location and Coordinates of Mineral Mining Zone (Draft, as of Mar. 2023)

Code	Remark	Area (Ha)	Longitude (X)	Latitude (Y)
KPU-MB-01	Brebes	338.17	109° 3' 25,562" E	6° 41' 7,096" S
KPU-MB-02	Pemalang	394.39	109° 22' 10,657" E	6° 47' 50,306" S
KPU-MB-03	Pemalang	151.50	109° 32' 16,500" E	6° 44' 13,784" S
KPU-MB-04	Pekalongan	1192.58	109° 37' 42,022" E	6° 46' 43,060" S
KPU-MB-05	Kendal	235.62	110° 1' 50,492" E	6° 50' 47,991" S
KPU-MB-06	Demak	2100.23	110° 29' 36,437" E	6° 40' 35,532" S
KPU-MB-07	Jepara	611.45	110° 34' 11,670" E	6° 28' 3,333" S
KPU-MB-08	Jepara	85.26	110° 34' 56,050" E	6° 29' 25,570" S
KPU-MB-09	Jepara	243.49	110° 38' 57,659" E	6° 21' 36,067" S
KPU-MB-10	Jepara	353.24	110° 41' 42,824" E	6° 21' 4,995" S
KPU-MB-11	Jepara	684.30	110° 43' 6,163" E	6° 19' 47,997" S
KPU-MB-12	Jepara	1985.79	110° 44' 40,382" E	6° 22' 56,500" S
KPU-MB-13	Jepara	368.64	110° 45' 45,133" E	6° 21' 19,521" S
KPU-MB-14	Rembang	3562.89	111° 21' 20,495" E	6° 31' 4,796" S
KPU-MB-15	Rembang	385.67	111° 23' 12,657" E	6° 31' 40,242" S
KPU-MB-16	Rembang	2430.48	111° 27' 16,316" E	6° 31' 1,077" S

Source: Organized by JICA Study Team based on draft Marine Spatial Plan

14.2 Equipment Procurement

In relation to the main materials listed above, the main equipment required for the construction work is shown as follows. These are all general heavy equipment for construction and are considered to be procurable in the North Java area where the project site is located (no special procurement such as import from abroad or long-distance transportation by sea is required). The necessity of offshore construction and its equipment will be examined in further studies.

< Major heavy equipment to be used for construction >

- Sand transport, loading, and leveling: Dump truck (10 t), excavator (0.8 m³), wheel loader (1.6 m³), bulldozer (100-150 HP)
- Transporting, loading, spreading, and placing stone: dump truck (10 t), excavator (0.8 m³), wheel loader (1.6 m³)

Table 14.2.1 shows hourly basic price each heavy equipment in target provinces of Central Java. Although there are differences among the provinces, the maximum value is adopted in the Project as the safe side of the construction cost.

Table 14.2.1 Standard Basic Price of Equipment by Each Regency

Type of Equipment	Basic Price (Rp/hour)		
	Indramayu Regency (Quoted from Pematang Regency)	Pekalongan Regency/ Pekalongan City	Rembang - Tuban Regency
Excavator (0.8 m ³)	321,490	668,200	668,200
Wheel loader (1.6 m ³)	391,408	472,400	472,400
Bulldozer (100 - 150 HP)	571,027	912,500	912,500
Dump truck (10 t)	172,548	304,800	304,800

Source: Harga satuan pekerjaan konstruksi harga satuan dasar bahan bangunan dan upah, 2022, Pemerintah Provinsi Jawa Tengah Dinas PU Bina Marga dan Cipta Karya

14.3 Preliminary Unit Price Analysis

Table 14.3.1 lists the main construction cost items (pay items) and their respective units and estimated unit costs.

As for “**1. General Preparatory Works**” and “**2. Health, Safety and Environmental Works**”, units are set as lump sum and unit price is tentatively set referring to similar coastal projects in Indonesia.

For “**3. Beach Nourishment**” and “**4. Headland/Groin Works**”, the pay items are set assuming general construction procedures from land side (i.e. no special marine construction work is expected for cost estimate). The main thoughts/assumptions applied in the calculation of these unit prices are shown below.

- Increase factor of materials: Increase factor for materials was considered for the actual loss during. In the case of sand, 0.3 was applied and in the case of stone, 0.25-0.45 was used to fulfill the voids between the armour stones (the larger the stone size, the larger the increase factor) (Permen PUPR No. 1 of 2022).
- Direct Cost: Direct cost was calculated from the sum of labor, material, and equipment costs for each type of construction. For labor costs, the standard unit price (Permen PUPR No. 1 of 2022) was applied. The cost of materials and equipment was calculated by multiplying the above-mentioned unit cost by the standard work efficiency of each type of work (Permen PUPR No. 1 of 2022).

- Indirect Cost: The contractor's site management costs, profit, etc. were included in the unit price as 15 % of the above direct costs.

In addition, the following two points are added for “**3. Beach Nourishment**”, considering characteristics of the measures and situation of land subsidence.

- Margin height against land subsidence: Considered only for the Sections of Indramayu and Pekalongan and added by the amount of 5 years land subsidence (refer to 3.1.2 in the table).
- Stockpile sand for maintenance work: It is estimated to secure maintenance sand for 30 years after the implementation. The maintenance work was assumed to be done as following frequency: one (1) time at the latter stage of the implementation period and once at every 5 years after the implementation. The amount of sand for each maintenance work is assumed to be 5 % of the initial sand fill volume and therefore the total volume of sand is estimated as 35 % of the initial sand fill volume (refer to 3.1.3 in the table).

As for “**4. Headland/ Groin Works**”, margin height against for both land subsidence and settlement due to structure weight were included for construction quantity. Bamboo pile and bamboo mat were also considered as a measure against the settlement due to structure weight on soft soil (i.e. considered for the Sections of Indramayu and Pekalongan). Unit prices for bamboo pile and mat were set from hearing from BBWS.

In the “**5. Mangrove Protection and Plantation Works**”, breakwaters will be constructed in front of the plantation area to create an area where mangroves can grow. Breakwater is designed as rubble type structure like headland and groin. Since the required function is relatively limited compared to that of headland and groin (a full function will be required only until mangroves become stable), the bamboo pile and bamboo mat will not be applied for this breakwater for the purpose of cost reduction. A certain amount of soil fill is considered to secure soil ground with sufficient elevation for mangrove habitat where the original ground level is relatively low.

In the “**6. Maintenance Works**”, it is assumed that the maintenance and management works will be carried out within the construction period (maintenance and management cost after completion of the Project will be required separately). Item 6.1 in the table assumes that the sand stored in the stockpile in item 3.1.3 will be transported and supplied to the target beach (the transport distance and other details are not yet determined, so the unit price is an estimate). According to interviews with the research institute (BRIN, National Research and Innovation Agency) that conducts mangrove plantations, post-plantation maintenance costs tend to be higher than the initial costs (in some cases, it is five times higher). In this study, maintenance cost is included with the same amount of the initial planation and soil fill cost.

Table 14.3.1 Work Items and Unit Price for Construction (Indramayu West Case)

No.	Work Item (Pay Item)	Unit	Unit price (Rp)	Note
1	General and Preparatory Works	Sum	Estimated as 10 % of the other works	Mobilization, demobilization, common temporary works, office-related expense etc. (refer to case example in Indonesia)
2	Health, Safety and Environmental Works	Sum	5,000,000,000	Health management, safety management and work, environment monitoring works (refer to case example in Indonesia)
3	Beach Nourishment			
3.1	Supply and transportation of sand to site, and spreading and profiling for initial beach fill			
3.1.1	Sand fill with design volume	cu.m	272,000	Calculated based on material cost (on-site delivery) Rp 180,000
3.1.2	Additional sand fill for land subsidence	cu.m	272,000	
3.1.3	Sand fill for sand stockpile (35 % volume of 3.1.1)	cu.m	272,000	
4	Headland/ Groin Works			
4.1	Bamboo Pile Works	lin.m	44,500	Ref. to case example in Indonesia
4.2	Bamboo Mat Works	sq.m	158,000	Ref. to case example in Indonesia
4.3	Supply and install of rock as core layer (1-40 kg) including profiling	cu.m	440,000	Calculated based on material cost (on-site delivery) Rp 260,000/m ³
4.4	Supply and install of rock as under layer (50-100 kg) including profiling	cu.m	470,000	Random placement, Calculated based on material cost (on-site delivery) Rp 260,000/m ³
4.5	Supply and install of rock as amour layer including profiling (500-1,000 kg)	cu.m	560,000	Static placement, calculated based on material cost (on-site delivery) Rp 260,000/m ³
5	Mangrove Protection and Plantation Works			
5.1	Bamboo Pile Works	lin.m	-(N/A)	-
5.2	Bamboo Mat Works	sq.m	-(N/A)	-
5.3	Supply and install of rock as core layer (1-40 kg) including profiling	cu.m	440,000	(Same as above)
5.4	Supply and install of rock as under layer (50-100 kg) including profiling	cu.m	470,000	(Same as above)
5.5	Supply and install of rock as amour layer including profiling (500-1,000 kg)	cu.m	560,000	(Same as above)
5.6	Soil filling		100,000	Assumption
5.7	Mangrove Plantation	ha	23,000,000	Ref. to case example in Indonesia
6	Maintenance Works			
6.1	Sand fill from sand stockpile	cu.m	100,000	Assumption
6.2	Mangrove plantation and rehabilitation	ha	23,000,000	Ref. to case example in Indonesia

Source: JICA Study Team

14.4 Construction Cost

Basic specifications and construction cost for four Sections of Coastal Facility Plan are summarized in Table 14.4.1. The breakdown of construction cost for each Section is shown in Table 14.4.2 to Table 14.4.3.

Table 14.4.1 Summary of Basic Specifications and Rough Estimate on Construction Cost

		Indramayu West	Indramayu East	Pekalongan	Tuban	Total	
Coastal length protected	1. Beach Nourishment	2.9 km	5.0 km	2.9 km	3.1 km	14.0 km	
	2. Mangrove Plantation & Breakwaters	7.8 km	-	5.5 km	-	13.2 km	
	3. Breakwaters with backfill	-	-	-	11.3 km	11.3 km	
	Total	10.7 km	5.0 km	8.4 km	14.4 km	38.5 km	
Quantity	Beach Nourishment (Total volume)		289,866 m ³	369,851 m ³	438,531 m ³	200,043 m ³	1,298,291 m³
	Headland/ Groins	No.	11 Nos	15 Nos	11 Nos	5 Nos	42 Nos
		Length	2,200 m	3,500 m	2,100 m	500 m	8,300 m
		Vol.	60,729 m ³	60,729 m ³	83,023 m ³	11,491 m ³	215,973 m³
	Breakwaters (with mangrove plantation)	No.	39 Nos	-	27 Nos	-	66 Nos
		Length	7,430 m	-	5,190 m	-	12,620 m
		Vol.	215,916 m ³	-	185,906 m ³	-	401,822 m³
	Area of Mangrove Plantation		117 ha	-	82 ha	-	199 ha
	Volume of Breakwaters (with backfill)		-	-	-	231,198 m ³	231,198 m³
	Volume of backfill (Tuban)		-	-	-	791,000 m ³	791,000 m³
Construction Cost (IDR)	General and Preparatory Works		35,843,000,000	16,138,000,000	35,775,000,000	42,520,000,000	130,276,000,000
	Health, Safety and Environmental Works		5,000,000,000	3,000,000,000	5,000,000,000	5,000,000,000	18,000,000,000
	Beach Nourishment		78,843,573,253	100,599,562,484	119,280,447,633	54,411,696,000	353,135,279,370
	Headland/ Groin Works		42,652,251,200	56,406,026,480	54,833,528,000	5,841,318,000	159,733,123,680
	Mangrove Protection and Plantation Works		228,175,646,000	0	175,215,411,000	0	403,391,057,000
	Breakwaters (with backfill)		0	0	0	359,203,609,000	359,203,609,000
	Initial Maintenance Works		3,757,678,067	1,369,819,751	3,424,394,075	740,900,000	9,292,791,893
	Total		394,272,148,520	177,513,408,714	393,528,780,709	467,717,523,000	1,433,031,860,943

Source: JICA Study Team

Table 14.4.2 Construction Cost for Indramayu West

No.	Pay Item	Unit	Quantity	Unit Price(Rp)	Amount (Rp)
1	General and Preparatory Works	Sum	1	35,843,000,000	35,843,000,000
2	Health, Safety and Environmental Works	Sum	1	5,000,000,000	5,000,000,000
3	Beach Nourishment (L=2,850 m)				
3.1	Supply and transportation of sand to site, and spreading and profiling				
3.1.1	Sand fill with design volume	cu.m	214,716	272,000	58,402,646,854
3.1.2	Additional sand fill for land subsidence	cu.m	0	272,000	0
3.1.3	Sand fill for sand stockpile (35% volume of 3.1.1)	cu.m	75,150	272,000	20,440,926,399
4	Headland/ Groin Works (11 Nos, L=2,200 m)				
4.1	Bamboo Pile Works	lin.m	146,080	44,500	6,500,560,000
4.2	Bamboo Mat Works	sq.m	34,808	158,000	5,499,727,200
4.3	Supply and install of rock as core layer (1-40 kg) including profiling	cu.m	17,081	440,000	7,515,552,000
4.4	Supply and install of rock as under layer (100 kg) including profiling	cu.m	14,519	470,000	6,823,836,000
4.5	Supply and install of rock as amour layer including profiling (1,000 kg)	cu.m	29,130	560,000	16,312,576,000
5	Mangrove Protection and Plantation Works (L=7,800 m)				
5.1	Bamboo Pile Works	lin.m	0	44,500	0
5.2	Bamboo Mat Works	sq.m	0	151,000	0
5.3	Supply and install of rock as core layer (1-40 kg) including profiling	cu.m	62,784	440,000	27,624,740,000
5.4	Supply and install of rock as under layer (100 kg) including profiling	cu.m	50,970	470,000	23,955,806,000
5.5	Supply and install of rock as amour layer including profiling (1,000 kg)	cu.m	102,163	560,000	57,211,000,000
5.6	Soil filling	cu.m	1,167,000	100,000	116,700,000,000
5.7	Mangrove Plantation	ha	117	23,000,000	2,684,100,000
6	Maintenance Works				
6.1	Sand fill from sand stockpile	cu.m	10,736	100,000	1,073,578,067
6.2	Mangrove plantation and rehabilitation	ha	117	23,000,000	2,684,100,000
Sum					394,272,148,520

Source: JICA Study Team

Table 14.4.3 Construction Cost for Indramayu East

No.	Pay Item	Unit	Quantity	Unit Price (Rp)	Amount (Rp)
1	General and Preparatory Works	Sum	1	16,138,000,000	16,138,000,000
2	Health, Safety and Environmental Works	Sum	1	3,000,000,000	3,000,000,000
3	Beach Nourishment (L=5,010 m)				
3.1	Supply and transportation of sand to site, and spreading and profiling				
3.1.1	Sand fill with design volume	cu.m	273,964	272,000	74,518,194,432
3.1.2	Additional sand fill for land subsidence	cu.m	0	272,000	0
3.1.3	Sand fill for sand stockpile (35% volume of 3.1.1)	cu.m	95,887	272,000	26,081,368,051
4	Headland/ Groin Works (18 Nos, L=3,500 m)				
4.1	Bamboo Pile Works	lin.m	202,664	44,500	9,018,548,000
4.2	Bamboo Mat Works	sq.m	49,237	158,000	7,779,471,280
4.3	Supply and install of rock as core layer (1-40 kg) including profiling	cu.m	19,301	440,000	8,492,514,800
4.4	Supply and install of rock as under layer (100 kg) including profiling	cu.m	18,788	470,000	8,830,566,800
4.5	Supply and install of rock as amour layer including profiling (1,000 kg)	cu.m	39,795	560,000	22,284,925,600
5	Maintenance Works				
5.1	Sand fill from sand stockpile	cu.m	13,698	100,000	1,369,819,751
Sum					177,513,408,714

Source: JICA Study Team

Table 14.4.4 Construction Cost for Pekalongan

No.	Pay Item	Unit	Quantity	Unit Price (Rp)	Amount (Rp)
1	General and Preparatory Works	Sum	1	35,775,000,000	35,775,000,000
2	Health, Safety and Environmental Works	Sum	1	5,000,000,000	5,000,000,000
3	Beach Nourishment (L=2,930 m)				
3.1	Supply and transportation of sand to site, and spreading and profiling				
3.1.1	Sand fill with design volume	cu.m	308,139	272,000	83,813,757,689
3.1.2	Additional sand fill for land subsidence	cu.m	22,544	272,000	6,131,874,753
3.1.3	Sand fill for sand stockpile (35% volume of 3.1.1)	cu.m	107,849	272,000	29,334,815,191
4	Headland/ Groin Works (11 Nos, L=2,100 m)				
4.1	Bamboo Pile Works	lin.m	163,200	44,500	7,262,400,000
4.2	Bamboo Mat Works	sq.m	39,546	158,000	6,248,268,000
4.3	Supply and install of rock as core layer (1-40 kg) including profiling	cu.m	28,946	440,000	12,736,240,000
4.4	Supply and install of rock as under layer (100 kg) including profiling	cu.m	18,850	470,000	8,859,500,000
4.5	Supply and install of rock as amour layer including profiling (1,000 - 1,400 kg)	cu.m	35,227	560,000	19,727,120,000
5	Mangrove Protection and Plantation Works (L=5,500 m)				
5.1	Bamboo Pile Works	lin.m	0	44,500	0
5.2	Bamboo Mat Works	sq.m	0	151,000	0
5.3	Supply and install of rock as core layer (1-40 kg) including profiling	cu.m	78,421	440,000	34,505,196,000
5.4	Supply and install of rock as under layer (100 kg) including profiling	cu.m	36,278	470,000	17,050,707,000
5.5	Supply and install of rock as amour layer including profiling (1,000 kg)	cu.m	71,207	560,000	39,875,808,000
5.6	Soil filling	cu.m	819,000	100,000	81,900,000,000
5.7	Mangrove Plantation	sq.m	82	23,000,000	1,883,700,000
6	Maintenance Works				
6.1	Sand fill from sand stockpile	cu.m	15,407	100,000	1,540,694,075
6.2	Mangrove plantation and rehabilitation	ha	82	23,000,000	1,883,700,000
Sum					393,528,780,709

Source: JICA Study Team

Table 14.4.5 Construction Cost for Tuban

No.	Pay Item	Unit	Quantity	Unit Price (Rp)	Amount (Rp)
1	General and Preparatory Works	Sum	1	42,520,000,000	42,520,000,000
2	Health, Safety and Environmental Works	Sum	1	5,000,000,000	5,000,000,000
3	Beach Nourishment (L=3,100 m)				
3.1	Supply and transportation of sand to site, and spreading and profiling				
3.1.1	Sand fill with design volume	cu.m	148,180	272,000	40,304,960,000
3.1.2	Additional sand fill for land subsidence	cu.m	0	272,000	0
3.1.3	Sand fill for sand stockpile (35% volume of 3.1.1)	cu.m	51,863	272,000	14,106,736,000
4	Headland Works (5 Nos, L=500 m)				
4.1	Bamboo Pile Works	lin.m	0	56,400	0
4.2	Bamboo Mat Works	sq.m	0	151,000	0
4.3	Supply and install of rock as core layer (1-40 kg) including profiling	cu.m	2,846	440,000	1,252,284,000
4.4	Supply and install of rock as under layer (100 kg) including profiling	cu.m	2,803	470,000	1,317,598,000
4.5	Supply and install of rock as amour layer including profiling (1,000 kg)	cu.m	5,842	560,000	3,271,436,000
5	Amenity Oriented Revetment Works (L=11,300 m)				
5.1	Supply and install of rock as core layer (1-40 kg) including profiling	cu.m	62,602	440,000	27,544,880,000
5.2	Supply and install of rock as under layer (100 kg) including profiling	cu.m	35,595	470,000	16,729,650,000
5.3	Supply and install of rock as amour layer including profiling (1,000 kg)	cu.m	133,001	560,000	74,480,560,000
5.4	Supply and install of geotextile sheet	sq.m	186,789	21,000	3,922,569,000
5.5	Backfill sand	cu.m	791,000	181,000	143,171,000,000
5.6	Parapet works	lin.m	11,300	5,492,000	62,059,600,000
5.7	Pavement works	sq.m	19,775	262,000	5,181,050,000
5.8	Drainage works	lin.m	11,300	2,311,000	26,114,300,000
6	Maintenance Works				
6.1	Sand fill from sand stockpile	cu.m	7,409	100,000	740,900,000
	Sum				467,717,523,000

Source: JICA Study Team

14.5 Maintenance Cost

As described in Sections 13.7 and Sections 14.5, the initial maintenance costs during the project period are included in the construction cost, considering characteristics of beach nourishment works and mangrove plantation. Maintenance cost here refers to the periodic maintenance cost after the completion of the Project. Therefore, this maintenance and management cost is not included in the estimated construction cost in the previous section and the estimated project cost in the next section. On the other hand, in the economic analysis in Chapter 16, this maintenance and management cost was taken into account because the evaluation period is set at 30 years after the completion of the Project.

As for the contents and items of maintenance and management, three maintenance and management items were set as follows, referring to the actual results of similar beach nourishment construction projects.

< Maintenance and management items and their contents >

- 1) Periodic sand fill: To be conducted once every 5 years. Based on the actual results of similar projects, 5 % of the initial design quantity is planned for each maintenance work.
- 2) Maintenance of mangrove forests: Partial replanting of mangrove and soil fill for the foundation ground will be conducted once every 5 years. 10 % of the initial implementation amount was assumed as maintenance volume.
- 3) Raising the crown height of headland/ groin for land subsidence (only in Pekalongan): Every 5 years, the headland/ groin will be raised to restore their function (assuming 5 cm subsidence per year).

Based on the above, the maintenance and management cost for each Section is summarized as follows: assumed maintenance and management cost for Tuban is smaller than those for the other Sections because the amount of beach nourishment for this Section is smaller than for the other sections. For the other three sections, the assumed maintenance costs ranged from 4.2 % to 4.5 % (once every five years) of the initial project cost. This corresponds to an annualized rate of about 1 %. This rate is slightly higher than the 0.5 % annualized maintenance cost, which is generally assumed in Japanese project evaluations (for coastal protection facilities). In this study, measures such as beach nourishment and mangrove plantation, which are susceptible to natural conditions, are the main measures taken. Therefore, the above values (4.2 % to 4.5 % of initial cost per maintenance work) are used in this study because the ratio of maintenance and management cost is likely to be higher than in the case of hard measures. Future maintenance and management that will actually be required is highly uncertain in terms of its content and frequency and should be planned and implemented in an adaptive manner through monitoring of the pilot project proposed in this Project.

Table 14.5.1 Estimated Maintenance Cost for Each Section (once in every 5 years)

Item for Maintenance	Indramayu West	Indramayu East	Pekalongan	Tuban	Total
1) Periodic sand fill	5,840,000,000 Rp	7,452,000,000 Rp	8,381,000,000 Rp	4,030,000,000 Rp	25,703,000,000 Rp
2) Maintenance of mangrove	11,938,000,000 Rp	-	8,378,000,000 Rp	-	20,316,000,000 Rp
3) Raising crown height of headland/ groin	-	-	587,000,000 Rp	-	587,000,000 Rp
Total	17,778,000,000 Rp	7,452,000,000 Rp	17,346,000,000 Rp	4,030,000,000 Rp	46,606,000,000 Rp
Ratio of maintenance cost to initial construction cost	4.5%	4.2%	4.4%	0.9%	3.3%

Source: JICA Study Team

14.6 Rough Project Cost

The project cost was calculated by adding the following necessary expenses to the aforementioned estimated construction cost, based on the project implementation details and schedule shown in Chapter 15. Project cost shown in this section (i.e. Section 14.6) is referred as “Option-1 (only for Action-4 (new coastal facilities))” to distinguish from that of next section (i.e. Section 14.7)

- Consultant fee for E/S (Engineering Service): 10 % of the construction cost, referring to similar projects in the past.
- Consultant fee for S/C (Soft Component): estimated as Rp 1.5 billion (total for 3 years period), based on similar soft component projects.
- Price escalation: the average inflation rate for the last 6 years in the Indonesian public works sector was 2.9 % (2019: 3.10 %, 2020: 2.72 %, 2021: 1.68 %, 2022: 1.87 %, 2023: 5.50 %, 2024, BPS Data). This was assumed to be the average annual price increase after 2024 at the time of evaluation, and the price increase from 2027 to 2032, when the Project is scheduled to be implemented, was calculated and averaged, resulting in a rate of 17% (price increase during the project period, based on 2024).
- Physical Contingency: 5 % of construction cost and consultant fee, respectively, based on actual results of similar work.

Table 14.6.1 Rough Estimate on Project Cost (Option-1: Action-4 (New Coastal Facilities))

Item	Amount	Note
(1) Construction Cost	1,433,031,860,943 Rp	Total of 4 Sections
(2) Consultant Fee(E/S)	143,303,186,094 Rp	(1) × 10%
(3) Consultant Fee(S/C)	15,000,000,000 Rp	Assumed from similar project
(4) Physical Contingency	79,566,752,352 Rp	Sum of (1)(2)(3) × 5%
(5) Price Escalation (P/E)	284,053,305,896 Rp	Sum of (1)(2)(3)(4) × 17%
(6) Rough Project Cost	1,954,955,000,000 Rp	Sum of all of the above, Approx. 1,955 billion Rp

*Reference: Estimated project cost in Yen: 19.0 billion Yen (1 Rp=0.0097 yen), in USD: 122 mil USD (1 Rp=0.0000623USD)

Source: JICA Study Team

14.7 (Reference) Additional Case for Rough Project Cost

In addition to the abovementioned, as reference, the construction cost for improvement of existing structures (i.e. Action-3 in Indramayu West) was estimated and the project cost including this component was evaluated as follows.

Table 14.7.1 Construction Cost (Action-3, Indramayu West)

Work item	Unit	Total Length (m)	m3	Unit price (IDR)	Cost (IDR)
Supply and install of rock as core layer (1-40 kg) including profiling	cu.m	11,900	24,990	440,000	10,995,600,000
Supply and install of rock as under layer (50-100 kg) including profiling	cu.m	11,900	42,840	470,000	20,134,800,000
Supply and install of rock as amour layer including profiling (500 -1,000 kg)	cu.m	11,900	122,570	560,000	68,639,200,000
Excavation	cu.m	11,900	78,540	5,420	425,686,800
Supply and install of geotextile sheet	sq.m	11,900	-	21,000	3,823,470,000
Backfill Sand	cu.m	2,200	242,000	181,000	43,802,000,000
Total					147,820,756,800

Source: JICA Study Team

Table 14.7.2 (Reference) Rough Project Cost (Option-2: Action-4 (New Coastal Facilities) and Action-3(Improvement of Existing Coastal Facilities))

Item	Amount	Note
(1) Costruction Cost	1,595,634,617,743 Rp	Total of 4 Sections
(2) Consultant Fee(E/S)	159,563,461,774 Rp	(1) × 10%
(3) Consultant Fee(S/C)	15,000,000,000 Rp	Assumed from silimar project
(4) Physical Contingency	88,509,903,976 Rp	Sum of (1)(2)(3) × 5%
(5) Price Escalation (P/E)	315,980,357,194 Rp	Sum of (1)(2)(3)(4) × 17%
(6) Rought Project Cost	2,174,688,000,000 Rp	Sum of all of the above, Approx 2,175 billion Rp

*Reference: Estimated project cost in Yen: 21.1 billion Yen (1 Rp=0.0097 yen), in USD:135 mil USD (1 Rp=0.0000623USD)

Source: JICA Study Team

Table 14.7.3 Project Cost by Options

Option	Facility (Action)	Project Cost
1	Only Action-4(New Coastal Facility)	1,955 billion Rp (Approx.122 million USD)
2	Action-4(New Coastal Facility) and Action-3(Improvement of Existing Coastal Facility)	2,175 billion Rp (Approx.135 million USD)

Source: JICA Study Team

CHAPTER 15 Scenario for Future Project Formation (with View of Loan Project)

15.1 Outline

The objective of the Project is to realize the coastal management in cooperation with related organizations, based on a unified basic policy on coastal management plan that harmonizes "protection," "environment," and "utilization. As a first step, the following studies were conducted in the Project.

- In order to share a unified basic policy on coastal management among all agencies and stakeholders involved in coastal management, the “Draft of Basic Policy for Coastal Management” was proposed, and discussions were held several times through the WG to exchange opinions on its contents and to discuss with related agencies in Indonesia for its legal institutionalization.
- In order to implement coastal protection/conservation projects under a unified medium-term plan for coastal management, the Project prepared the “Draft of Basic Coastal Management Plan” in the selected three Areas as case studies. The concrete procedure and technical approach for each step in the procedure was presented and discussed through the WG and CGD with related agencies in Indonesia. The proposed “Draft of Basic Coastal Management Plan” emphasized the selection from various coastal protection measures combining gray- and green-infrastructures in cooperation with related organizations according to the coastal situation (coastal disaster risk, coastal environment, and coastal use) in order to change from current common stile on coastal protection in Indonesia, which is “unified protection measures” and “implementation individually for each agencies”.
- From the selected three Areas, the “Section” which will be implemented by PUPR were extracted for Coastal Facility Plan. Concrete images for proposed facility plan, estimated project costs, project effects, etc. were examined at the Pre-F/S level. The proposed idea was discussed with PUPR and related BBWS through the CGD.

In order to realize coastal management system based on this idea near the future, it is necessary to identify remaining subjects and their solutions, as well as necessary actions for realization. This chapter discusses scenarios for future project formation and implementation based on the study results of the Project.

15.2 Target Project

In the Project, the Sections which will be implemented as PUPR project are extracted from the three selected Areas in the north coast of Java Island (three Sections from the three Areas, plus one Section added in response to subsequent requests from PUPR, for a total of four Sections). From the selected 4 sections, the coastal area proposed as a new project (38 km in total) is selected as the current target project site (see Chapter 13, Section 13.6).

15.3 Remaining Subjects and Required Actions to Solve

In order to develop the coastal project in accordance with the coastal management system proposed in this Project, there are several remaining subjects that shall continue to be considered and finalized by the related agencies in Indonesia, and need to be addressed. Table 15.3.1 shows the summary of this. Expected target period which was discussed and agreed with each parties between C/P of GOI and JICA is also shown in the table.

Table 15.3.1 Remaining Subjects, Required Action by Indonesian Side and Expected Target Period

Item	Remaining Subjects	Required Action	Expected Target Period
Basic Policy for Coastal Management	Finalization of contents	Continuous coordination & discussion with WG members (PUPR, KKP, KLHK, BAPPENAS etc.) to achieve finalization	Sep. 2024
	Action taking for legislation	Continuous coordination with relevant agencies to prepare action plan and taking concrete actions for legislation	Dec. 2026
Basic Coastal Management Plan	Understanding & acceptance for procedure	Continuous discussion with WG members (PUPR, KKP, KLHK, BAPPENAS etc.) to enhance understanding	Sep. 2024
	Clarification for enforcement system of prepared plan	Continuous coordination & discussion and consensus building with relevant parties including local Gov. for enforcement system	Dec. 2026
	How to expand to prepare the plan to other coastal areas	To start coordination & discussion with relevant parties (including possibility of continuous cooperation with JICA)	Dec. 2026
Coastal Facility Plan	Concrete procedure for implementation of combined green & gray infrastructures	Continuous discussion with WG members (Especially between PUPR and KKP, KLHK) for implementation procedure, structure, etc.	Dec. 2025
Others (Project Formation)	Project formation as JICA Loan Project following current Blue Book	To start coordination with PUPR, BAPPENAS and JICA for formulation of JICA Loan Project	Jun. to Dec. 2024

Source: JICA Study Team

The Basic Policy for Coastal Management outlined in Table 15.3.1 will be formalized into Presidential Regulation. The legalization process, as shown in Figure 15.3.1, will include finalizing policy contents through high-level discussions among Working Group members, with the Ministry of Maritime Affairs and Fisheries (KKP) taking the lead.



Source: JICA Study Team

Figure 15.3.1 Draft of Roadmap for Legislation of the Basic Policy for Coastal Management

15.4 Further Required Studies for Realization of Project Formation

The coastal protection measures in the four Sections proposed in the Project are not linear protection measures using only hard structures such as revetments and jetties etc., which have been implemented by PUPR in the past, but rather a combination of green- and gray-infrastructures and soft and hard measures such as beach nourishment, and mangrove plantations, which have rarely been implemented by PUPR in the past.

In deciding the implementation of green infrastructure measures, for example, mangrove reforestation, there are several subjects to be considered that are not present in hard structure measures, such as proper site selection considering waves, soil and its stability condition, selection of suitable mangrove species, certainty of growth, and verification of effectiveness, among others. In addition, the Bali Coastal Conservation Project, which is currently undertaken, has shown that there are several issues that need to be addressed before beach nourishment can be implemented. Furthermore, the north coast of Java Island has unique sediment characteristics (many coastal areas are composed of fine sand and silt), and there are coastal areas where the effects of land subsidence need to be considered.

From above mentioned points of view, it is desirable to obtain the information through further information collection and investigations as shown in Table 15.4.1 in order to examine the realization of the Project.

In addition, the “Blue Book” compiled by BAPPENAS includes a JICA quota of 250 million U.S. dollars for coastal protection and flood control projects in the north coast of Java Island. It is necessary to discuss and coordinate among PUPR, BAPPENAS, JICA, and other related parties to realize the project.

Table 15.4.1 Required Study Item for Realization of the Project

Coastal Facility	Remaining Subjects	Outline
Beach Nourishment	Sand borrow investigation at offshore seabed	For beach nourishment, the unit cost of sand must be reduced. Potential area at offshore will be Investigated.
	Permission procedure (especially KKPR of Spatial Plan) for above	Currently, it is no need to revise the spatial plan itself, but approval from the ATR is required (KKPR: Conformity of Space Utilization Activities). Based on the Bali Beach Conservation Project, it may take about one year for this approval. Considering AMDAL and Mining Permit afterward, it is advisable to proceed in advance.
Mangrove Plantation	Reviewing on specific site selection, protection effectiveness, implementation methods, etc.	Although the above-mentioned studies are not conducted in this Pre-F/S level study, it is necessary to obtain some evidence and assurance for formulation of the project
	Discussion & study of implementation system through cooperation with related agencies for combination with gray-infrastructure	It is desirable to promote discussions on mechanisms and systems to promote active collaboration among related agencies, including the possibility of implementing the project with multiple agencies.
Hard Structures	Necessity on design consideration for settlement (consolidation, liquefaction) due to construction and subsidence	Some areas and facilities may or may not have subsidence control measures. The effectiveness of such measures is also unclear. Since this will affect the project cost, it is desirable to collect and study further information in advance.
Others	Project development as JICA loan project, described in current "Blue Book"	Discussions and coordination among the parties, including technical support as "soft component (S/C)" for the realization of proposed coastal management system, as well as the implementation of the proposed coastal project as E/S, are necessary.

Source: JICA Study Team

15.5 Project Implementation Image

The general characteristics of coastal protection projects are described as follows.

- Coastal facilities are often smaller in scale and have relatively simple structure type compared to other infrastructure facilities such as roads, ports, and bridges.
- On the other hand, coastal areas are exposed to external forces such as waves and currents. Moreover the construction sites are positioned at the most dynamic sediment movement (littoral drift) occurring due to wave breaking and other effects. Because of the continuity of littoral drift in the alongshore direction, the potential for localized protection to affect the surrounding coasts is extremely high compared to other infrastructure projects.
- From this, appropriate planning and design (especially layout design) based on the coastal characteristics in both wide viewpoints and specific area are strongly required (importance of planning and layout design on coastal protection).

Based on the characteristics of these coastal protection, the image of predicted project implementation is shown below.

15.5.1 Planning and Design Work (as Consulting Services)

Coastal protection projects in Indonesia have mainly focused on localized protection measures applying conventional hard structure measures such as revetments, groins, detached breakwaters, etc. In planning and design for coastal measures, various studies and analyses have been conducted. However, it is still insufficient to study and implement the most appropriate coastal protection measures among several options, which are not only hard structure measures but also soft measures and combined green- and gray-infrastructures based on the results of comprehensive studies that focus on the characteristics and problems of the target coasts from a wide-area coastal characteristic viewpoint, compared to those in Japan and other developed countries. From these points, it is necessary to further enhance the technology and experience for the realization of coastal protection based on a unified plan. Especially, it is recommended to develop the planning and design skill for government officials who are in charge of planning, design and implementation of coastal protection measures with technical assistance from Japan or other European countries, which have abundant knowledge on this field.

15.5.2 Implementation of Coastal Protection Measures (as Construction Work)

As mentioned above, coastal facilities generally have relatively simple structure type, and there are not many cases where specific construction techniques are required. The construction of coastal facilities itself can basically be handled by local general or marine contractors in most cases. On the other hand, since the construction site is located in a coastal area and is constantly used by local residents and tourists, advanced skill for construction management is strongly required, such as safety management, consideration for natural coastal environment, and efficient construction method and sequence to fully consider external force conditions such as waves and tide.

15.5.3 Project Image and Schedule (Draft)

The following projects are expected to realize various coastal protection based on the proposed plan in this Project, taking into account the differences from other infrastructure projects as described above.

- The proposed method, which is to formulate a medium-term basic plan for coastal protection and to implement based on this plan, is just at the stage of case study in this Project. In order to establish this system in Indonesia, it is thought that continuous technical support and capacity building are still necessary. During this support period, it is desirable for the Indonesian side to gradually take the initiative for the implementation of this system.
- PUPR's knowledge of coastal protection measures, such as the combination of green- and gray-infrastructure, hard and soft measures, such as applying beach nourishment, combined protection facility and mangrove plantations proposed in the Project, is still insufficient due to limited number of actual implementation. In view of this, it is recommended that the project will be implemented as "loan project" at first, rather than as common regular projects for each Indonesian ministry, in order to enhance the knowledge and to take into account the possibility of implementing the project in collaboration with other organizations for green-infrastructure measures.

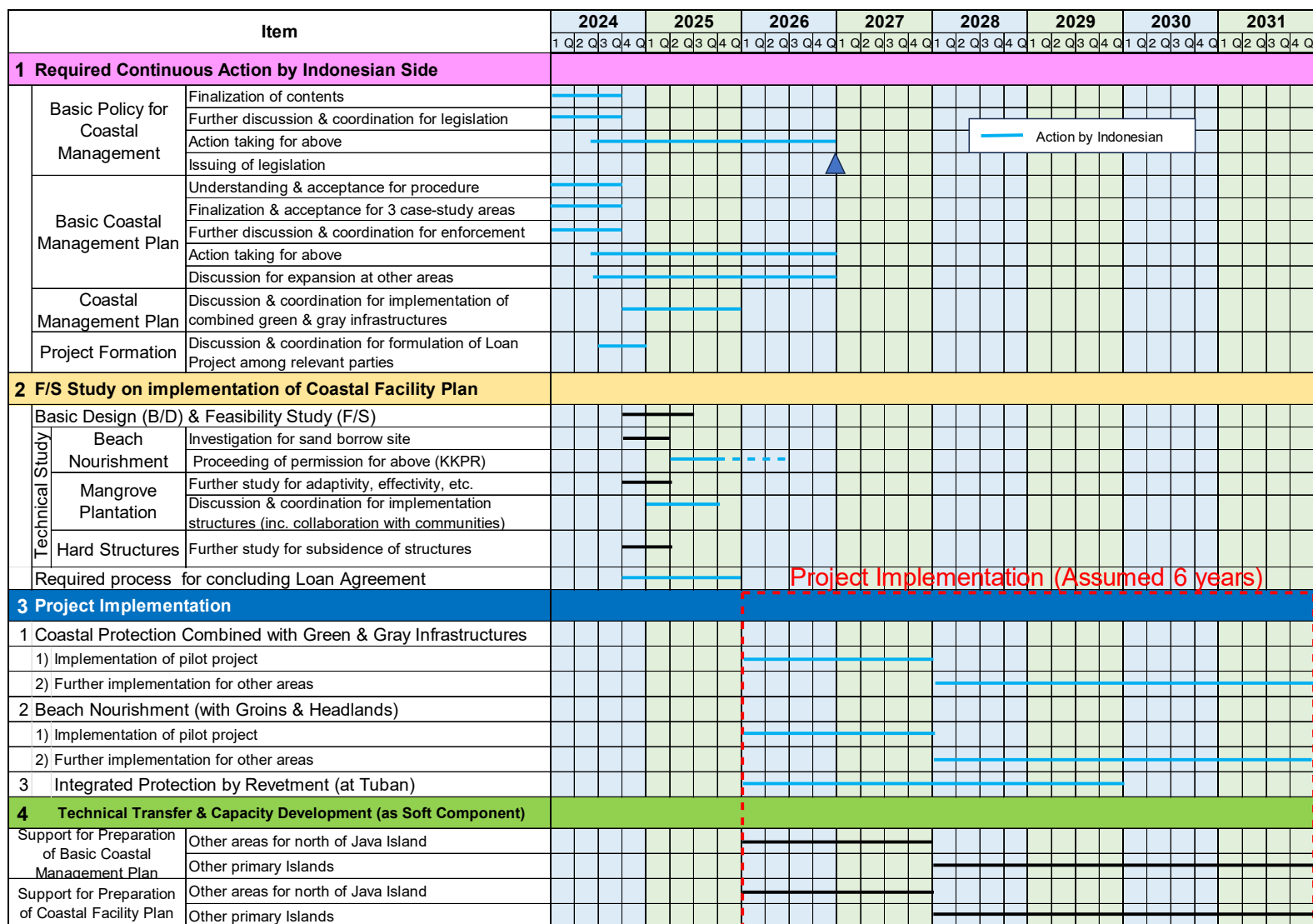
- The proposed beach nourishment and green-infrastructure projects should be based on adaptive management, whereby the next step is to proceed while observing the results as shown in Figure 15.5.1. From this point of view, different project scheme and procedure from that for ordinary infrastructure projects might be appropriate. In other words, the proposed measures will be implemented on a pilot basis, monitored and evaluated, and then reconsidered, including adaptation measures, before proceeding to the next step.

The draft project schedule based on the above concept is shown in Figure 15.5.2.



Source: Monitoring and Adaptive Management Procedures and Guidelines Manual (USDA, 2019)

Figure 15.5.1 Adaptive Management



Source: JICA survey team

Figure 15.5.2 Image of Project Schedule

CHAPTER 16 Economic Analysis

In this chapter, economic analysis per Area is implemented. Assumptions, economic costs, and economic benefits used for the economic analysis are explained.

16.1 Basic Assumptions for Economic Analysis

Basic assumptions applied for economic analysis are shown in Table 16.1.1. Evaluation period is set for 33 years (construction 3 years + operation 30 years). The general construction period of similar projects is around three years. The evaluation period for coastal protection projects is generally set at 30-50 years, but for the Project, it is shorter at 30 years as the main coastal facility of the Project is soft structural measures such as beach nourishment. Standard conversion factor and discount rate are set at 0.9 and 10 % which are popularly used for feasibility studies funded by international institutes including JICA.

Table 16.1.1 Assumptions of Economic Analysis

Items	Assumptions	Notice
Project scope	Project Implementation of the following 4 areas A) Indramayu West B) Indramayu East C) Pekalongan D) Tuban	-
With-Project, Without-Project	With-Project: Influenced from the project implementation, erosion and flood damage will be reduced, and number of tourists will increase Without-Project: Project is not implemented, and the economic damage of erosion and flood continue	-
Evaluation period	2027-2059, 33 years Construction Period: 2027-29 (3 years) Operation Period: 2030-2059 (30 years)	30 years after the completion of the facilities (as main facility is the soft structural measures)
Exchange rate	IDR/ USD 0.0000623, IDR/ JPY 0.097	As of May 2023
Standard conversion rate	0.9	Popular value used for FS of international funded project
Social discount rate	10%	Popular value used for FS of international funded project

Source: JICA Study Team

Quantified economic costs and economic benefits of proposed projects are shown in Table 16.1.2. Project cost, O&M cost and residual value are added as economic costs. Economic benefits of reduced damage by erosion and inundation, economic benefit of increased tourists by created beach, and land creation by mangrove plantation are quantified. Furthermore, there are other qualitative economic benefits that are difficult to quantify in financial terms. Examples of the qualitative benefits include sea water purification by created beach, nurturing natural life and preservation of ecosystems on created beach. Both quantified economic benefits and qualitative benefits for each type of proposed coastal facility are shown in Table 16.1.3.

Table 16.1.2 Economic Costs and Economic Benefits Used in the Economic Analysis

Area	Economic Costs	Economic Benefits
A) Indramayu West	1) Project cost	1) Economic benefit of reduced damage by erosion
B) Indramayu East	2) O&M cost	2) Economic benefit of reduced damage by inundation
C) Pekalongan	3) Facility rehabilitation cost	3) Economic benefit of increased tourists by created beach
D) Tuban	4) Residual value	4) Economic benefit of land increase by mangrove foresting

Source: JICA Study Team

Table 16.13 Quantified Economic Benefits and Qualitative Benefits for Each Type of Proposed Coastal Facilities

Proposed Coastal Facility	Function	Quantitively estimated benefits	Qualitative benefits	Overview of the estimation of quantitatively estimated benefits / Examples of qualitative benefit
Beach nourishment and headlands/groins Section (Length) - Indramayu west (2.9 km) - Indramayu east (4.5 km) - Pekalongan(2.9 km) - Tuban (3.1 km)	Protection	1) Reduction of erosion damage 2) Reduction of inundation damage	-	1) In coasts where erosion is expected, the value of land and buildings was estimated, and the reduction in the damage due to coastal projects was calculated. 2) In coasts where high-waves and surges inundation is expected, the value of buildings was estimated considering the damage rate, and the reduction in the damage due to coastal projects was calculated.
	Protection	1) Increase in tourists due to coastal development	2) Non-use (existence) value	1) The increase in coastal use for tourism purposes due to the creation of sandy beaches was quantitatively calculated. 2) Even without consumptive use, the development of a beautiful coast is expected to provide psychological well-being to the local residents.
	Environment	-	1) Biological growth and ecosystem conservation 2) Seawater purification	1) Sandy beaches are assumed to serve as habitats for a variety of organisms, contributing to conservation and restoration of ecosystems. 2) One sandy beach is created; it is assumed that the shellfish and bacteria inhabiting sandy beaches have seawater purification effects.
Mangrove Plantation and Breakwaters Section (Length) - Indramayu west (7.8 km) - Pekalongan (5.5 km)	Protection	1) Reduction of erosion damage 2) Land increase by mangrove foresting	3) Reduction of wave-induced inundation	1) In coasts where erosion is expected, the value of land and buildings was estimated, and the reduction in the damage due to coastal projects was calculated. 2) Benefit of land increase was calculated based on the assumption that mangrove planting restore a large land area, and thereby create valuable use. 3) The extensive and dense development of mangrove forests is expected to have a wave attenuation effects and is assumed to reduce wave-induced inundation damage to the hinterland.
	Protection	-	1) Creation of tourism resources 2) Creation of fishery resources and increase in fishery utilization 3) Non-use (existence) value	1) Planted mangrove forests are expected to be used as resources for ecotourism area. 2) Since mangrove forests serve as breeding grounds for marine life, they are expected to be utilized for local fishing activities. 3) Even without consumptive use, the development of a beautiful coast is expected to provide psychological well-being to the local residents.
	Environment	-	1) Biological growth and ecosystem conservation 2) Seawater purification 3) Blue carbon effect	1) Mangroves are assumed to serve as breeding grounds for marine life, contributing to the conservation and restoration of ecosystems. 2) Once mangroves are planted, It is assumed that the organisms newly inhabiting around mangroves are expected to have a water purification function. 3) Mangroves are assumed to absorb and sequester carbon dioxide from the atmosphere, contributing to climate change mitigation.
Amenity oriented revetment Section (Length) - Tuban (11.3 km)	Protection	1) Reduced damage by erosion 2) Reduced damage by inundation	-	1) In coasts where erosion is expected, the value of land and buildings was estimated, and the reduction in the damage due to coastal projects was calculated. 2) In coasts where high-waves and surges inundation is expected, the value of buildings was estimated considering the damage rate, and the reduction in the damage due to coastal projects was calculated.
	Protection	-	1) Non-use (existence) value	1) Even without consumptive use, the development of a beautiful coast is expected to provide phycological well-being to the local residents.
	Environment	-	-	

Source: JICA Study Team

16.2 Economic Costs

16.2.1 Project Cost

Project cost is estimated based on the project cost prescribed in 14.4 of Chapter 14. Firstly, price escalation is excluded from the project cost (composed of construction cost, consultant cost, physical contingency cost and price escalation) as it is identified as the transition cost. Secondly, the project cost is separated into local currency portion and foreign currency portion, and the Standard Conversion Factor (0.9) is multiplied to the local currency portion to calculate the economic cost. The main coastal facilities of the Project are beach nourishment, coastal protection, etc., and there is no import materials or machines. Therefore, all the construction cost is assumed as local currency portion. Only the consultant cost is categorized in the foreign currency portion. The annual disbursement is assumed to be the same during the construction period for 3 years.

Table 16.2.1 Estimated Economic Costs per Area

Area	Project Cost	Economic Cost	Year 2027	Year 2028	Year 2029
A) Indramayu West	459,718	418,319	139,440	139,440	139,440
B) Indramayu East	206,979	188,340	62,780	62,780	62,780
C) Pekalongan	458,851	417,530	139,177	139,177	139,177
D) Tuban	545,354	496,244	165,415	165,415	165,415
合計	1,670,902	1,520,433	506,811	506,811	506,811

Source: JICA Study Team

16.2.2 O&M Cost

As explained in Chapter 14.5, O&M work will be implemented every 5 years after the year 2034. The O&M cost shown in Table 14.5.1 is categorized as local currency portion, and the Standard Conversion Factor (0.9) is multiplied to estimate the economic cost shown in Table 16.2.2.

Table 16.2.2 Estimated Economic Cost of O&M Cost

Area	Financial Cost	Economic Cost
A) Indramayu West	17,779	16,001
B) Indramayu East	7,452	6,707
C) Pekalongan	17,346	15,611
D) Tuban	4,030	3,627
Total	46,607	41,946

Source: JICA Study Team

16.2.3 Residual Value

Residual value of the coastal facilities is added at the final year of the evaluation period if there is a residual asset value at the final year. In the Project, the facility life period is assumed at 30 years, and it corresponds to the total evaluation period for 30 years, there is no residual value added at the final year.

16.3 Economic Benefits

16.3.1 Economic Benefit of Reduced Damage by Erosion

To estimate the economic benefit of reduced damage by erosion, the values of erosion area, number of affected houses, prices of land and house, and damage amount, are estimated.

(1) Estimation of Erosion Area and Number of Affected Houses

The economic benefit of reduced damage caused by inundation is calculated by estimating the damage to various facilities based on water depth, the number of affected houses, and damage rates. Since there is no guideline in Indonesia for calculating flood damage or damage rates, the methodology of the “Guideline for economic analysis of coastal protection project (April 2020)” issued by the Ministry of Land, Infrastructure, Transport and Tourism in Japan in 2020, is used for the calculation.

(1) Estimation of Flood Area and Affected Houses

In Coastal Facility Plan, all proposed coastal facilities are designed to prevent coastal erosion, that is either maintaining the current shoreline or restoring the shoreline. Thus, for all the proposed coastal facilities, economic benefits due to the reduction of coastal erosion damages were considered (refer to Table 16.1.3).

Coastal erosion damage was estimated by assuming that the historical erosion rate at each target coast will continue at a constant rate. The annual average erosion rate for each coast was calculated, and the annual erosion area and the number of buildings damaged by coastal erosion were estimated. The annual average erosion rate for each coast was determined using the temporal shoreline changes extracted from satellite images (Table 16.3.1). On most coasts in the Sections, the arithmetic mean of the annual average erosion rate was applied, while on some coasts experiencing excessive coastal erosion at a rate exceeding the average for each Section, the specific annual average erosion rate for those coasts was used.

Table 16.3.1 Annual Average Erosion Rate in Each Area

Section	Erosion rate	Remarks
A) Indramayu West	6.23 m/year	Shoreline changes from 2011 to 2020 and from 2009 to 2020 were analyzed.
B) Indramayu East	2.85 m/year	Shoreline changes from 2011 to 2020 were analyzed.
C) Pekalongan	4.12 m/year	Shoreline changes from 2013 to 2022 were analyzed.
D)Tuban	0.00 m/year	Shoreline changes from 2010 to 2020 were analyzed. (In Tuban, coastal erosion is not observed.)

Source: JICA Study Team

Additionally, the annual number of erosion-damaged buildings was estimated by multiplying the annual erosion rate in the hinterland of each coastal facility by housing density, that is the proportion of building area within 100 meters behind the shoreline. For calculating the housing density building dataset was used, which is GIS data of building locations, building outlines, and building areas. Such a building dataset is not commonly obtainable in Indonesia, the open-source Google Open Buildings dataset was used.

Table 16.3.2 Affected Area and Number of Houses in Each Area

Area (Extension of Coastal Facility)	Estimated annual erosion area	Housing density (Within 100 m behind shoreline)	Estimated erosion- damaged buildings
1) Indramayu West (10.7 km)	91,666 m ² /year	0.0 % - 6.9 %	25.7 buildings/year
2) Indramayu East (4.5 km)	16,103 m ² /year	1.2 % - 9 %	10.7 buildings/year
3) Pekalongan (8.4 km)	55,876 m ² /year	0.0 % - 14.5 %	22.4 buildings/year
4) Tuban (14.4 km)	-	-	-
Total	163,664 m ² /year	-	58.9 buildings/year

Source: JICA Study Team

(2) Estimation of Prices of Land and Houses

Land price is obtained based on the samples of advertisement at individual trading site of real estate (rumah123.com, olx.co.id). Typical 10 samples of land sales are chosen, and the average prices are calculated per square meters. Price of house is calculated using typical 5 examples of house sales. As the sales price includes land value, the estimated land value is excluded from the house price, and unit cost of house is calculated dividing the building price by built area. As the statistical information is not available, average household size is assumed at 50 m² based on the visual evaluation of satellite images and interview results. Average house value is calculated by multiplying the estimated average household size and unit price of the house.

Table 16.3.3 Prices of Land and House in Each Area

Area	Land Price of Residential Area (IDR 1000/m ²)	Land Price of Non-residential Area (IDR 1000/m ²)	Unit Cost of House (IDR 1000/m ²)	Average House Value (50m ²) (IDR 1000/m ²)
1) Indramayu	1,566	232	3,240	161,995
2) Pemalang-Pekalongan	1,533	357	2,983	149,170
3) Rembang-Tuban	931	291	3,766	141,730

Source: JICA Study Team, sales price of individual trading site

(3) Calculation of Annual Economic Damage

To calculate the annual economic damage, prices of land and house shown in Table 16.3.3 are multiplied by the estimated erosion land area and number of affected houses shown Table 16.3.2. The estimated annual loss value is shown in Table 16.3.4. Total loss in four areas became IDR 56,210 million/year. Out of the total loss, the loss of non-residential area takes the biggest share of 78 % which is IDR 43, 961 million. Loss of houses and residential area are IDR 8,322 million/year (15 %) and IDR 3,927 million/year (7 %) respectively. If the loss amount is compared by area, the loss of Indramayu West and Pekalongan are higher at IDR 27,090 million /year (48 %) and IDR 22,961 million /year (41 %) respectively as large area is affected by the erosion.

Table 16.3.4 Annual Economic Damage by Land Erosion in Each Section

(unit: IDR million/year)

Section	Loss of Residential Land	Loss of Non-Residential Land	Loss of Houses	Total
1) Indramayu West	2,431	20,911	3,749	27,090
2) Indramayu East	1,012	3,586	1,561	6,159
3) Pekalongan	484	19,464	3,013	22,961
4) Tuban	0	0	0	0
Total	3,927	43,961	8,322	56,210

Source: JICA Study Team

16.3.2 Economic Benefit of Reduced Damage by Inundation

The economic benefit of reduced damage caused by inundation is calculated by estimating the damage to various facilities based on the water depth, number of affected houses, and the damage rates. Since there is no guideline in Indonesia for calculating flood damage or damage rates, the methodology of the “Guideline for economic analysis of coastal protection project (April 2020)” issued by the Ministry of Land, Infrastructure, Transport and Tourism in Japan in 2020, is used for the calculation.

(1) Estimation of Inundation Area and Affected Houses

The economic benefits of flood damage reduction were examined for coastal facilities proposed to mitigate flood damage. Among the four types of coastal facilities proposed in Coastal Facility Plan, the flood prevention effect of mangrove plantation is considered limited, and thus, the economic benefits of flood damage reduction for mangrove plantation were not estimated (refer to Table 16.1.3).

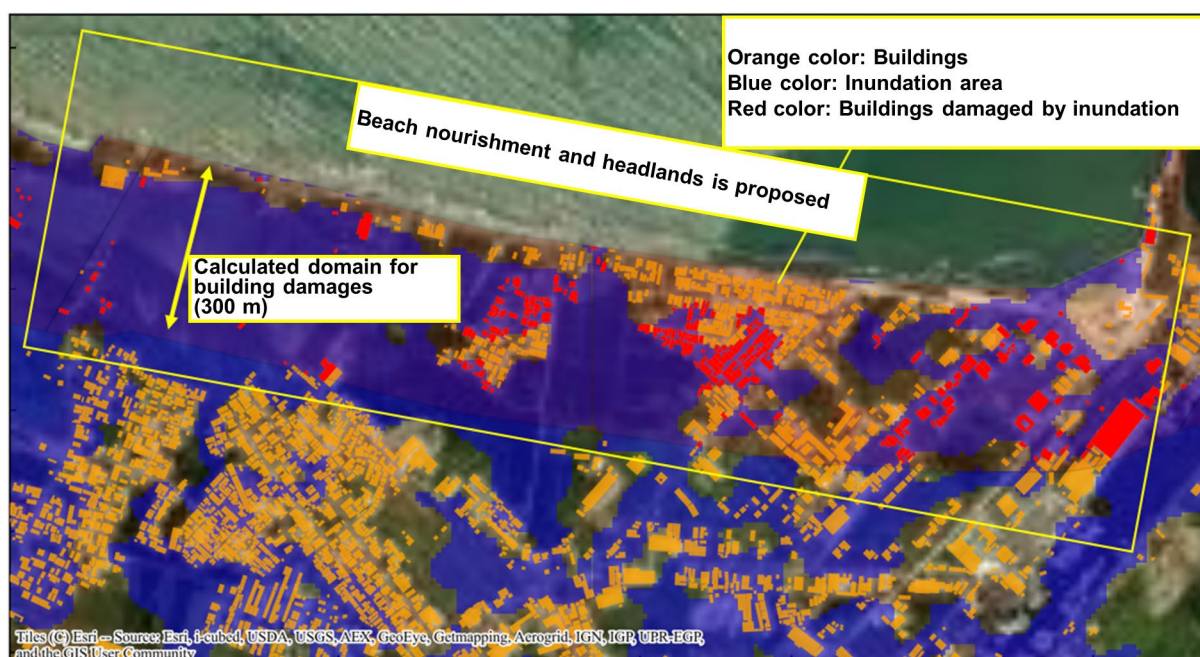
Flood damage was estimated for the hinterland of each coastal facility by calculating the inundation area and the number of buildings affected by high waves and storm surges. Flooding process in the target Sections is considered as the low-plain elevation areas inundated due to high tides and high waves. Therefore, in this flood damage estimation, the inundation depth was calculated by assuming the difference between the design water level and the elevation of the hinterland. The elevation data is used by DEMNAS data from the Geospatial Information Agency in Indonesia, which are open-source data and with the spatial resolution of 0.27 arcsecond, approximately 8.3 m. Additionally, in some target Sections, such as Pekalongan which has a low-plain evaluation hinterland, tidal flood that occurs a few times in a year causes extensive inundation area, about 1 to 2 km behind the shoreline. In this flood damage estimation, to avoid overestimation, the maximum inundation area was limited to 300 m from the shoreline.

Table 16.3.5 shows the cases of flood damage estimation for each Section with annual probability of occurrence. Since in Coastal Facility Plan, the protection level is based on the 50-year probability event, the economic benefits of flood damage reduction was estimated to include the reduction of the damage up to the amount corresponding to the 50-year probability event. Additionally, Pekalongan Section has experienced land subsidence (assuming 5 cm/year), it is considered that the absence of a new coastal facility, that is without case, increases the relative flood depth, leading to larger flood damage and larger damage cost to buildings. In this flood damage estimation, the reduction of the increase of flood damage due to land subsidence was considered as the economic benefit of the implementing new Coastal Facility. It should be noted that to avoid overestimation, the duration of land subsidence was assumed to be 10 years from 2025 to 2034. Figure 16.3.1 shows inundation map in Pekalongan city, as an example.

Table 16.3.5 Cases of Flood Damage Estimation for Each Section

Section	Return period	Design water level
1) Indramayu West	10 years	DWL = 0.9 m (HHWL + Wave Setup due to 10-year return period wave)
	50 years	DWL = 1.0m (HHWL + Wave Setup due to 50-year return period wave)
2) Indramayu East	10 years	DWL = 0.9 m (HHWL + Wave Setup due to 10-year return period wave)
	50 years	DWL = 1.0m (HHWL + Wave Setup due to 50-year return period wave)
3) Pekalongan	10 years	2024 年 : DWL = 1.1 m (HHWL + Wave Setup due to 10-year return period wave) 2034 年 : DWL = 1.6 m (0.5 m of a relative water level rise due to land subsidence was added on the DWL of 2024)
	50 years	2024 年 : DWL = 1.2 m (HHWL + Wave Setup due to 50-year return period wave) 2034 年 : DWL = 1.7 m (0.5 m of a relative water level rise due to land subsidence was added on the DWL of 2024)
4) Tuban	10 years	DWL = 1.3 m (HHWL + Wave Setup due to 10-year return period wave)
	50 years	DWL = 1.4 m (HHWL + Wave Setup due to 50-year return period wave)

Source: JICA Study Team



Source: JICA Study Team

Figure 16.3.1 Inundation Map and Affected Buildings in Pekalongan (Case: Pekalongan Section in 50-years return period wave and in 2024)

Table 16.3.6 shows inundated area and the number of buildings within the inundation area for each return period. The number of houses was calculated by dividing the area of the affected houses by 50 m², the average house area .

Table 16.3.6 Inundation Area and Number of Affected Houses

Cases	Building areas per inundation depth			Num. of houses
	0.49 m or less	0.50 - 0.99 m	1.00 m or above	
1) Indramayu West 10-year return period	3,836 m ²	4,876 m ²	20,370 m ²	582 houses
1) Indramayu West 50-year return period	4,418 m ²	4,730 m ²	20,880 m ²	601 houses
2) Indramayu East 10-year return period	980 m ²	1,371 m ²	8,271 m ²	212 houses
2) Indramayu East 50-year return period	816 m ²	1,261 m ²	8,692 m ²	215 houses
3) Pekalongan (2024 年) 10-year return period	4,978 m ²	7,501 m ²	18,784 m ²	716 houses
3) Pekalongan (2024 年) 50-year return v	4,732 m ²	7,620 m ²	24,801 m ²	743 houses
3) Pekalongan (2034 年) 10-year return period	8,503 m ²	8,627 m ²	30,750 m ²	958 houses
3) Pekalongan (2034 年) 50-year return period	7,686 m ²	8,630 m ²	32,568 m ²	978 houses
4) Tuban 10-year return period	2,559 m ²	1,936 m ²	27,149 m ²	633 houses
4) Tuban 50-year return period	3,124 m ²	2,021 m ²	27,540 m ²	654 houses

Note: Although inundation depth was classified every 0.2 m starting from 0.2 m ending at 1.0 m, the table indicate values in total.

Source: JICA Study Team

(2) Estimation of Damage Rates

Referring to “Guideline for economic analysis of coastal protection project (MLIT, April 2020, Table V-5)”, damage rates of different assets are shown in Table 16.3.7. According to this guideline, damage rates were obtained by multiplying the damage rates of “manual of economic analysis for flood control projects in Japan” and damage factor for sea water against fresh water used in the “The Economics of Coastal Management (UK)”.

Table 16.3.7 Damage Rate of Sea Water Inundation

Asset Item	Water depth			
	Lower than floor	- 0.49 m	0.50 – 0.99 m	1.00 – 1.99 m
Household building	0.059	0.263	0.391	0.655
Household asset (except for vehicle)	0.037	0.400	0.800	1.000
Household asset (vehicle)	-	0.150	0.150	0.875

Source: Guideline for economic analysis of coastal protection project (MLIT of Japan, April 2020), Table V-5

(3) Estimation of Reduced Economic Damage

Economic benefit of reduced damage by inundation in each area is calculated. Average asset value of house and household asset is estimated, and the damage of inundation is quantified. Asset value of household asset is assumed to be 30 % of house value. Damage of other assets such as enterprises, agricultural land, aquaculture, and infrastructure are not quantified because of the lack of statistical information.

Annual average economic benefit of reduced damage of houses is calculated using the “Number of Damaged House”, “Average House Value”, “Damage Rate”, and “Probability”.

Damage rates of household building and household asset are referred from the Table 16.3.7 under the water depth of less than 0.49 m, 0.50 – 0.99 m, and more than 1.00 m.

Annual average damage is calculated considering the several return period cases (10 years 50 years) based on the Guideline for economic analysis of coastal protection project (April 2020). In line with the protection level of coastal facility plan, the benefits of reduced inundation damage were calculated assuming coastal development can prevent flood damage up to a 50-year probability event. Additionally, to avoid overestimating the damage, a three-years return period was assumed for the probability that do not cause inundation damage. Calculation method of annual average damage is shown in Table 16.3.8, and the estimated economic damage under each return period cases, and calculated annual average damage are shown in Table 16.3.9.

Table 16.3.8 Calculation Method of Reduced Annual Average Damage

Return Period	Probability	Estimated Damage	(A)	(B)	(C) = (A) x (B)	Annual Average of Reduced Damage
			Annual Average Probability	Annual Average Damage	Annual Average Damage	
3 years	N3 = 1/3	L3 (=0)	-	-	-	Total of (C)
10 years	N10 = 1/10	L10	N3 – N10	(L3+L10)/2	((N3-N10) (L3+L10))/2	
50 years	N50 = 1/50	L50	N10 – N50	(L10+L50)/2	((N10-N50) (L10+L50))/2	

Source: JICA Study Team

Table 16.3.9 Economic Damage under Each Return Period per Section

Section	3 years	10 years	50 years	Annual Averal Damage Amount
1) Indramayu West	0	70,745	72,545	10,716
2) Indramayu East	0	28,189	28,976	4,588
3) Pekalongan (year 2024)	0	78,479	82,273	11,899
3) Pekalongan (year 2034)	0	103,110	106,937	20,431
4) Tuban	0	72,971	74,614	11,236
Total	0	250,384	258,408	38,439

Source: JICA Study Team

16.3.3 Economic Benefit of Increased Tourist by Created Beach

The economic benefit of increased tourist by the project implementation is calculated using the following formula. Assumptions for calculation are further explained in latter part.

"Incremental number of tourists (people/year)" x "Average daily consumption of tourist" x "Profit margin of tourism industry (%)".

(1) Incremental Number of Tourists

Incremental number of tourists by the project implementation is estimated based on the current number of tourists in the area and size of the newly constructed beach.

Firstly, outline of representative beach for recreation, current annual number of tourists of each beach are summarized in Table 16.3.10, using statistical data, on-site photo and web information.

In Indramayu, there are many beaches with black sand, and the annual number of tourists are from 25,000 to 45,000 (2016). The length of beach varies from 260m to 2,100m. There is a low correlation between beach length and the number of tourists. However, several beaches with restaurants tended to attract more tourists.

In Pemalang, there are beaches with 24,000 to 27,000 tourists per year (2020). Wonokerto Beach in Pekalongan has a wide black sand beach that stretches for 3.8 km, and 76,000 tourists visit every year (2020).

In Rembang, there are beaches with white sand, and the numbers of tourists are high ranging from 113,000 to 288,000 (2021) per year. Tuban also has white sandy beaches. Although statistical data on the number of tourists in Tuban is not available, according to interviews and newspaper articles, around 2,000 to 4,500 tourists visit per day, and the annual numbers of tourists are estimated to be around 100,000 to 200,000.

Table 16.3.10 Outline and Annual Number of Tourists at Existing Beaches

Area	Name of Beach	Length of Beach	Beach Condition	Number of Tourists (people/year)	Data source	
1) Indramayu	Balongan Indah Beach	260 m	Black sand, restaurants	52,916	Visitor's Satisfaction Analysis of Tourism in Karangsong Mangrove Forest, Indramayu, 2016	
	Tirtamaya Beach	270 m	Black sand, restaurants	44,451		
	Glayem Beach	2,100 m	Black sand	25,007		
	Karangsong Beach	260 m	Black sand, restaurants	around 100,000		Interview (200/day weekday, 400-700/day weekend, 2022)
	Plentong Beach	210 m	Black sand	around 40,000		Interview (60/day weekday, 250/day weekend, 2022)
2) Pemalang-	Widuri Beach	700 m	Black sand, wide, restaurants	126,627	Draft Tourism Book of Central Java, 2021	
	Joko Tingkir Beach	590 m	Black sand, wide	24,951		
3) Pekalongan	Wonokerto Beach	3,830 m	Black sand, wide	110,375		
4) Rembang-	Pasir Putih Wates Rembang Tasikharjo Beach	1,080 m	White sand	113,197	Draft Tourism Book of Central Java, 2021	
	Karang Jahe Beach	690 m	White sand, recreation beach	288,465		
5) Tuban	Remen Beach	470 m	White sand	around 200,000	Interview (2,000/day, weekend, 2022)	
	Cemara Sugiharwas Beach	860 m	White sand, restaurants	around 100,000		News article, 2022, (4,500/day, Islamic holiday)

Source: JICA Study Team

Incremental number of tourists will be estimated after designing the project facility as taking the impact of the past similar projects into account.

Estimation of tourist number in future is difficult. However, the created beaches which has brighter sand color, 30 - 40 m wide, 2.9 - 4.5 km long, is believed to attract more people compared with the existing beaches with black

color sand in Indramayu West, Indramayu East and Pekalonga area. In tuban area, there are existing beaches with bright color sand, and number of tourists is higher than 200,000 per year. In each area, taking account of the current number of tourists and length of created beach, the incremental number of tourists per year is estimated. The tourist number at new beach is estimated at 100,000 in Indramayu West, 150,000 in Indramayu East, 150,000 in Pekalongan, and 200,000 in Tuban.

Table 16.3.11 Estimated Additional Number of Tourists

Area	Number of New Beaches	Width of Beach	Length of Beach	Current Number of Tourists	Estimated Number of Tourist (as of 2034s)
1) Indramayu West	3 sites	40 m	2.9 km	262,000 people/year	+100,000 people/year
2) Indramayu East	3 sites	40 m	4.5 km		+150,000 people/year
3) Pekalongan	2 sites	40 m	2.9 km	282,000 people/year	+150,000 people/year
4) Tuban	2 sites	30 m	3.1 km	435,000 people/year	+200,000 people/year
Total	10 sites	30m – 40m	13.5 km	1,056,000 people/year	+600,000 people/year

Source: JICA Study Team

After the completion of the beach, it is assumed that it takes 5 years until the target number is achieved as the acknowledgment of the constructed beach and construction of restaurants around the site take time.

Number of tourists after the year 2035 is estimated under three different alternative cases.

Alternative1 of tourist number: No change

Alternative2 of tourist number: Number increases 4.9 %/year from 2036 to 2045

Alternative3 of tourist number: Number increases 10.0 %/year from 2036 to 2045

According to the OECD Tourism Trends and Policies 2020, the average growth rate of number of domestic tourism from 2014 to 2018 was 4.9 %/year. Under the Alternative2 of tourist number, the number of domestic tourist in the project area increases the same rate of this data.

According to the consultant of “Bali conservation project” which is the similar beach nourishment project in Indonesia, number of domestic tourists sharply increased after the project completion. Under Alternative3 of tourist number, the annual increase rate is set at 10.0 %/year during the said 10 years.

The estimated number of tourists, and its growth rates are summarized in Table 16.3.12. Influenced by the economic growth in Indonesia, the number of domestic tourists is assumed to increase, and the Alternative 2 is set as Base Case for this economic analysis.

Table 16.3.12 Estimated Number and Growth Rate of Tourists under Alternative Cases

Numbers/Growth Rate	Increased Number	Number	Growth Rate	Growth Rate
Year	2030 – 2034	2034	2035 – 2044	After 2045
Alternative1	+120,000 people/year (20% of target number in 2034)	600,000 people/year	None	None
Alternative2 (Base Case)			+4.9 %/year	
Alternative3			+10.0 %/year	

Source: JICA Study Team

(2) Average Daily Consumption of Tourist

The "average daily consumption of tourist" is calculated based on the "average expenditure per travel per province" and "average length of stay" listed in the Domestic Tourism Statistics issued by the BPS-Statistics Indonesia. Influenced by the COVID-19 pandemic, there were fluctuations in the figures from 2020 to 2021, so the average value for the latest three years was calculated. The average daily expenditure per person was IDR 407,000 in Indramayu West and East (West Java), IDR 410,101 in Pekalongan (Central Java), and IDR 597,000. As Tuban is located in both Central Java and East Java, average of those two provinces, which is IDR 662,749/day, is used for the analysis.

Table 16.3.13 Average Daily Consumption of Tourist per Province

Province	Year	Average consumption per stay (IDR)	Average period of stay (day)	Average daily consumption of tourist (IDR/day)
1) West Java (Indramayu)	2020	1,375,370	4.08	337,100
	2021	1,953,820	4.39	445,062
	2022	2,134,680	4.88	437,434
	Average			407,000
2) Central Java (Pemalang, Pekalongan, Rembang)	2020	938,060	2.75	341,113
	2021	1,675,540	3.26	513,969
	2022	1,808,990	4.82	375,309
	Average			410,000
3) Eastern Java (Tuban)	2020	1,074,460	2.71	396,480
	2021	2,568,950	3.18	807,846
	2022	2,002,290	3.42	585,465
	Average			597,000

Source: Domestic Tourism Statistics, 2019-2021, BPS-Statistics Indonesia

(3) Profit Margin of Tourism Industry

The value added of tourism industry (sales – operational costs) is purely counted as the economic benefit. The profit margin (proportion of value added out of sales) is set at 35 %, based on the value added ratio of Japan's accommodation and food service industry (37.7 % according to the Economic Census Activity Survey 2016).

(4) Calculation of Economic Benefit of Increased Tourists

Based on the incremental number of tourists, average daily consumption of tourist, and profit margin of tourism industry, the annual economic benefit of increased tourists is estimated as shown in Table 16.3.14.

Table 16.3.14 Economic Benefit of Increased Tourists per Area

Area	Incremental number of tourists (people/year)	Average daily consumption of tourist (IDR/day)	Profit margin	Economic benefit of incremental tourists (IDR million)
1) Indramayu West	100,000	407,000	35%	14,245
2) Indramayu East	150,000	407,000	35%	21,368
3) Pekalongan	150,000	410,000	35%	21,525
4) Tuban	200,000	597,000	35%	41,790
Total	600,000			98,928

Source: JICA Study Team

16.3.4 Economic Benefit of Land Increase by Mangrove Foresting

Mangrove foresting is included in Indramayu West and Pekalongan area. The foresting land could be used for recreation purpose, and the land itself has the economic value. The economic benefit of land increase calculated by the following formula is added in 2030 at the year of project completion.

$$\text{“Area of Foresting (m}^2\text{)”} \times \text{“Land Price (IDR/m}^2\text{)} \times 1/2$$

(1) Area of Foresting

According to Chapter 14.4, area of foresting is 1,167,000 m² in Indramayu West, and 819,000 m² in Pekalongan.

(2) Land Value

Standing on the conservative side, half of the land price shown in Table 16.3.3 of Non-residential land (IDR 116,000/m² in Indramayu West, IDR 178,500/m² in Pekalongan) is used for the calculation.

16.3.5 Estimated Amount of Economic Benefits

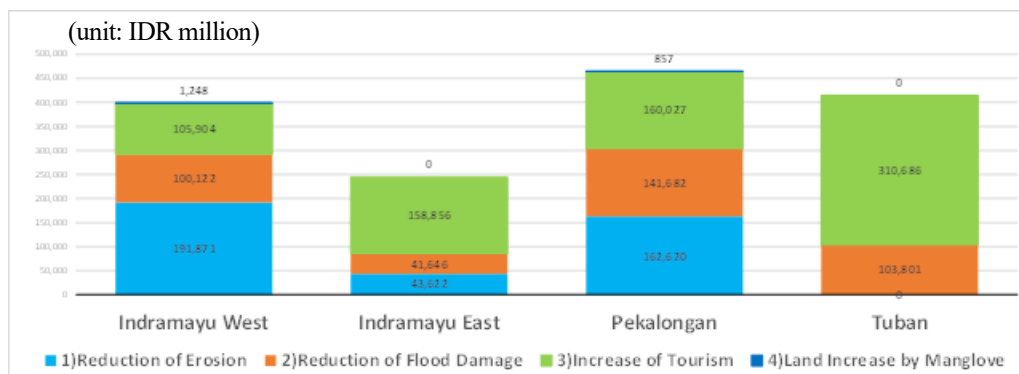
Estimated amount of four economic benefits under Alternative2 (Base Case) of tourist number are shown in Table 16.3.15 and Figure 16.3.2.

Table 16.3.15 Economic Benefit of Increased Tourists per Area (Alternative2 of Tourist Number)

(unit: IDR million)

Area	Economic benefit of reduced damage by erosion	Economic benefit of reduced damage by inundation	Economic benefit of increased tourist by created beach	Economic benefit of land increase by mangrove foresting	Total
1) Indramayu West	191,871	100,122	105,904	1,248	399,145
2) Indramayu East	43,622	41,646	158,856	0	244,123
3) Pekalongan	162,620	141,682	160,027	857	465,187
4) Tuban	0	103,801	310,686	0	414,487
Total	398,113	387,251	735,473	2,105	1,522,942

Source: JICA Study Team



Source: JICA Study Team

Figure 16.3.2 Composition of Economic Benefits at Net Present Value (Alternative2 of Tourist Number)

16.4 Result of Economic Analysis

16.4.1 Result of Economic Analysis

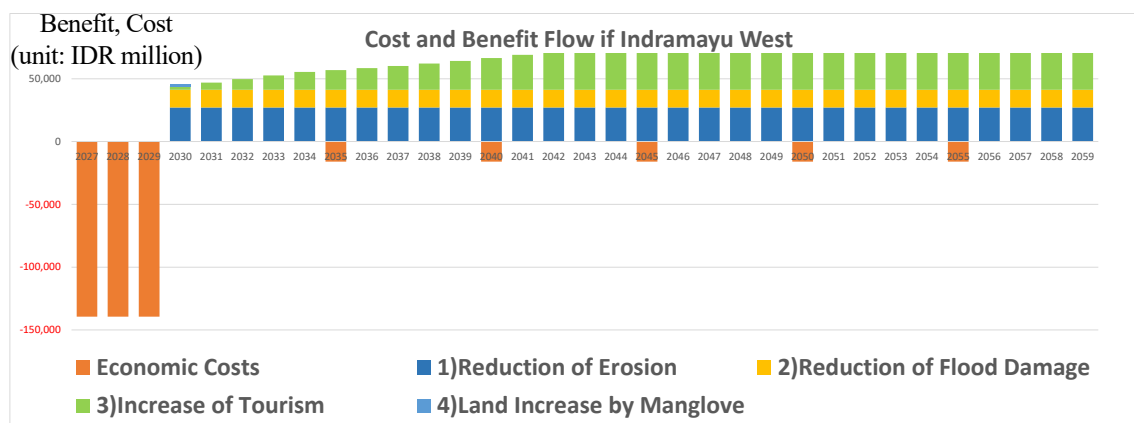
The result of economic analysis per area is shown in Table 16.4.1. As an example, flow of economic costs and economic benefits in Indramayu West is shown in Figure 16.4.1. The detailed calculation sheet is attached at Appendix 16.

Under alternative2 (Base Case) of tourist number, EIRR, B/C and ENPV of the whole project became 11.6%, 1.17 and IDR 220.0 billion. EIRR per area is the highest at 14.2% in Indramayu East area. EIRR values of Pekalongan, Indramayu West and Tuban follow at 12.8%, 11.0% and 10.0%, respectively. EIRR values of whole project under alternative1 and alternative3 of tourist number, became 10.5% and 12.9%. Under all alternative cases, the EIRR values of whole project surpass the critical value at 10%, and the project is evaluated as economically viable. Evaluating per area, EIRR value of Tuban area under alternative1 of tourist number is 8.3%, and the value is lower than 10%. To ensure the economic viability of the project, statistical data and future projection in tourism sector should be carefully monitored.

Table 16.4.1 Result of Economic Analysis

Area	Alternative2 (Base Case) of Tourist Number			Alternative1	Alternative3
	EIRR	B/C	Net Present Value (NPV) (IDR million)	EIRR	EIRR
1) Indramayu West	11.0%	1.10	36,130	10.4%	11.8%
2) Indramayu East	14.2%	1.50	81,188	12.8%	15.9%
3) Pekalongan	12.8%	1.29	103,222	12.0%	13.7%
4) Tuban	10.0%	1.00	-558	8.3%	11.8%
All Area	11.6%	1.17	219,982	10.5%	12.9%

Source: JICA Study Team



Source: JICA Study Team

Figure 16.4.1 Economic Costs and Economic Benefits (Case of Indramayu West, Alternative2 of tourist number)

16.4.2 Sensitivity Analysis

To evaluate the impact of surrounding conditions, sensitivity analysis is conducted under the following conditions. 12 different results are calculated in addition to the base case as there are 3 alternative cases of tourist number and 4 cases of sensitivity analysis. EIRR values of each case is shown in Table 16.4.2 and detail calculation sheet is attached at Appendix 16.

Base Case: No change on cost and benefit

Sensitivity1: All benefits increase by 10 %

Sensitivity2: All costs increase by 10 %

Sensitivity3: All benefits decrease by 10 %

Sensitivity4: All costs increase by 10 %, all benefits decrease by 10 %

Compared with the Base Case, EIRR values under Sensitivity1 increased by 1.0%, and EIRR values decreased by 1.0 – 2.2% under other sensitivity cases. Out of 15 assumed cases, EIRR values of 11 cases surpass the critical level at 10%, and the economic viability of the project is confirmed. 4 case out of 15 cases, EIRR values became lower than 10%. To ensure the economic impact of the project, the project implementation conditions should be monitored carefully, and necessary countermeasures should be taken smoothly to avoid the cost increase and benefit decrease.

Table 16.4.2 Result of Sensitivity Analysis

	Alternative2 (Base Case) of Tourist Number	Alternative1 of Tourist Number	Alternative3 of Tourist Number
Base Case	11.6%	10.5%	12.9%
Sensitivity1 (Benefit +10 %)	12.6%	11.5%	13.9%
Sensitivity2 (Cost +10 %)	10.6%	9.5%	11.9%
Sensitivity3 (Benefit -10 %)	10.5%	9.4%	11.8%
Sensitivity4 (Cost+10 %, Benefit -10 %)	9.6%	8.4%	10.9%

Source: JICA Study Team

CHAPTER 17 Environmental and Social Considerations

17.1 Purpose

Since the Project is a master plan study, a strategic assessment (SEA) study at the Initial Environmental Examination (IEE) level¹ is to be conducted in accordance with the JICA Guidelines for Environmental and Social Considerations. As the project plans to develop the draft of Basic Coastal Management Plan (Master Plan) and then the Coastal Facility Plan in three priority Areas, SEAs, including analysis of alternatives, prediction and assessment of environmental and social impacts, and development of mitigation measures and monitoring plans, were conducted in each of the three Areas.

17.2 Current Conditions of the Natural and Social Environment

17.2.1 Natural Environment

(1) Protected Area

The national-level protected areas are designated and managed by KLHK for terrestrial areas and mainly by KKP for marine areas. In addition, protected areas defined and managed by local governments below the provincial level are designated in spatial plans issued by the provincial government.

There are no national parks or protected areas designated as shown in Appendix 3, “Examples of Sensitive Areas” of the JICA Guidelines in the terrestrial and marine areas within the priority Areas of the Project. In addition, no protected areas equivalent to the protected areas in the JICA Guidelines have been designated in the priority Areas.

Terrestrial Protected Area

Terrestrial protected areas are mainly managed by KLHK. Protected areas are classified by Law No. 41 of 1999 (Forest Law) into two types: Conservation forests and Protected forests. Conservation forests are designated as forest areas that function to maintain biodiversity and ecosystems, and correspond to protected areas under JICA Guidelines. Commercial logging and other resource development are prohibited in conservation forests. Protected forests are designated as forest areas for water and soil conservation, including water source recharge, flood control, soil erosion control, and prevention of sea water intrusion, where commercial logging is prohibited. The location of protected areas in Java is shown in Appendix 17. There are no conservation forests designated around the priority coastal land areas but in some areas of Indramayu, Protected Forests, mainly mangrove forests, have been identified."

In the draft of Basic Coastal Management Plan (Master Plan), a hybrid structure (consisting of mangrove reforestation and offshore breakwaters using bamboo) is proposed for the areas. This is aimed at mitigating the impact (damage) of high tides and waves to protect mangrove forests, thereby contributing to the conservation of the ecosystems within the mangrove forests and the preservation of coastal resources.

Marine Protected Area

Marine Protected Areas in Indonesia are designated by KKP Ministerial Decree No. 31 /2020 for the purpose of ecosystem conservation, fisheries resources protection, cultural resources protection. There are 10 national marine protected areas under the jurisdiction of KKP and 7 under the jurisdiction of KLHK throughout Indonesia, but none in the northern Java coastal area. Marine Protected Areas were designated and managed by the KLHK until the jurisdiction was transferred to the KKP, and some of them are still managed by the KLHK. Marine protected areas

¹ “Initial Environmental Examination (IEE) level study” is a study that includes analysis of alternatives, prediction and assessment of environmental and social impacts, and development of mitigation measures and monitoring plans, based on available information such as existing data and brief field surveys if necessary.

at the provincial level are designated in accordance with the spatial plan of each province and individual laws and regulations and are being managed by the local government. The location of marine protected areas in Indonesia and the locations of marine protected areas under the jurisdiction of KLHK are shown in Appendix 17.

Regarding marine protected areas at the provincial level, in Area-I Indramayu, Eretan coastal and marine areas have been designated as marine parks by the West Java Provincial Spatial Plan (see Appendix 17). According to the West Java Provincial Spatial Plan (Provincial Regulation No. 9 of 2022 West Java Provincial Spatial Plan), the purpose of designating marine parks is for the conservation and utilization of ecosystems and resources (tourism, fisheries, and aquaculture areas). The park is classified as Category VI Resource Conservation Area among the IUCN Protected Areas Management Categories, and the main focus is the sustainable use of resources. Currently, the backlands are a densely populated fishing village and fishponds, with a river to the east that is accessed by large fishing boats. The area is also highly turbid due to river sediment inflow and is unlikely to be a habitat for valuable species. Therefore, it is different from the area designated for nature conservation as indicated in the JICA guidelines.

However, according to the West Java Provincial Spatial Plan, as shown in Table 17.2.1, permits are required for the construction of seawalls, jetties, and detached breakwaters. When construction work that will cause turbidity is planned, it is necessary to review the impact and take appropriate mitigation measures.

Table 17.2.1 Summary of Indramayu Eretan Marine Park

Purpose of Designation	Prohibited Activities (partial)	Activities Allowed with Condition (partial)
To protect, conserve and utilize biodiversity and resources.	International shipping routes Disposal and reclamation of waste Construction and activities of container ports Bottom trawl fishery, etc.	Construction of breakwaters, seawalls, and jetties Seascape tourism Fishing with gill nets and other traps, etc.

Source: Provincial Regulation No. 9/2022 Spatial Plan of West Java Province

The marine protected area (Taman Pesisir Ujungnegero-Roban Kabupaten Batang)², as defined by the Ministry of Marine Fisheries Decree No. 29/MEN/2012, is designated 5 km east of the eastern edge of the Pekalongan-Pemalang area. This protected area is classified as a Category VI Resource Conservation Area under the IUCN Protected Area Management Category, and is designated as a communal fishing zone for the purpose of sustainable use of resources, which is different from the purpose of designation as an area for nature conservation under the JICA Guidelines. The zone includes a buffer zone, and there are no restrictions on activities outside of the zone (according to the KKP Protected Area Officer).

International Protected Area

Some parts of the northern coast of Java are designated as Key Biodiversity Area (KBA) and Important Bird and Biodiversity Area (IBA), which are proposed by international NGOs for the purpose of biodiversity conservation. All KBAs and IBAs on the northern coast are designated as the same area. The locations of KBAs and IBAs in Java are shown in Appendix 17.

Within the priority area of Indramayu, Muara Cimanuk, located 10 km northwest of the city center of Indramayu, is designated as an IBA and KBA (see Appendix 17). This area covers mangroves, fishponds and freshwater swamps. It is important for waders such as Javan Coucal (*Centropus nigrorufus*), a VU species on the IUCN Red List, and Milky Stork (*Mycteria cinerea*), an EN species. Therefore, this area has been designated as an IBA and KBA. In this project, the area

² Designated by the Ministerial Decree No. 29/MEN/2012 of KKP. It is applied for designation as a marine protected area by the provincial governor and subsequently designated as a provincial-level marine protected area according to the Ministerial Decree of KKP.

in question is located within the priority area. However, upon researching the distribution range of the Javan Coucal and Milky Stork via the IUCN website, it was found that the Javan Coucal is distributed across Java Island, while the Milky Stork is found from North Sumatra to Sumbawa Island. Due to their extensive ranges, it is unlikely that this project will significantly impact them. Additionally, the terrestrial areas behind this project already consist of significantly converted lands for agricultural purposes, indicating that the area in question cannot be considered purely natural habitat. Therefore, since environmental impact is not expected, it will not affect the environmental category for the Project.

(2) Protected Species

Protected species in Indonesia are designated by the Ministry of Environment and Forestry Decree No. P.106 of 2018. Those specified in the Decree include 904 plant and animal species, which are prohibited from illegal logging and hunting, and are subject to consideration when being used for industrial and recreational purposes. The existence of protected species in each priority area will be confirmed when sub-areas are identified.

(3) Coral Reefs and Mangrove Forests

Coral Reefs

The coral reef area in Indonesia forms part of the Coral Triangle, an area of great marine biodiversity in the tropical western Pacific Ocean, and is home to the second largest coral reef in the world. There is no coral reef distribution along most of the coastline around the northern coast of Java Island, except for a few remote islands (see Appendix 17). No coral reef distribution data have been confirmed in the project sections of the three priority areas. Since there is no coral reef distribution data around Pemalang-Pekalongan, the map is omitted.

Mangrove Forest

As of 2010, mangrove forests in Indonesia accounted for about 21% of the world's total area of mangrove forests, making it the largest mangrove forest distribution area in the world. On the other hand, previous studies have shown that mangrove forests in Indonesia have been significantly decreasing, with a 31% decline over the past 25 years. The main causes of this trend are excessive logging for reclamation, fishponds, agriculture, salt pans, and other purposes associated with coastal development. In response to this, KLHK, KKP, local governments, local residents, and CSR activities by private companies have been promoting mangrove planting activities. These activities are mainly managed by KLHK and KKP. The location of mangrove forests planted and managed by the mangrove rehabilitation project of KLHK is shown in Appendix 17.



Source: JICA Study Team

**Figure 17.2.1 Collapsed Mangrove Forest
on the Western Coast of Pekalongan**

In the field survey, JICA Study Team found that many local residents voluntarily planted mangroves as a countermeasure against erosion and tidal waves, and to thin out fishponds. On the other hand, most of the mangroves were not rooted and did not grow in clusters due to erosion and tidal waves.

17.2.2 Social Environment

(1) Population and Administrative

Table 17.2.2 shows basic information on the population and administrative of the regencies in which the priority areas are located. Of the priority areas, Indramayu Regency has the largest population. According to interviews with local residents, one of the reasons is the expansion of industries such as the Pertamina oil refinery and the Indramayu coal-fired power plant, and the influx of industrial workers from other regions.

Table 17.2.2 Basic Information on the Five Regencies in the Priority Area

		Indramayu	Pemalang	Pekalongan	Rembang	Tuban
Population	People (2021)	1,851,383	1,484,209	976,504	647,770	1,203,127
	Male	930,838	752,565	495,409	325,750	600,785
	Female	920,545	731,644	481,095	322,010	602,342
Area	(km ²)	2,099.42	1,115.30	836.13	1,036.70	1,839.94
Lower Administrative	District	31	14	19	14	20
	Village	317	222	285	294	311

Source: JICA Study Team Edited Based on Regency in Number 2022

(2) Indigenous People and Minorities

For the distribution of ethnic groups and minorities in Java, see 2.2.3 *Ethnicity and Religion*.

Two minorities living in the regencies of the priority areas were identified: the Dayak Losarang tribe living in Indramayu Regency and the Samin tribe in Rembang Regency. Both ethnic groups live in mountainous areas, at least 5 km away from the coast in a straight line. Since they are engaged in agriculture and other livelihood activities in the areas surrounding their houses, it is unlikely that they use the coast on a daily basis and the coast for religious or ceremonial purposes.

(3) Fisheries

See 2.2.2 *Main Industries* for the main industries and means of livelihood in the target provinces of the project priority area.

The scale of the fishing industry in the priority areas is summarized in Table 17.2.3. Among the priority areas, Indramayu has the largest scale of fishery with the largest number of fishermen and fish catch. In terms of aquaculture, Tuban has the largest fish catch among the five regencies.

Table 17.2.3 Scale of Fisheries in the Priority Areas

		Indramayu	Pemalang	Pekalongan	Rembang	Tuban
Fishing port	Location	12	5 (under KKP)	3	1	11
Fishing market	Location	6	5	2	12	3
Fishermen	persons	40,664 Owner of vessel : 6,067 Fishermen: 34,597 (2017)	172 (12 groups, 2021)	12,001 (Ocean: 9378 Land: 2623, 2021)	32,859 (2021)	5,030 (Ocean: 3,276 Land: 1,754)
Catch	Catch (t, 2021)	166,673t	18,396t	4,797t	97,954t	31,244t (Ocean : 30,395t Land : 850t)
	Price (IDR)	-	1,847,548,121	14,967,645,000	702,145,151,719	-
Aquaculture	Catch	39,390t (2019)	18,529t (2021)	6,813t (2021)	6,721t (2021)	44,166t (2021)
	Area/ No. of workers	-	-	-	brackish waters 2.2452ha Freshwater: 538ha	2582 households

- No data

Source: JICA Study Team Edited Based on Regency in Number 2022

17.3 Screening and Scoping

17.3.1 Screening

The master plan prepared in the Project is determined to fall into Category B in accordance with the JICA Guidelines for the following reasons.

- The Project is a master planning project for coastal protection and conservation measures and does not fall under the sensitive sectors.
- Since the location of facility development will be considered based on the use of the coast, resettlement is not expected to occur. In addition, the vicinity of the protected area already contains significant areas that have been converted into agricultural lands or other lands by human activities. Therefore, the priority Areas do not fall under the category of sensitive characteristics/areas.

Based on the above, the project is classified as Category B because the undesirable effects on the environment are not significant in view of the sector specifics, project characteristics, and regional characteristics.

17.3.2 Scoping

Scoping was conducted based on the specific measures planned in the draft Basic Coastal Management Plan (Master Plan) as shown in Table 17.3.1.

Table 17.3.1 Specific Measures Planned in the Draft of Basic Coastal Management Plan

Expecting Measures
Beach nourishment (installing sand from sand quarries) + jetties/headlands, etc.
Mangrove plantation + breakwaters
Conventional revetment (Linea protection)
Amenity-oriented revetment (Area protection)

Source: JICA Study Team

(1) Area-I: Indramayu

Based on the results of the natural and social environment survey in Indramayu, scoping was conducted based on JICA environmental guidelines for the current study stage plan.

Table 17.3.2 Scoping in Area-I

	No	Impacts	Assessment		Description of the Assessment
			Pre-CP/CP	AC	
Pollution	1	Air pollution	✓	✓	<p>CP: Temporary air pollution due to operation of construction machines and vehicles and construction of basecamp is expected.</p> <p>AC: Temporary air pollution due to operation of construction machines and vehicles and construction of basecamp is expected. Temporary operation of construction vehicles and machinery during maintenance of the beach nourishment will result in air pollutant emissions and generation of dust.</p>
	2	Water pollution	✓	✓	<p>CP: Turbidity is generated when sand is loaded in the beach nourishment works.</p> <p>AC: Some types of beach use change may affect water quality. In addition, beach nourishment inputs are expected to improve water quality.</p>
	3	Waste	✓	✓	<p>CP: Construction waste will be generated.</p> <p>AC: Waste will be generated depending on the type of coastal use.</p>
	4	Soil contamination			There are no plans to use hazardous substances that may cause soil contamination during construction or when the site is in service.
	5	Noise and vibration	✓	✓	<p>CP: Noise and vibration will be generated by the construction.</p> <p>AC: Noise may be generated depending on the type of beach use change.</p>
	6	Ground subsidence			Activities that would cause subsidence (e.g., use of large volumes of groundwater) are not anticipated. Measures to address subsidence are not included in the project.
	7	Odor			No odor-producing activities are anticipated, both during construction and in operation.
	8	Sediment quality	✓	✓	<p>CP: Sand application changes the bottom sediment quality of the seabed.</p> <p>AC: Seabed sediment quality due to beach nourishment may change over the long term due to current conditions and sediment supply.</p>

	No	Impacts	Assessment		Description of the Assessment
			Pre-CP/CP	AC	
Natural environment	9	Protected area	✓	✓	A provincial-level marine park is located in a part of the priority area.
	10	Ecosystem	✓	✓	Mangrove forests are scattered throughout the priority areas. Many of them have not taken root due to high waves and erosion, and only some of them are growing in clusters. On the other hand, mangrove forests may provide important habitats and ecosystems, and valuable and endemic species may be found in the area. Although facility development is not being considered inside of mangrove forests, the ecological connectivity between land and sea and the network of habitats may be affected by the installation of hard infrastructure (breakwaters).
	11	Hydrology	✓	✓	CP: Construction of jetties/headlands will alter coastal currents and drifting sand. AC: If changes occur in the topography of the nourished beach, the flow regime in surrounding areas may change.
	12	Topography and geology	✓	✓	CP: The construction of the facility and beach nourishment will change the topography of the beach. In addition, impacts at sand extraction sites should be identified. AC: The topography of the nourished beach may be altered by currents and waves.
Social environment	13	Involuntary resettlement	✓	✓	Pre-CP: Involuntary resettlement may occur as a result of the construction of structures. AC: Involuntary resettlement may occur if nearby residents construct houses or stores on the land expanded by beach nourishment or sand storage area.
	14	Poverty	✓	✓	Pre-CP: Relocated residents may include the poor. CP: The residents affected by the construction may include the poor. AC: Residents subject to relocation may include the poor.
	15	Indigenous groups and ethnic minority	✓	✓	No ethnic minorities or indigenous groups have been identified living within the priority areas. It is necessary to confirm if there is any use of the coast for religious or ceremonial purposes by the minorities residing inland.
	16	Local economy such as employment and livelihood	✓	✓	CP: Fishing, agriculture, and other activities in the coastal area may be affected. On the other hand, employment opportunities will be created due to construction. AC: Although the current land use is planned to be utilized, activities such as fishing and agriculture in the coastal area may be affected. On the other hand, nourished beaches and structures may create new fishing grounds and habitats for fishery resources. The reduction of disaster risk through coastal protection measures will contribute to the economic growth of the region.
	17	Land use and local resources	✓	✓	CP: Construction activities may impact existing land and water uses. AC: Although current land uses are planned to remain, existing land and water uses, such as fishing and agriculture, may be affected. On the other hand, nourished beaches and structures may become new fishing grounds, nurseries for fishery resources, recreational areas, and other local resources.
	18	Water usage			No large amounts of water use will occur during construction and in service.

	No	Impacts	Assessment		Description of the Assessment
			Pre-CP/CP	AC	
	19	Existing social infrastructures and services	✓	✓	<p>CP: Existing social infrastructure and services such as roads and local transportation may be affected by the transportation of construction materials.</p> <p>AC: Land use changes in tourist areas and other areas may affect social services such as local transportation.</p>
	20	Social institutions such as social infrastructure and local decision-making institutions	✓	✓	<p>Pre-CP: In developing the master plan, the coastal users, including the local community, need to be briefed.</p> <p>AC: Consent of coastal users, including local communities, is required.</p>
	21	Misdistribution of benefit and damage	✓	✓	Facility development may cause damage and uneven distribution of benefits to beach users and land users.
	22	Local conflict of interests	✓	✓	Need to confirm with stakeholders.
	23	Cultural heritage	✓		Although no cultural heritage sites have been identified in the priority areas, if any are discovered during construction, the location of cultural heritage sites should be confirmed to ensure that construction will not be affected.
	24	Landscape	✓	✓	Installation of facilities and beach nourishment will alter the coastal landscape. Seawalls obstruct views of the sea.
	25	Gender	✓	✓	<p>CP: Employment opportunities need to be equal regardless of gender.</p> <p>AC: The development of a sales area, such as selling refreshments on the beach, may affect women's means of livelihood.</p>
	26	Right of children	✓	✓	<p>CP: Child labor in construction work must be eliminated. In addition, if the project site is a playground, safety must be ensured.</p> <p>AC: Beach nourishment and seawall installation/renovation could expand playgrounds and improve safety.</p>
	27	Water usage Existing social infrastructures and services	✓	✓	<p>CP: Influx of construction workers may spread infectious diseases.</p> <p>AC: Recreational use of beaches can be used for prostitution businesses that can lead to the spread of infectious diseases. ◦</p>
	28	Occupational environment (including work safety)	✓		<p>CP: Construction work safety and working environment must be properly ensured in accordance with laws and regulations.</p> <p>AC: No employment of workers is expected.</p>
Other	29	Accidents	✓	✓	<p>CP: Risk of construction accidents and traffic accidents caused by construction vehicles is expected.</p> <p>AC: Possible accidents during recreational use or other shore use.</p>
	30	Climate Change		✓	<p>CP: Construction equipment and vehicles emit greenhouse gases, but the amount and duration of emissions are limited and their impact on global warming is negligible.</p> <p>AC: Coastal management may be one of the adaptation measures to climate change.</p>

Note: Pre-CP: pre-construction period, CP: construction period, AC: after construction

Source: JICA Study Team

(2) Area-II: Pemalang-Pekalongan

Based on the results of the natural and social environment survey in Pemalang-Pekalongan, scoping was conducted based on JICA environmental guidelines for the current study stage plan.

The assessment results are the same as Area-I except the following 2 items.

Table 17.3.3 Scoping in Area-II

	No.	Category	Impacts		Description of the Assessment
			Pre-CP/CP	AC	
Natural environment	9	Protected area			No protected areas have been designated in priority areas.
	10	Ecosystem	✓	✓	Mangrove forests are growing in the Mojo area, a priority area. In this area, green infrastructure including hybrid engineers is currently planned, but no logging is planned in this area. On the other hand, mangrove forests may have important habitats and ecosystems in the vicinity, and valuable and endemic species may be found in the surrounding area. Although constructing structures in mangrove forests is not considered, the ecological continuity between land and sea and the network of habitats may be affected by the establishment of detached breakwaters or other structures by combined with green infrastructure.

Source: JICA Study Team

(3) Area-III: Rembang-Tuban

Based on the results of the natural and social environment survey in Rembang-Tuban, scoping was conducted based on JICA environmental guidelines for the current study stage plan.

The assessment results are the same as Area-I except the following 2 items.

Table 17.3.4 Scoping in Area-III

	No.	Impacts	Assessment		Description of the Assessment
			Pre-CP/CP	AC	
Natural environment	9	Protected area			No protected areas have been designated in priority areas.
	10	Ecosystem	✓	✓	There are almost no mangrove forests in the priority areas, and the potential for critical habitat and ecosystems is limited, but impacts should be identified when structures are developed.

Source: JICA Study Team

17.4 Comparison of the Alternatives

In the Project, after the draft of Basic Coastal Management Plan (Master Plan) has been developed, Coastal Facility Plans have been proposed for Indramayu West (Section-1) and Indramayu East (Section-6) in Area-I, Pekalongan (Section-4) in Area-II, and an Tuban Section adjacent to Area-III Rembang-Tuban.

Here, a comparative examination from the perspectives of natural and social environments and project costs using three alternatives, i.e. Alternative 1 (Proposed project), Alternative 2 (Construction of new revetment), and Alternative 3 (Without project).

The detailed comparison and evaluation results of alternatives for each section are described in Appendix 17. Table 17.4.1 summarizes the results for the four Sections.

Table 17.4.1 Results of the Analysis of Alternatives

Item	Alternative 1 (Proposed project)	Alternative 2 (Construction of new revetment)	Alternative 3 (Without project)
Beneficiary effects	⊙	○	×
Urban development	⊙	○	×
Natural environment	○	○	⊙
Social environment	○	○	⊙
Project cost	⊙	×	⊙
Evaluation	⊙ (Alternative 1 is recommended in terms of beneficiary effect, consistency with urban development, and project cost.)	×	×
		(Alternative 2 is not recommended in terms of project cost.)	(Without project alternative is not recommended in terms of beneficiary effect and consistency with urban development.)

Source: JICA Study Team

The proposed project, which uses soft engineering measures such as beach nourishment and combining with green infrastructure, considering environment and utilization, for area-based protection instead of conventional linear protection measures using hard infrastructure, leads to more resilient urban development. Accordingly, the proposed project has the highest advantage, although this is a qualitative comparison.

With the ‘without project’ alternative, there would be no direct impact on the natural environment and societal aspects. However, various coastal issues such as coastal erosion, high waves and tidal inundation, land subsidence, and significant changes in estuarine morphology, and coastal disasters cannot be avoided. As a result, there is a concern that natural disasters and land subsidence could significantly impede economic development and the maintenance or improvement of people's living standards.

17.5 Impact Evaluation

In this context, if the proposed project for Section-1 and Section-6 in Area-I Indramayu, Section-4 in Area-II Pemalang-Pekalongan, and additional section in Area-III Rembang-Tuban are implemented, preliminary predictions and assessments of the environmental impacts of the project were conducted based on the information provided in 18.2 *Current Conditions of Natural and Social Environment*. It should be noted that in the event of

future project implementation, a baseline survey on environmental and social considerations should be conducted for further evaluation.

Table 17.5.1 Impact Evaluation in Priority Areas

	No.	Impacts	Evaluation at Scoping		Evaluation Based on Results		Reason for Evaluation
			Pre-CP/CP	AC	Pre-CP/CP	AC	
Pollution	1	Air pollution	✓	✓	B-	B-	CP: Temporary air pollution due to operation of construction machines and vehicles and construction of basecamp is expected. AC: Temporary operation of construction vehicles and machinery during maintenance of the beach nourishment will result in air pollutant emissions and generation of dust.
	2	Water pollution	✓	✓	B-	D	The impact is limited during construction phase. It is temporary and locally limited and can be mitigated by general measures.
	3	Waste	✓	✓	B-	D	The impact is limited during construction phase. It is temporary and locally limited and can be mitigated by general measures.
	4	Soil contamination			N/A	N/A	
	5	Noise and vibration	✓	✓	B-	D	The impact is limited during construction phase. It is temporary and locally limited and can be mitigated by general measures.
	6	Ground subsidence			N/A	N/A	
	7	Odor			N/A	N/A	
	8	Sediment quality	✓	✓	B-	B-	CP: Sand application changes the bottom sediment quality of the seabed. AC: Seabed sediment quality due to beach nourishment may change over the long term due to current conditions and sediment supply.
Natural environment	9	Protected area	✓	✓	N/A	N/A	
	10	Ecosystem	✓	✓	B-	B-	The ecological connectivity between land and sea and the network of habitats may be affected by the installation of hard infrastructure (breakwaters).
	11	Hydrology	✓	✓	B-	B-	CP: Construction of jetties/headlands will alter coastal currents and drifting sand. AC: If changes occur in the topography of the nourished beach, the flow regime in surrounding areas may change.
	12	Topography and geology	✓	✓	B-	B-	CP: The construction of the facility and beach nourishment will change the topography of the beach. In addition, impacts at sand extraction sites should be identified. AC: The topography of the nourished beach may be altered by currents and waves.

	No.	Impacts	Evaluation at Scoping		Evaluation Based on Results		Reason for Evaluation
			Pre-CP/CP	AC	Pre-CP/CP	AC	
Social environment	13	Involuntary resettlement	✓	✓	N/A	N/A	Pre-CP: Land acquisition and involuntary resettlement will not occur. Therefore no impact is expected.
	14	Poverty	✓	✓	N/A	N/A	Involuntary resettlement will not occur. Therefore no impact is expected.
	15	Indigenous groups and ethnic minority	✓	✓	N/A	N/A	
	16	Local economy such as employment and livelihood	✓	✓	A+	A+	CP: Fishing, agriculture, and other activities in the coastal area may be affected. On the other hand, employment opportunities will be created due to construction. AC: Although the current land use is planned to be utilized, activities such as fishing and agriculture in the coastal area may be affected. On the other hand, nourished beaches and structures may create new fishing grounds and habitats for fishery resources. The reduction of disaster risk through coastal protection measures will contribute to the economic growth of the region.
	17	Land use and local resources	✓	✓	B-	A+	The impact is limited during construction phase. On the other hand, nourished beaches and structures may become new fishing grounds, nurseries for fishery resources, recreational areas, and other local resources.
	18	Water usage			N/A	N/A	
	19	Existing social infrastructures and services	✓	✓	B-	B-	CP: The impact on transportation etc. is locally limited and can be mitigated by general measures. AC: Land use changes in tourist areas and other areas may affect social services such as local transportation.
	20	Social institutions such as social infrastructure and local decision-making institutions	✓	✓	D	D	The local communities welcomes the development of coastal facilities.
	21	Misdistribution of benefit and damage	✓	✓	C	C	Facility development may cause damage and uneven distribution of benefits to beach users and land users.
	22	Local conflict of interests	✓	✓	D	D	Local conflict of interests is not expected.
	23	Cultural heritage	✓		D	N/A	No cultural heritage sites have been identified in the priority areas.

	No.	Impacts	Evaluation at Scoping		Evaluation Based on Results		Reason for Evaluation
			Pre-CP/CP	AC	Pre-CP/CP	AC	
	24	Landscape	✓	✓	B-	B-	Installation of facilities and beach nourishment will alter the coastal landscape. Seawalls obstruct views of the sea.
	25	Gender	✓	✓	B-	B+	CP: Employment opportunities need to be equal regardless of gender. AC: The development of a sales area, such as selling refreshments on the beach, may affect women's means of livelihood.
	26	Right of children	✓	✓	B-	A+	CP: Child labor in construction work must be eliminated. In addition, if the project site is a playground, safety must be ensured. AC: Beach nourishment and seawall installation/renovation could expand playgrounds and improve safety.
	27	Water usage Existing social infrastructure and services	✓	✓	B-	B-	CP: Influx of construction workers may spread infectious diseases. AC: Recreational use of beaches may be used for prostitution businesses that may lead to the spread of infectious diseases. 。
	28	Occupational environment (including work safety)	✓		B-	D	The impact is limited during construction phase and can be mitigated by general measures.
Other	29	Accidents	✓	✓	B-	D	Risk of construction accidents and traffic accidents caused by construction vehicles during construction phase is locally limited. Accidents during recreational use or other shore use after construction can be mitigated by general measures.
	30	Climate Change		✓	N/A	A+	AC: Coastal facility may be one of the adaptation measures to climate change.

Note: Pre-CP: pre-construction period, CP: construction period, AC: after construction

A+/-: Significant positive/negative impact is expected.

B+/-: Positive/negative impact is expected to some extent.

C: Extent of impact is unknown. (A further examination is needed, and the impact could be clarified as the study progresses)

D: No impact is expected.

N/A: Impact assessment isn't conducted because the item was categorized into D in scoping phase.

Source: JICA Study Team

17.6 Mitigation Measures

Table 17.6.1 shows the details of possible mitigation measures for the impact items narrowed down in the above impact evaluation in the event of future project implementation.

Table 17.6.1 Possible Mitigation Measures

No	Item	Candidate Mitigation Measures
1	Air pollution	CP: Measures to reduce exhaust gas emissions, such as maintenance of vehicles and construction equipment, and dust control measures, such as water sprinkling. AC: Measures to reduce exhaust gas emissions, such as maintenance of vehicles and construction equipment, and dust control measures, such as water sprinkling, during maintenance work for beach nourishment.
2	Water pollution	CP: Prevention of diffusion of turbidity by means of anti-pollution barrier and monitoring of turbidity. AC: Compliance with effluent standards, etc.
3	Waste	CP: Proper disposal of construction waste AC: Appropriate disposal for each type of waste
4	Noise and Vibration	CP: Measures against construction noise and vibration (soundproof walls, restrictions on nighttime construction, notification to nearby residents, complaint handling system, etc.) AC: Measures according to the type of noise (e.g., restrictions on nighttime use)
5	Sediment Quality	CP: Adoption of beach sand with properties that do not affect bottom sediment and benthic organisms. AC: Monitoring of sediment quality, etc.
6	Ecosystem	If the project has the potential to impact the ecosystem, mitigation measures should be taken according to the nature of the impact, such as restoration and protection of existing habitats, management of fisheries resources, regular monitoring.
7	Hydrology	CP: Adoption of appropriate design and construction techniques, implementation of coastal current and sediment drift modeling and monitoring. AC: Regular coastal surveillance and monitoring, early detection of changes, and study of appropriate responses.
8	Topography and geology	CP: Optimization of construction plans and beach nourishment methods. Also, study of sustainable sand extraction methods, measures such as restoration of extraction sites. AC: Monitoring of the impact on surrounding flow conditions. Consideration of measures such as coastal management plans and sand replenishment as needed.
9	Land use and local resources	Develop a construction plan that considers land use and water use If existing means of livelihood such as fishing and agriculture will be affected, identify and consult with affected parties and reach a consensus on compensation policies
10	Social infrastructures and services	If traffic congestion is expected, detour routes should be secured, etc.
11	Misdistribution of benefit and damage	Study of measures such as strengthening community participation processes, ensuring equal access as needed.
12	Landscape	Consideration of facility design, securing view points on seawalls, etc.
13	Gender	CP: Gender equality in employment opportunities AC: Additional considerations when the coast is used as a means of livelihood for women (e.g., livelihood restoration support for women)

14	Right of children	CP: Prohibition of employment of children in construction work AC: Consideration for children's use of the beach
15	Infectious diseases such as HIV/AIDS	CP: Sanitary management of construction workers, measures to prevent the spread of infectious diseases, and educational activities AC: Study of measures to prevent infectious diseases in shoreline use
16	Occupational environment (including work safety)	Compliance with labor laws and regulations, additional measures as needed
17	Accidents	CP: Construction safety measures, traffic safety measures for construction vehicles, safety training for workers and drivers AC: Entry restrictions, installation of safety fences, etc.

Note: Pre-CP: pre-construction period, CP: construction period, AC: after construction

Source: JICA Study Team

17.7 Environmental Monitoring Plan

Environmental monitoring is conducted for the purpose of assessing the effectiveness of mitigation measures for environmental impacts and for making appropriate adjustments to subsequent actions. The anticipated monitoring survey content for items assessed as having an impact in the above impact assessment is shown in Table 17.7.1. Among these, the environmental impacts that are considered most critical for monitoring are: 1) changes in water quality around the project site, 2) changes in sediment characteristics in the nourishment area and its surroundings, and 3) changes in topography after nourishment and alterations in surrounding flow conditions.

Table 17.7.1 Environmental Monitoring Plan

No	Item	Monitoring Survey Content
1	Air pollution	CP • AC: Confirmation of the current status of air quality in the area surrounding the project site
2	Water pollution	CP • AC: Current status of water quality in the surroundings of the project site
3	Waste	CP: Confirmation of the types of construction waste AC: Confirmation of the types of waste generated during beach use
4	Noise and Vibration	CP: Confirmation of the current status of noise around the project site AC: Confirmation of the possibility of noise generation during beach use
5	Sediment Quality	CP: Confirmation of current condition of bottom sediment and benthic organisms in and around the beach nourishment area, breakwaters, and mangrove forests AC: Confirmation of the potential for long-term changes in beach sediment quality based on flow and sediment supply conditions
6	Ecosystem	CP • AC: Confirmation of the presence of species that behavior between land and sea, and dispersal of coastal organisms, and evaluation of the impact of the installation of facilities on such factors as impediments to their movement
7	Hydrology	CP: Confirmation of changes in coastal currents and drifting sand AC: Confirmation of changes in the surrounding currents based on predictions of topographic changes after beach nourishment and breakwater (mangrove) construction
8	Topography and geology	CP: Confirmation of the current topography of the project site and impact assessment AC: Prediction of topographic changes after beach nourishment and breakwater (mangrove) construction
9	Land use and local resources	CP: Confirmation of land use and water use in the surrounding area of the target beaches AC: Assessment of the potential of nourished beaches and structures to become new fishing grounds, growth areas for fishery resources, recreational areas, and other local resources
10	Social infrastructures and services	CP • AC: Confirmation of the amount of road traffic around the construction site and the possibility of traffic congestion associated with the transportation of construction materials
11	Misdistribution of benefit and damage	CP • AC: Land use of backlands, confirmation of coastal users, and public opinion on the project
12	Landscape	CP • AC: Confirmation of the surrounding landscape, confirmation of residents' opinions and requests for sea views
13	Gender	CP • AC: Confirmation of livelihoods, living arrangements, and coastal use by women in the target area.
14	Right of children	CP • AC: Confirmation of children's living, working/employment status, and overseas usage in the target area

15	Infectious diseases such as HIV/AIDS	CP • AC: Confirmation of the number of patients with HIV/AIDS and other infectious diseases
16	Occupational environment (including work safety)	CP: Confirmation of working environment and labor laws for construction workers and vehicle drivers
17	Accidents	AC: Confirmation of the existence of hazardous work

Note: Pre-CP: pre-construction period, CP: construction period, AC: after construction

Source: JICA Study Team

17.8 Stakeholder Meeting and Focus Group Discussion

Based on the JICA Environmental Guidelines, a Stakeholder Meeting (SHM) was held to reflect stakeholders' opinions in the project. Focus Group Discussions (FGDs) were also held to gather opinions of beach users and residents in the priority areas.

17.8.1 First Stakeholder Meeting and Focus Group Discussion

The first SHM and FGD were held from Wednesday, October 26th to Friday, November 16th, 2022 (Table 17.8.1). The purpose of the first SHM was mainly to identify issues related to the coast and the state of management and countermeasures by coastal-related administrations, as well as to identify future management and countermeasure aspirations. In addition, as part of the environmental and social survey, FGDs collected information on the use of the coast and awareness of problems, and conducted a survey on environmental and social aspects among users of the coast and residents in the surrounding area.

(1) Method and Venue

Table 17.8.1 Date and Time of SHM and FGD

No.	Date and Time	Location	Type
1	October 26 th , 2022 (Wed) 9: 00-13: 00	BBWS Pemali Juana (Semarang)	SHM
2	October 28 th , 2022 (Fri) 14: 00-16: 00	Widuri village, Pemalang	FGD
3	October 29 th , 2022 (Sat) 9: 00-12: 00	Mojo village, Pemalang	FGD
4	October 31 st , 2022 (Mon) 9: 00-11: 00	Panjang Wetan village Pekalongan	FGD
5	November 2 nd , 2022 (Wed) 9: 00-12: 00	Bajingmeduro village, Rembang	FGD
6	November 2 nd , 2022 (Wed) 14: 00-16: 00	Pandangan Wetan village, Rembang	FGD
7	November 15 th , 2022 (Fri) 9: 00-11: 00	Juntikedokan village, Indramayu	FGD
8	November 15 th , 2022 (Fri) 15: 00-17: 00	Ujunggebang village, Indramayu	FGD
9	November 16 th , 2022 (Wed) 10: 00-12: 30	BBWS Cimanuk-Cisanggarung (Indramayu)	SHM

Source: JICA Study Team

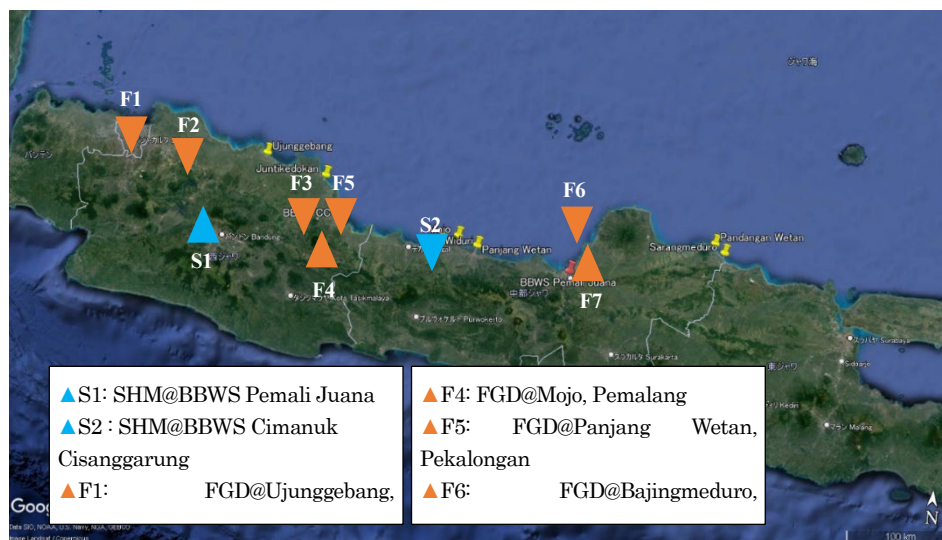
■ Selection of Target and Venue

The purpose of the first SHM for this project was to explain the project outline, discuss current measures and requests, and call for participation by representatives of residents and local administrative agencies representing priority areas. In order to cover a wide range of priority areas, BBWS Pemali Juana (with jurisdiction over Pemalang, Pekalongan, Rembang, etc.) for Central Java and BBWS Cimanuk-Cisanggarung (with jurisdiction over Indramayu, etc.) for West

Java were the host organizations. The meeting was held in a hybrid face-to-face/online format at the respective offices. BBWS Bengawan Solo participated in the SHM for Central Java.

The FGDs were held in the village of Tuban in order to collect information on the use of the coast, awareness of problems, and environmental and social aspects of the coastline. The selection of FGD sites was based on the results of social surveys and a comparative study of sites in each prefecture to determine the proportion of fishermen and the diversity of shoreline and backland use.

Figure 17.8.1 shows the SHM and FGDs location. The main land uses and main means of livelihood in the FGD sites are shown in Table 17.8.2.



Source: JICA Study Team

Figure 17.8.1 First SHM and FGDs Location

Table 17.8.2 Land Use and Means of Livelihood in FGD

Regency	Pemalang		Pekalongan	Rembang		Indramayu	
Village	Widuri	Mojo	Panjang Wetan	Pandangan Wetan	Sarangmeduro	Juntikedokan	Ujung Gebang
Main land use	Tourism (beaches, water parks, amusement parks), fish and shellfish processing plants, fishing ports, etc.	Mangroves, salt fields, fishing ports, etc.	Fishponds (shrimp, fish), housing, fishing ports, etc.	Fishing ports, residential areas (coastline), fishponds, etc.	Fishing ports, residential areas (coastline), fishponds, etc.	Paddy fields	Paddy fields, mangroves
Main livelihood	Tourism, fishermen, industrial workers	Fishermen, salt farmers, other farmers	Fishermen, industrial workers	Fishermen, industrial workers	Fishermen, industrial workers	Fishermen, farmers, retailers	Fishermen, industrial workers, farmers

Source: JICA Study Team

■ Method

At the SHM, the JICA Study Team provided an overview of the project and explained the purpose of holding the SHM and the content of the discussions through an interpreter, and BBWS served as facilitator, facilitating the discussions in

Indonesian. JICA Study Team and local staff from the recommissioned company acted as facilitators for the FGDs, providing an overview and explaining the purpose of holding the FGDs, and facilitating discussions through an interpreter.

(2) Results of SHM and FGD

Detailed results of the first SHM and FGDs are described in Appendix 17.

During the SHM held at BBWS Cimanuk Cisanggarung (Area-I: Indramayu), there was considerable agreement on the concept of achieving harmony between protection, utilization, and environment. Additionally, there were opinions advocating for considering both structural and non-structural approaches. Concerns were raised about the suitability of beach nourishment due to heavy use by fishermen along the northern coast of Java.

In the SHM held at BBWS Pemali Juana (Area-II: Pemalang-Pekalongan), participants highlighted the importance of combining green infrastructure and hard measures, and there was significant consensus regarding the harmony between protection, utilization, and environment.

During the FGD held in Area-I Indramayu, many voices expressed a desire for sandy beaches with good road access. Some participants felt that the existing breakwater was insufficient as a protective measure. About 80% of the coastline is used for tourism, and there were calls for beach maintenance and land restoration. Concerns were raised about disputes over restored land, emphasizing the need for local residents' cooperation in land zoning and management.

In the FGD held in Area-II Pemalang-Pekalongan, many participants reported experiencing flooding, inundation, erosion, sedimentation at estuaries, and seasonal damage from high waves. Many expressed a strong desire for sandy beaches as a defense against erosion and high waves, particularly for tourism development. There were mentions of local conflicts arising from residents constructing fish ponds on lands expanded through a mangrove reforestation project conducted by overseas NGOs and KLHK. Additionally, while reinforcement work for seawalls is planned, there were many opinions advocating for green infrastructure measures such as mangrove forests.

During the FGD held in Area-III Rembang-Tuban, many voiced a desire for safe sandy beaches with erosion protection measures in place. As most residents are fishermen and the sea is frequented by fishing boats, there were concerns about mangrove reforestation affecting navigation, leading to opposing views.

(3) Questionnaire Survey Results

After the FGD, a social survey and a questionnaire survey on the participants' awareness of coastal issues and ideal beaches were conducted. Detailed results of the questionnaire survey are described in Appendix 17.

17.8.2 Second Stakeholder Meeting

The second SHM were held from Wednesday, January 1st to Friday, February 2nd, 2024 (Table 17.8.3). The purpose of the second SHM were mainly to explain the draft Basic Coastal Management Plan, the Coastal Facility Plans in three priority areas, the alternatives (including the background leading to the alternatives) and to conduct discussions for exchanging opinions among participants, who were representatives from local governments (River Basin Headquarter, Directorate of Public Works, Development Planning Agency, Environment and Forestry Agency, Land Agency, Road Agency, etc.) in the priority areas. A total of 44 participants (10 on-site, 34 online), 57 participants (41 on-site, 16 online), and 48 participants (23 on-site, 25 online) attended the SHM in Area-I, Area-II and Area-III, respectively.

Table 17.8.3 Date and Time of the Second SHM

No.	Date & Time	Location
1	January 31 st , 2024 (Wed) 9: 15-11: 15	BBWS Cimanuk Cisanggarung @Cirebon
2	February 1 st , 2024 (Thu) 9: 30-12: 50	BBWS Pemali Juana @Semarang
3	February 2 nd , 2024 (Fri) 9: 15-11: 15	BBWS Bengawan Solo @Solo

Source: JICA Study Team

(1) Method and Venue

■ Selection of Target and Venue

Figure 17.8.2 shows the second SHM location.



Source: JICA Study Team

Figure 17.8.2 Second SHM Location

■ Method

BBWS served as facilitator, facilitating the discussions in Indonesian. JICA Study Team explained the draft of Basic Coastal Management Plan, the Coastal Facility Plans in three priority areas, and the alternatives (including the background leading to the alternatives).

(2) Results of SHM

The results of the second Stakeholder Meeting (SHM) in each area are as follows:

■ Area-I: Indramayu

The discussions centered on addressing coastal protection, sediment management, infrastructure improvement, and environmental conservation while ensuring community involvement and effective coordination among relevant stakeholders.

- BBWS Cimanuk Cisanggarung highlighted that coastal protection structures perpendicular to the coast cause erosion on the downdrift side and sedimentation on the updrift side.
- BBWS Citarum raised concerns about specific roles and responsibilities, particularly regarding facility and management plans. There were discussions about who would be responsible for various aspects such as

protecting ports, managing fisheries, and overseeing residential areas.

- Bappeda West Java emphasized the integration of coastal management plans with the integrated spatial plan of West Java.
- The need for studies and prioritization of affected areas was discussed, with a list of urgent areas (Eretan Wetan, Bulak, Parian Girang, Santing, Krimun, and Losarang) provided.
- Environmental agencies emphasized the importance of vegetation management for sedimentation control and disaster risk reduction. Suggestions were made for community-based disaster risk reduction strategies, including planting approaches and coordination with local disaster management agencies and social volunteers.

■ Area-II: Pemalang-Pekalongan

The discussions highlighted the multifaceted nature of coastal challenges and the importance of holistic, participatory approaches to sustainable coastal management and resilience-building efforts.

- Concerns were raised about the inadequacy of existing coastal protection measures, such as revetments and breakwaters, against land subsidence and coastal erosion.
- The need to balance infrastructure development with environmental conservation, particularly in the context of mangrove protection and shoreline restoration, was emphasized. The depletion of mangrove ecosystems, loss of agricultural land, and disruption of fisheries due to environmental degradation and tidal flooding were major concerns. Efforts to address these issues included proposals for mangrove rehabilitation, coastal reforestation, and the restoration of degraded ecosystems to enhance coastal resilience and biodiversity. Mangroves without protection are difficult to thrive.
- Discussions also touched upon the importance of sand nourishment for restoring beaches and enhancing tourism potential, alongside considerations for equitable access to coastal resources for fishpond cultivators.
- Discussions underscored the importance of empowering coastal communities through livelihood diversification, training, and infrastructure resilience measures. Strategies to support affected communities, particularly those reliant on coastal activities such as fishing and agriculture, were emphasized.
- Challenges related to land ownership, compensation for lost land, and regulatory frameworks were discussed, with calls for integrated spatial planning and policy coordination.
- The importance of technical studies, data sharing, and community consultations in formulating comprehensive coastal management plans and infrastructure projects was emphasized. Efforts to enhance community engagement, awareness, and participation in coastal management initiatives were highlighted as essential for fostering resilience and sustainable development.

■ Area-III: Rembang-Tuban

The discussions highlighted the complexities of coastal management, including technical, regulatory, and community resilience aspects, emphasizing the importance of integrated planning and collaboration among stakeholders.

- The importance of aligning proposals with existing regulations, citing Presidential Regulation No. 80 of 2019, which includes Tuban in strategic national projects, was stressed.
- Suggestions were made to synchronize coastal protection efforts with spatial planning and to address flood control and settlement issues. BBWS Bengawan Solo emphasized the need to consider community prosperity and the importance of harmonizing plans with local regulations. DKP East Java highlighted conflicts with spatial planning regulations regarding proposed revetment construction in designated capture fishery zones.
- Dinas PUPR East Java discussed challenges with existing coastal infrastructure, such as roads close to the sea, and proposed measures like mangrove planting and wave overtopping mitigation. Local KLHK East Java emphasized the importance of mangrove protection as part of environmental quality indices and highlighted challenges with mangrove loss due to community activities.
- BPN/Land Agency East Java discussed land ownership issues and the need for detailed spatial planning to address coastal development challenges.
- The integration of sectors and harmonization of plans to address technical and future impact considerations was stressed. DGWR PUPR emphasized the need for clear policies on sand nourishment and environmental assessments.
- Key actions include sharing detailed spatial planning studies, coordinating with Tuban government contacts, and sharing road planning documents for further collaboration and implementation. Various stakeholders discussed the importance of collaboration and information sharing, including providing technical input and sharing development plans.

CHAPTER 18 Draft of Basic Policy for Coastal Management

18.1 Overview

In Chapter 4, the direction of coastal management in Indonesia is discussed, along with the outline of three outputs: the draft of Basic Policy for Coastal Management, the draft of Basic Coastal Management Plan, and the Coastal Facility Plan. This Chapter describes the study on the draft of the Basic Policy for Coastal Management in Indonesia, as well as the explanation of an overview of the Basic Policy of Coastal Conservation in Japan and its basic plan.

The draft of the Basic Policy for Coastal Management in Indonesia was developed referring Japan's Basic Policy for Coastal Management. This involves the consideration of necessary and unnecessary items specific to Indonesia. In formulating the draft of the Basic Policy for Coastal Management in Indonesia, it is considered essential to consult with related organizations involved in coastal management in Indonesia. To facilitate the opportunities, the Project regularly holds a Working Group (WG) meeting consisting of related agencies in Indonesia. The WG aims to enhance the understanding of the necessity and importance of the Basic Policy for Coastal Management. Through the WGs, the WG participants discuss and review the content of the draft of the Basic Coastal Management Plan in Indonesia and deliberate on the steps towards its legislation.

The draft of Basic Policy for Coastal Management drafted in the Project is a preliminary version. Finalizing and formalizing this policy will be necessary in the future, and these steps will need to be undertaken by the Indonesian side, taking into account the discussions held within the Working Group (WG).

18.2 Outline of the Draft of Basic Policy for Coastal Management

Table 18.2.1 shows the outline of Indonesia's draft of the Basic Policy for Coastal Management. Following Japan's Basic Policy of Coastal Conservation and Basic Coastal Conservation Plan, the items to be included in the Indonesia's Basic Policy for Coastal Management have been determined. Additionally, based on subsequent discussions in the WG, it was decided to clearly include the objectives of the Basic Policy for Coastal Management and the definitions of basic terms.

The term, “coastal conservation” used in Japan may be misinterpreted in Indonesia as solely referring to environmental conservation activities, such as mangrove and coral conservation. Therefore, in the English version of this report, Japan's “Basic Policy of Coastal Conservation” and “Basic Coastal Conservation Plan” will be referred to as Indonesia's "Basic Coastal Management Policy and “the Basic Coastal Management Plan (Master Plan)” respectively, to avoid such misunderstandings and clearly distinguish between the two countries' policies.

In the Basic Policy for Coastal Management in Indonesia, it is considered desirable to identify the relevant organizations that will primarily formulate the Basic Coastal Management Plan, taking into account the jurisdictions of related ministries and agencies. Additionally, Indonesia consists of more than 17,500 islands with various sizes, making it impractical to cover all coastlines as in Japan's case. Therefore, it is advisable to clearly define the coastal divisions for which the basic coastal conservation plan will be formulated.

Table 18.2.1 Outline of the Draft of Basic Policy for Coastal Management in Indonesia

The Draft of Basic Policy of Coastal Conservation in Japan	Items to be Described in the Draft of Basic Policy for Coastal Management in Indonesia
1. Purpose of the draft of Basic Policy of Coastal Conservation	1. Purposes of the draft of Basic Policy for Coastal Management
2. — (No descriptions)	2. Definitions of Terms
3. Philosophy of the coastal conservations	3. Philosophy of coastal management
4. Basic items on coastal conservation	4. Direction of coastal management
5. Basic items on the implementation of coastal facilities	5. Direction of implementation of coastal facilities
6. Important items on coastal conservation	6. Important items on coastal management
7. Coasts where Basic Coastal Conservation Plan is prepared	7. Coasts where Basic Coastal Management Plan (M/P) is prepared
8. Items to be included on Basic Coastal Conservation Plan	8. Items to be included on Basic Coastal Management Plan (M/P)

Source: JICA Study Team

18.3 Contents of Discussion Through WG

Table 18.3.1 shows the contents of the WG discussion. The contents of the discussion are classified into each of the outlines of the draft of Basic Policy for Coastal Management in Indonesia, which was discussed in the previous section.

Table 18.3.1 Contents of Discussion WG

Outlines	Contents of Discussion
1. Purpose of the draft of Basic Policy for Coastal Management	<ul style="list-style-type: none"> -Describe the purpose of the Basic Coastal Management Plan -Describe “the coast is the national asset”
2. Definitions of Terms	<ul style="list-style-type: none"> -Need to define “hard”, “soft”, and “green”, “gray” in coastal facilities -Need to define coastal areas for Basic Coastal Management Plan -Need to define the coastal management area, which should be in line with existing spatial planning. However, it should have the flexibility considering changes of coastlines due to land subsidence. -Clarify the implementation agencies for the draft of Basic Policy for Coastal Management, Basic Coastal Management Plan
3. Philosophy of the Coastal Management	—
4. Direction of the Coastal Management	<ul style="list-style-type: none"> -Sedimentation should be described as coastal issues on coastal protection -Land subsidence should be described as coastal issues on coastal protection -Describe about mangrove -Describe conservation of the mangrove forest and coral reefs (Proposed by JICA Study Team)
5. Direction of the implementation of coastal facilities	<ul style="list-style-type: none"> -Delete the description regarding tenacious structure (Proposed by JICA Study Team) -Delete the description regarding the seismic stability of general coastal facilities (Proposed by JICA Study Team) -Incorporate the consideration of potential future changes of target coasts
6. Other important items on coastal management	<ul style="list-style-type: none"> -Including the description about Cooperate Social Responsible activities -Need to describe the promotion of researches related to sedimentation and sand transport -Due to the divergence between coastal utilization and spatial planning, careful consideration is required when preparing coastal management plans.
7. Coast where the Basic Coastal Management Plan is prepared	<ul style="list-style-type: none"> -Expect the draft of Basic Policy for Coastal Management in Indonesia is a plan to manage the whole coastal areas, which will be followed by all coastal projects.
8. Items to be included to the Basic Coastal Management Plan	<ul style="list-style-type: none"> -Describe the time schedule as the items of Basic Coastal Management Plan -It is advisable to consider a revision of Basic Coastal Management Plan approximately every five years. However, this timeline may be subject to change depending on the actual regional circumstances.
9. Others	<ul style="list-style-type: none"> -Include the private management coast on Basic Policy for Coastal Management -Describe the landownership and sand use of the sedimentation -Need to consider the legal frame of the draft of Basic Policy for Coastal Management -Importance of development, not only conservation -Describe the land ownership issues on sedimentation and erosion area in the draft of Basic Policy for Coastal Management

Source: JICA Study Team

18.4 Draft of Basic Policy for Coastal Management in Indonesia

18.4.1 Essence of the Draft of Basic Policy for Coastal Management in Indonesia

Table 18.4.1 shows the essence of the draft of the Basic Policy for Coastal Management in Indonesia, developed by incorporating the content of discussions from the WG. The underlined parts specifically represent the changes or adaptations made to suit the Indonesian context, based on the outcomes of the WG discussions.

Table 18.4.1 Outline and Essence of the Basic Policy for Coastal Management in Indonesia

Outlines	Essences of the Basic Policy of Coastal Conservation in Japan	Essences of the Basic Policy for Coastal Management in Indonesia
1. Purpose of enforcing Basic Policy for Coastal Management	➤ To provide the principles on coastal conservation toward achieving the realization of desirable vision of the coast.	➤ To provide the principles on <u>coastal management, development, and conservation</u> toward achieving the realization of desirable future vision of the coast of Indonesia, <u>along with its continuous coastal development</u>
2. Definition of terms	—	➤ Defining the basic terms required for the Basic Coastal Management Plan ➤ Clarifying the relevant agencies responsible for establishing and enacting the Basic Coastal Management Plan
3. Basic philosophy of coastal management	➤ The basic philosophy is to conserve and pass the "beautiful, safe, and vibrant coasts" as a shared national asset to the future generation.	➤ <u>Achieving coastal protection and conservation harmonizing with coastal utilization and coastal environment, and passing on the coast as national asset to the next generation (Necessary to be determined by Indonesia)</u>
4. Direction of coastal management	➤ Ensuring appropriate protection levels against disasters ➤ Promoting conservation and creation of coastal environment that coexist with nature. ➤ Promoting proper coastal utilization by the public ➤ Ensuring appropriate maintenance and repair of coastal facilities based on preventive maintenance	➤ Ensuring appropriate protection levels against disasters ➤ Promoting conservation and creation of coastal environment that coexist with nature. ➤ Promoting proper coastal utilization by the public ➤ Ensuring appropriate maintenance and repair of coastal facilities <u>to maintain their functions</u>
5. Measures to achieve the Direction of coastal management	➤ Promotion of development of safer coast ➤ Promotion of measures for the creation of nature-rich coast ➤ Promotion of measures for the coast ➤ Promotion of planned implementation and effective maintenance and repair of coastal facilities based on preventive maintenance	➤ Promotion of development of safer coast ➤ Promotion of measures for the conservation of nature-rich coasts, <u>and their creation as required.</u> ➤ Promotion of measures for the beloved coast ➤ Promotion of implementation of planned and effective maintenance and repair of coastal facilities
6. Other considerations on coastal management	➤ Promotion of initiatives from a broad and comprehensive perspective ➤ Promotion of cooperation with local communities and raising awareness of coastal conservation ➤ Promotion of research, and studies	➤ Promotion of initiatives from a broad and comprehensive perspective ➤ Promotion of cooperation with local communities and raising awareness of coastal conservation ➤ Promotion of research, studies, and <u>monitoring</u>
7. Area for Preparation of Basic Coastal Management Plan	➤ Coastal area throughout Japan	➤ <u>Five main island (Sulawesi, Kalimantan, Java, Papua, Sumatra) and two island-groups (Maluku Islands and Nusa Tenggara)</u>
8. Basic Items for Preparation of the Basic Coastal Management Plan	➤ Status of the coast and the direction of coastal conservation ➤ Items related to coastal protection. ➤ Items related to the management, maintenance, and conservation of the coastal environment. ➤ Items related to proper public utilization of the coast. ➤ Items related to new development or repair of coastal facilities. ➤ Items concerning the maintenance or repair of coastal facilities. ➤ Other important items to be considered in the Basic Coastal Management Plan	➤ Status of the coast and the direction of coastal management ➤ Items related to coastal protection. ➤ Items related to the management, maintenance, and conservation of the coastal environment. ➤ Items related to proper public utilization of the coast. ➤ Items related to new development or repair of coastal facilities. ➤ Items concerning the maintenance or repair of coastal facilities. ➤ Other important items to be considered in the Basic Coastal Management Plan

Source: JICA Study Team

18.4.2 Reflection of the Discussions on the Draft of Basic Policy for Coastal Management in Indonesia

Table 18.4.2 shows Indonesia's draft of the Basic Policy for Coastal Management, incorporating the outcomes of the WG discussions.

Table 18.4.2 Contents of the Basic Policy of Coastal Conservation in Japan and the Draft of Basic Policy for Coastal Management in Indonesia

Contents of the Draft of Basic Policy for Coastal Management	Summary of Japan’s Basic Policy of Coastal Conservation	Indonesia’s the Draft of Basic Policy for Coastal Management
1. Purpose of enforcing Basic Policy for Coastal Management		
Purpose of enforcing Basic Policy for Coastal Management		<p>(1) In order to protect and preserve human lives, assets and territorial land, as for continuous coastal development, the purpose of enforcing the Basic Policy for Coastal Management is to establish the fundamental principles on coastal management and development to address coastal vulnerability such as coastal erosion, tidal flood, wave overtopping, sea level rise associated with climate change, while ensuring the harmonization of “protection,” “utilization,” and “environment.”</p> <p>(2) The designated coastal areas, in which the Basic Coastal Management Plan is required to be prepared., are coastal areas of the five main islands, that is Sulawesi, Kalimantan, Java, Papua, and Sumatra, and the two main islands, namely: Maluku Islands and Nusa Tenggara.</p> <p>(3) The purpose of the Basic Policy for Coastal Management is to clearly define the fundamental requirement and procedures for the Basic Coastal Management Plan which will be issued by the ministers of primary ministries – PUPR, KKP, and KLHK, as the guideline for coastal management in Indonesia</p>
2. Definition of terms		
Definition of terms	—	<p>【Definition of terms for the preparation of Basic Coastal Management Plan】</p> <p>(1) Definition of Coastal Management Area is described. (Refer to next section)</p> <p>(2) Definition of Coastal Facility is described. (Refer to the next section)</p> <p>(3) Position of Basic Coastal Management Plan such as difference of purpose and position with the spatial plan is</p>

		described. (Refer to next section) 【Agencies involved in preparation and implementation of Basic Coastal Management Plan】 (4) The government of each regency prepares the Basic Coastal Management Plan in cooperation with relevant agencies from the central government, such as PUPR, KLHK, and KKP. The governor of the province approves the Basic Coastal Management Plan. (Refer to the next section)
3. Basic philosophy of coastal management		
Clause: 1 Basic Guidelines for Coastal Management	—	—
1. Basic philosophy of coastal management	【Basic philosophy of coastal conservation】 (1) The basic principles is to pass the “beautiful, safe, and lively coasts” into the future generation as national assets 【Vision of coastal conservation to achieve the philosophy】 (2) In addition to protection from coastal disasters, it is promoted to secure management of coastal environment and proper coastal utilization for integrated coastal conservations. (3) Coastal development with regional characteristics is aimed.	【Coastal context and the basic philosophy derived from it】 (1) The basic philosophy is to pass on the coast with “coastal protection in harmony with utilization and environment” to future generation as a shared national asset. (Necessary to be determined by Indonesia) 【Targeted state of coastal management to achieve the basic philosophy】 (2) Comprehensive coastal development, conservation, and management from the mid-to long-term and wide-area perspectives are promoted. (3) Coastal development with local governance is aimed.
4. Direction of coastal management		
Direction of coastal management	【Direction of coastal conservation】 (1) Ensure a proper protection level against disasters (2) Promote the development and preservation of the coastal environment and appropriate use of the coast. (3) Promote comprehensive measures including soft measures. (4) Appropriate maintenance and renewal of coastal protection facilities based on the concept of preventive maintenance as they degrade 【Main bodies of coastal conservation】	【Direction of coastal management and conservation】 (1) Coastal development and coastal conservation from the three perspectives of protection, environment, and utilization is fostered. (2) In the context of protection, ensuring appropriate protection levels considering high waves, wave overtopping, coastal erosion, topographical change at the river mouth, land subsidence, climate change, etc., is promoted; and integrate both hard and soft measurer.

	(5) Coastal protection through mutual cooperation between the national and local governments	(3) In the context of environment, the conservation and maintenance of natural beaches, coral reefs, mangrove forests, as well as conservation of coastal and marine ecosystems including coral and fish and other marine species, area promoted. (4) In the context of utilization, coastal utilization by tourism and the local community is promoted.
(1) Direction of coastal protection	<p>【Classification of coastal disasters】</p> <p>(1) Coastal disasters such as Tsunami, storm surge, high waves, and coastal erosion</p> <p>【Protection levels for each coastal disaster】</p> <p>(2) Tsunami : Protection against tsunamis, which occur about once every few decades to a few hundred years</p> <p>(3) Storm surge : Protection from tides + waves appropriately estimated based on historical maximum tides or records and future projections - based on past typhoon records.</p> <p>(4) Coastal erosion: Goal is to maintain current shoreline and conduct further shoreline restoration, if necessary.</p> <p>【Direction on protection measures】</p> <p>(5) Coastal protection facilities shall prevent seawater intrusion or erosion by seawater and mitigate damage to the backlands in the event of seawater overtopping.</p> <p>(6) Tsunami and storm surge countermeasures should be promoted to implement comprehensive hard and soft countermeasures.</p> <p>(7) Sluice gate should be effectively managed and operated in a manner that ensures the safety of field investigators.</p> <p>(8) Coastal erosion control measures should be taken from a broad-based perspective, taking into account the importance of adaptive management and the sediment budget situation.</p>	<p>【Classification of coastal disasters】</p> <p>(1) Same as Japan’s policy -Add land subsidence, sedimentation, tidal flood, high waves, and wave overtopping</p> <p>【Protection levels for each coastal disaster】</p> <p>(2) Same as Japan’s policy</p> <p>(3) Same as Japan’s policy</p> <p>(4) Same as Japan’s policy -Add land subsidence (10~100 yrs. order) -Add sedimentation (10~100 yrs. order)</p> <p>【Direction on protection measures】</p> <p>(5) Same as left + Add the description of integrated coastal measures such as securing buffer zone.</p> <p>(6) Same as Japan’s policy</p> <p>(7) Delete</p> <p>(8) Same as Japan’s policy - Add the descriptions on land ownership in sedimentation and erosion area</p>
(2) Direction for development and conservation of coastal environment	<p>【Functions of coastal environment】</p> <p>(1) Coasts provide diverse habitat and growth environments for living organisms.</p> <p>(2) Coasts provide great landscapes</p>	<p>【Functions of coastal environment】</p> <p>(1) Same as Japan’s policy</p> <p>(2) Same as Japan’s policy</p> <p>【Direction of measures for coastal environment】</p>

	<p>【Direction of measures for coastal environment】</p> <p>(3) Conserve and maintain the coastal environment in harmony with nature.</p> <p>(4) Respond appropriately to the preservation of excellent nature and to sudden environmental impacts such as oil spills, etc.</p> <p>(5) To create a good coastal environment, coastal protection facilities are maintained as necessary.</p> <p>(6) Ensure that all parties concerned have a common understanding of the coastal environment that should be preserved.</p>	<p>(3) Same as Japan’s policy</p> <p>(4) Same as Japan’s policy</p> <p>(5) Same as Japan’s policy</p> <p>(6) Same as Japan’s policy</p> <p>-Add the descriptions on the importance of mangrove forest and coral reefs for the sake of maintaining great ecosystems.</p>
(3) Direction for proper coastal utilization by public	<p>【Functions of coastal utilization】</p> <p>(1) Coasts create and preserve local culture.</p> <p>(2) Coasts promote a variety of uses such as leisure, sports, educational activities, and recreational areas.</p> <p>【Direction for measures of coastal utilizations】</p> <p>(3) Promote the development of facilities that contribute to the promotion of coastal utilization.</p> <p>(4) Appropriately deal with the damage of facilities and abandoned boats, which seriously impair the scenery and convenience of the coast.</p> <p>(5) Ensure public access to the seashore.</p> <p>(6) Ensure a place for interaction with the sea and promote educational activities on user manners.</p>	<p>【Functions of coastal utilization】</p> <p>(1) Same as Japan’s policy</p> <p>(2) Same as Japan’s policy</p> <p>【Direction for measures of coastal utilizations】</p> <p>(3) Same as Japan’s policy</p> <p>(4) Same as Japan’s policy</p> <p>(5) Same as Japan’s policy</p> <p>(6) Same as Japan’s policy</p>
5. Direction of implementation of coastal management		
3 Direction of implementation of coastal facilities	—	
(1) Basic items on new and repair of coastal facilities	—	
1) Development of safer coasts	<p>【Measures to be promoted to achieve coastal protection】</p> <p>(1) Promote an integrated coastal protection policy in the development of coastal protection facilities.</p> <p>(2) Promote tenacious structures that can withstand tsunamis</p>	<p>【Measures to be promoted to achieve coastal protection】</p> <p>(1) Add the description on promotion of hard/soft and green/gray measures</p> <p>(2) Delete due to unnecessary to the common coastal facilities</p>

	<p>and storm surges that exceed the design target.</p> <p>(3) Promote automation and remote operation of sluice gates and land locks.</p> <p>(4) Promotion of measures that combine facilities in a complex and effective manner to prevent extensive and widespread damage caused by tsunamis and storm surges.</p> <p>(5) Promotion of appropriate sediment management, including non-structural measures, taking into account the movement of sand drift over a wide area.</p> <p>(6) Promotion of earthquake resistance enhancement.</p>	<p>(3) Same as Japan's policy</p> <p>(4) Same as Japan's policy (Significantly important)</p> <p>(5) Delete due to unnecessary to the common coastal facilities -Add the descriptions on land subsidence, tidal flood, high waves, wave overtopping</p>
2) Maintenance of nature-rich coasts	<p>【Measures (Efforts) to be promoted to conserve diverse ecosystems and beautiful landscapes】</p> <p>(1) Promotion of coastal protection facilities in accordance with natural characteristics.</p> <p>(2) Promotion of maintenance for preservation and restoration of sandy beaches.</p> <p>(3) Consideration for the preservation of the natural environment when developing facilities.</p>	<p>【Measures (Efforts) to be promoted to conserve diverse ecosystems and beautiful landscapes】</p> <p>(1) Same as Japan's policy</p> <p>(2) Promotion of conservation and restoration of mangrove forest, coral reefs, and sandy beaches</p> <p>(3) Same as Japan's policy</p>
3) Maintenance of safer coast	<p>【Measures to be promoted to contribute to the convenience of users and the improvement of the living environment of the local community (initiatives)】</p> <p>(1) Devise facilities that contribute to user convenience and improvement of the living environment of local communities.</p> <p>(2) Securing access to the coast.</p> <p>(3) Making facilities barrier-free.</p>	<p>【Measures to be promoted to contribute to the convenience of users and improvement of the living environment of the local community (initiatives)】</p> <p>(1) Devise facilities that contribute to the convenience of users and the maintenance and improvement of the living environment of the local community</p> <p>(2) Same as Japan's policy</p> <p>(3) Same as Japan's policy -Conservation and development of sandy beaches for tourism and local community is added.</p>
(2) Basic items related to the maintenance or repair of coastal protection facilities	<p>【Necessity of maintenance】</p> <p>(1) Balance between reducing costs and ensuring necessary functions in the face of aging facilities.</p> <p>【Measures to be promoted】</p> <p>(2) Conduct inspections and inspections at appropriate times.</p> <p>(3) Promote systematic maintenance or repair.</p>	<p>【Necessity of maintenance】</p> <p>(1) Same as Japan's policy</p> <p>【Measures to be promoted】</p> <p>(2) Significantly important</p> <p>(3) Significantly important</p> <p>(4) Significantly important</p>

	(4) Prepare and keep records related to inspections or repairs.	
6. Other considerations on coastal management		
4 Other considerations on coastal management	—	
Promotion of initiatives from a broad and comprehensive perspective	<p>【Items to be promoted from a wide-area - comprehensive perspective】</p> <p>(1) Share with the society as a whole about climate change and the rise in mean sea level.</p> <p>(2) Promote regional integrated and systematic disaster prevention and mitigation measures in cooperation with relevant organizations.</p> <p>(3) Promote comprehensive measures against coastal erosion in cooperation with related organizations, such as coordination with comprehensive sediment management measures in the sediment transport system.</p> <p>(4) Promote coastal utilization in cooperation with measures for the coast and its surrounding area.</p>	<p>【Items to be promoted from a wide-area - comprehensive perspective】</p> <p>(1) Same as Japan’s policy</p> <p>(2) Same as Japan’s policy</p> <p>(3) Significantly important (especially for north coast of Java Island)</p> <p>(4) Same as Japan’s policy</p>
Promote cooperation with the community and raise awareness of coastal protection	<p>【Items that require cooperation with the community and promotion of the idea of coastal protection】</p> <p>(1) Create a disaster-resistant community and improve disaster prevention awareness of residents.</p> <p>(2) Promote participation of local residents in the beautification of the coast.</p> <p>(3) Promote educational activities to improve the morale for preservation of the coastal environment.</p> <p>(4) Promote making rules for the use of beaches for appropriate use.</p> <p>(5) Disseminate the idea of coastal protection and human resource development in the region.</p> <p>(6) Enhance coastal management through regional cooperation</p>	<p>【Items that require cooperation with the community and promotion of the idea of coastal protection】</p> <p>(1) Same as Japan’s policy</p> <p>(2) Same as Japan’s policy</p> <p>(3) Same as Japan’s policy</p> <p>(4) Same as Japan’s policy</p> <p>(5) Same as Japan’s policy</p> <p>(6) Same as Japan’s policy</p> <p>- Add the promotions of Cooperation Society Responsible activity, in order to encourage the involvement of the private sector in coastal conservation</p>

Promotion of research and studies	【Items related to research, studies】 (1) Collect basic information on coasts. (2) Share information to various stakeholders including the private sector and promote international technical exchanges. (3) Conduct continuous monitoring and accumulate data for tidal and wave fluctuations due to climate change.	【Items related to research, studies, and monitoring】 (1) Same as Japan's policy (2) Same as Japan's policy (Significantly important) (3) Same as Japan's policy (Significantly important)
7. Area for Preparation of Basic Coastal Management Plan (M/P)		
Areas for preparation of the Basic Coastal Management Plan	(1) Define the method of determining the areas for which a Basic Coastal Management Plan (2) Indicate the coastal classification in the attached table	(1) Define the method of determining the areas for which a Basic Coastal Management Plan (2) Indicate the coastal classification in the attached table - Add the regions, areas targeted for the preparation of Basic Coastal Management Plan -Add the description on the coastal length in which one Basic Policy for Coastal Management is prepared
8. Basic Items to be included to the Basic Coastal Management Plan		
Clause 3: Basic Items For the Preparation of the Basic Coastal Management Plan		
1. Basic Items to be stated in the Basic Coastal Management Plan	—	—
(1) Basic items concerning Coastal Conservation	—	—
Current status of the coast and the direction of coastal conservation	-Determine the long-term state of the coast based on natural and social characteristics.	-Same as Japan's policy
Items related to coastal protection	- Define the areas to be protected, the goals of coastal protection, and the measures to achieve them	-Same as Japan's policy
Items related to the management, maintenance and conservation of the coastal environment.	- Establish measures for the development and preservation of the coastal environment	-Same as Japan's policy
Items related to proper public utilization of the coast	- Establish measures to promote appropriate coastal utilization	-Same as Japan's policy
(2) Basic items concerning the	—	—

development of Coastal Facilities		
Items related to new development or improvement of coastal facilities	<ol style="list-style-type: none"> (1) Define the area where new or repair of coastal facilities are planned. (2) Define the types, specifications, and layout of the coastal facilities. (3) Indicate the area to be benefited by the new construction or improvement 	-Same as Japan's policy
Items concerning the maintenance or repair of coastal facilities	<ol style="list-style-type: none"> (1) Define the area in which existing facilities exist (2) Determine the type, size, and layout of the facility (3) Specify the method of maintenance or repair 	-Same as Japan's policy
2 Other important items to be considered in the Basic Coastal Management Plan	—	—
Ensuring of consistency with relevant plans	-Ensure consistency with related plans concerning use and development of national land, environmental preservation, and national land resilience.	-Same as Japan's policy
Cooperation and coordination with relevant administrative agencies	<ol style="list-style-type: none"> (1) Ensure consistency with related plans concerning use and development of national land, environmental preservation, and national land resilience. (2) Share regional risks, such as climate change, with agencies involved in urban development 	-Same as Japan's policy
Participation of local residents and information disclosure	<ol style="list-style-type: none"> (3) Obtain the participation of local residents. (4) Widely disclose information on the coast to improve transparency of the project 	-Same as Japan's policy
Review of plans	-Review plans and maintenance details according to changes in local conditions, changes in socioeconomic conditions, and expected climate change impacts	-Same as Japan's policy

Source: JICA Study Team

18.4.3 Contents of the Draft of Basic Policy for Coastal Management in Indonesia

Table 18.4.3 shows the contents of Indonesia's draft of the Basic Policy for Coastal Management, which was prepared based on the discussions in the WG. The draft of Indonesia's Basic Policy for Coastal Management, which was submitted to the WG participating agencies, can be referred in Appendix 18.

Table 18.43 Details of the Draft of Basic Policy for Coastal Management of Indonesia

Items of the Basic Policy for Coastal Management	Description of the Basic Policy for Coastal Management
<p>(1) Purpose of enforcing Basic Policy for Coastal Management To provide the principles on coastal management, development, and conservation toward achieving the realization of desirable future vision of the coast of Indonesia, along with its continuous coastal development</p>	
<p>Purpose of enforcing Basic Policy for Coastal Management</p>	<p>(1) In order to protect and preserve human lives, assets and territorial land as the continuous coastal development, the purpose of enforcing the Basic Policy for Coastal Management is to establish the fundamental principles on coastal management and development to address coastal vulnerability such as coastal erosion, tidal flood, wave overtopping, sea level rise associate with climate change, while ensuring the harmonization of “protection, utilization,” and “environment.”</p> <p>(2) The designated coastal areas, in which the Basic Coastal Management Plan is required to be prepared are coastal areas of the five main islands, that is Sulawesi, Kalimantan, Java, Papua, and Sumatra, and the two main islands, namely: Maluku Islands and Nusa Tenggara.</p> <p>(3) The purpose of the Basic Policy for Coastal Management is to clearly define the fundamental requirement and procedures for the Basic Coastal Management Plan, which will be issued by the ministers of primary ministry – PUPR, KKP, and KLHK, as the guideline for coastal management in Indonesia.</p>
<p>(2) Definition of terms</p> <ul style="list-style-type: none"> ➤ Defining the basic terms required for the Basic Coastal Management Plan ➤ Clarifying the relevant agencies responsible for establishing and enacting the Basic Coastal Management Plan 	
<p>Definition of terms</p>	<p>【Definition of terms for the preparation of Basic Coastal Management Plan】</p> <p>(1) Definition of Coastal Management Area is described.</p> <p>(2) Definition of Coastal Facility is described.</p> <p>(3) Position of Basic Coastal Management Plan such as difference of purpose and position with the spatial plan is described. (Refer to the next section)</p> <p>【Agencies involved in the preparation and implementation of Basic Coastal Management Plan】</p> <p>(1) The government of each regency prepares the Basic Coastal Management Plan in cooperation with relevant agencies from the central government, such as PUPR, KLHK, and KKP; and the governor of the province approves the Basic Coastal Management Plan. (Refer to next section)</p>
<p>(3) Basic philosophy of coastal management</p> <ul style="list-style-type: none"> ➤ Achieving coastal protection and conservation harmonizing with coastal utilization and coastal environment, and passing on the coast as national asset to the next generation (Necessary to be determined by Indonesia) 	
<p>Clause1: Basic Guidelines for Coastal Management</p>	<p>—</p>
<p>1. Basic philosophy of coastal management</p>	<p>【Coastal context and the basic philosophy derived from it】</p> <ul style="list-style-type: none"> • In Indonesia, which has the second-longest coastal length in the world, each island and area possesses distinct coastal characteristics, coastal hazards, and coastal utilization. • The basic philosophy is to pass on the coast with “coastal protection and coastal protection in harmony with utilization and environment” to future generation as a shared national asset.

	<p>【Targeted state of coastal management to achieve the basic philosophy】</p> <ul style="list-style-type: none"> • Comprehensive coastal development, conservation, and management from the mid-to long-term and wide-area perspectives are promoted. • Coastal development with the local governance is aimed.
<p>(4) Direction of coastal management</p> <ul style="list-style-type: none"> ➢ Ensuring appropriate protection levels against disasters ➢ Promoting conservation and creation of coastal environment that coexist with nature ➢ Promoting proper coastal utilization by public ➢ Ensuring appropriate maintenance and repair of coastal facilities to maintain their functions 	
2. Direction of coastal management	<p>【Direction of coastal management and conservation】</p> <ul style="list-style-type: none"> • Coastal development and coastal conservation from the three perspectives of protection, environment, and utilization is fostered. • In the context of protection, ensuring appropriate protection levels, considering high waves, wave overtopping, coastal erosion, topographical change at river mouth, land subsidence, climate change, etc., is promoted, and integrate both hard and soft measures. • In the context of environment, the conservation and maintenance of natural beaches, coral reefs, mangrove forests, as well as conservation of coastal and marine ecosystems including coral and fish and other marine species, area promoted. • In the context of utilization, coastal utilization by tourism and the local community is promoted.
(1) Direction of coastal protection	<p>【Classification of targeted coastal disasters】</p> <ul style="list-style-type: none"> • In the context of protection, ensuring appropriate protection levels, considering high waves, wave overtopping, coastal erosion, topographical change at river mouth, land subsidence, climate change, etc., is promoted. • Indonesian's coasts vary significantly from one region to another, with distinct natural condition and socio-economic condition of hinterland. Thus, considering natural conditions, occurrence of coastal disasters, and population and assets of hinterland, and coastal utilization, targeted coastal disasters and appropriate protection levels against the disaster are required to be set. <p>【Setting appropriate disaster levels against coastal disasters】</p> <ul style="list-style-type: none"> • High waves, overtopping, and tidal flood: the target protection levels are set considering the status of hinterland. • Coastal erosion: the basic target protection level is to maintain the current shoreline, and the further target protection level is to restore the shoreline to a greater extent. • Land subsidence: the protection level is to secure safety against land subsidence with a timescale ranging from 10 to 100 years. • Tsunami: the target protection level is set to protect against relatively frequent tsunamis that occurs once a few decades to a hundred and few decades years, based on records of past inundation and other relevant data. • Storm surge: the target protection level is set to protect against either the highest high tides based on records of past storm surges caused by typhoons, etc., or the tides appropriately estimated based on records or future projections, in addition to the effects of waves appropriately estimated based on records or future projections. <p>【Direction of measures for coastal protection】</p> <ul style="list-style-type: none"> • For developing coastal facilities, considering the status of the hinterland, the goal is set to prevent seawater intrusion or erosion, and if the sea water overflows the levees, to mitigate the damage to hinterland. Moreover., integrated protection, that is the protection not only by the single structure, but also by the combination of multiples coastal measures including the establishment of buffer zone. • Conservation and maintenance of natural protection functions such as existing sandy beach, coral reefs, mangrove forests, etc. is promoted. • Regarding tsunami and storm surge countermeasures, in addition to the development of coastal facilities, comprehensive measures should be

	<p>implemented that combine hard and soft measures.</p> <ul style="list-style-type: none"> For the countermeasures against coastal erosion, implementing measures through adaptive management of beach and from a wide-area perspective considering the entire cell of littoral drift.
(2) Direction for development and conservation of coastal environment	<p>【Functions of coastal environment】</p> <ul style="list-style-type: none"> The coast provides a diverse habitat and growth environment for organisms. The coast forms a part of outstanding natural landscapes. <p>【Direction of measures for coastal environment】</p> <ul style="list-style-type: none"> Conservation and maintenance of coastal environment that coexists harmoniously with nature is promoted. Conservation of coastal nature and appropriate response against environmental impacts resulting from sudden incidents such as oil spills is promoted. To create favorable coastal environment, coastal facilities are developed as necessary. It is promoted to secure that all parties concerned can share a common understanding of the coastal environment that need to be conserved. To maintain and conserve the rich biodiversity, conservation of mangrove forests and coral reefs is promoted.
(3) Direction for proper coastal utilization by public	<p>【Functions of coastal utilization】</p> <ul style="list-style-type: none"> The coast shapes and preserves regional culture of local community. The coast encourages diverse coastal utilizations such as leisure, sports, education activities, and recreational spaces. <p>【Direction for measures of coastal use】</p> <ul style="list-style-type: none"> Coastal facilities that contribute to the enhancement of coastal utilization are promoted to be developed. Actions are necessary to deal with the degradation of coastal facilities and abandoned vessels that significantly impair the scenery and convenience of the coast. Ensuring public access to the seashore is promoted. Awareness raising activities for users is promoted to improve their etiquette and behavior in coastal utilization.
<p>(5) Direction of implementation of coastal management</p> <ul style="list-style-type: none"> ➤ Promotion of development of safer coast ➤ Promotion of measures for the conservation of nature-rich coast, and their creation as required. ➤ Promotion of measures for the beloved coast ➤ Promotion for the implementation of planned and effective maintenance and repair of coastal facilities 	
3. Direction of implementation of coastal facilities	—
(1) Direction on new implementation or repair of coastal facilities	—
① Promotion of development of safer coast	<p>【Measures promoted to achieve target protection level】</p> <ul style="list-style-type: none"> In the development of coastal facilities, integrated protection is promoted, including, not only hard structure, but also soft measures such as beach nourishment (including sand bypass, etc.) as well as green infrastructure such as mangrove transplantation, and various measures such as combining these structures. To prevent widespread and catastrophic damages by tsunami and storm surges, it is promoted to take measures that efficiently and comprehensively

	<p>combines coastal facilities.</p> <ul style="list-style-type: none"> • The appropriate management of sediment is required, including non-structural measures such as sand replenishment from sedimentation areas to erosion areas on a series of beaches, taking into consideration the movement of sand drift over a wide area. • To address land subsidence, integrated measures are promoted including non-structural measure such as enhancements of regulations considering the estimated subsidence amount. • -For the protection against tidal flood, high waves, and wave overtopping, it is promoted to take measures that mitigate negative impacts on the surrounding coast considering the wide-scale sand transport.
② Promotion of measures for the conservation of nature-rich coast, and their creation as required	<p>【Measures to be promoted for the conservation of diverse ecosystems and beautiful landscapes】</p> <ul style="list-style-type: none"> • Development of coastal facilities in accordance with the natural characteristics. • Conservations and restoration of sandy beaches, coral reefs, and mangrove forests are promoted. • Development of coastal facilities shall be promoted in consideration to the natural environment.
③ Promotion of measures for the beloved coast	<p>【Measures to be promoted for the maintenance and improvement of user convenience and local community living environment】</p> <ul style="list-style-type: none"> • Coastal facilities for enhancing user convenience and maintaining the living environment of the local community area are promoted. • To secure access to the seashore, facilities such as stairs, staircase- revetment, gently sloping revetment, etc., are promoted. • Conservation and development of sandy beaches are promoted as sandy beaches are an important spaces for tourism, recreational activities for residents, and the preservation of local culture. • Facilitating barrier-free is encouraged.
(2) Promotion of implementation of planned and effective maintenance and repair of coastal facilities	<p>【Necessity of maintenance】</p> <ul style="list-style-type: none"> • As existing coastal facilities continue to degrade, it is necessary to satisfy the required functions while reducing and equalizing costs. <p>【Measures to be promoted】</p> <ul style="list-style-type: none"> • Conducting patrols or inspections at appropriate times shall be conducted. • Systematic and effective maintenance and repair of coastal facilities are promoted. • The records related to inspections and repairs as well as new construction or repair of coastal facilities shall be properly prepared and stored.
<p>(6) Other considerations on coastal management</p> <ul style="list-style-type: none"> ➤ Promotion of initiatives from a broad and comprehensive perspective ➤ Promotion of cooperation with local communities and raising awareness of coastal management ➤ Promotion of research, studies, and monitoring 	
4. Other considerations on coastal management	—
(1) Promotion of initiatives from a broad and comprehensive perspective	<p>【Initiatives that should be promoted from a broad and comprehensive perspective】</p> <ul style="list-style-type: none"> • Regarding sea level rise due to climate change, the common understanding shall be shared within a society about the target sea level. • Integrated and systematic disaster prevention and mitigation measures should be promoted in cooperation with related organizations. • Against coastal erosion, it is promoted to take wide-area and comprehensive measures in cooperation with various relevant organizations, such as comprehensive sediment management measures in the entire sediment system from upstream to the coast. • Further cooperation should be encouraged with various measures implemented in and around the coast to promote coastal utilization
(2) Promotion of cooperation with local	【Items which cooperation with local communities and raising awareness of coastal management】

communities and raising awareness of coastal management	<ul style="list-style-type: none"> • To archive the creation of a disaster-resistant community, enhancing local communities' awareness is promoted. • Beautification of coasts is promoted in cooperation of participants coming from the resident volunteers. • Awareness-raising activities to improve users' morale are also recommended. • It is encouraged to create rules for coastal utilization according to regional characteristics and disseminate information necessary for safe and proper coastal utilization. • Promotion of coastal conservation philosophy and capacity building in local communities are encouraged. • Coastal management in cooperation with local community is enhanced.
(3) Promotion of research, studies, and monitoring	<p>【Items that require the promotion of research, studies, and monitoring】</p> <ul style="list-style-type: none"> • Collecting and organizing basic information on the coasts are promoted. • It should be encouraged to collaborate and share information across a wide range of sectors, including the private sector, and to facilitate international technological exchanges. • To address the climate change impact, tidal levels and waves are monitored continuously, and the data shall be store and accumulated • In coastal regions prone to land subsidence, continuous monitoring and data accumulation of land subsidence are promoted to be conducted.
(7) Area for Preparation of Basic Coastal Management Plan	
➤ Five main Island (Sulawesi, Kalimantan, Java, Papua, Sumatra) and two island group (Maluku Islands and Nusa Tenggara)	
Clause 2: Area for the Preparation of Basic Coastal Management Plan	<ul style="list-style-type: none"> • Five main islands (Sulawesi, Kalimantan, Java, Papua, Sumatra) and two-island group (Maluku Islands and Nusa Tenggara) are designated to prepare the Basic Coastal Management Plan. • Division of one coastal area, in which one coastal management plan is prepared, shall be determined based on the similarity of topographical and oceanographical condition, the continuity of littoral drift as broadly as possible, and administrative boundary by setting an approximately 50 to 100 kilometers as the extent of a one of the unified coastal area.
(8) Basic Items for Preparation of the Basic Coastal Management Plan	
<ul style="list-style-type: none"> ➤ Current status of the coast and the direction of coastal conservation ➤ Items related to coastal protection ➤ Items related to the management, maintenance and conservation of the coastal environment ➤ Items related to proper public utilization of the coast ➤ Items related to new development or repair of coastal facilities ➤ Items concerning the maintenance or repair of coastal facilities ➤ Other important items to be considered in the Basic Coastal Management Plan 	
Clause 3: Basic Items for the Preparation of the Basic Coastal Management Plan	—
1. Basic Items to be Stated in the Basic Coastal Management Plan	—
(1) Basic items concerning Coastal Conservation	—
① Current status of the coast and the direction of coastal conservation	<ul style="list-style-type: none"> • The long-term vision of the coast shall be determined based on the natural and social characteristics and other factors.

② Items related to coastal protection	<ul style="list-style-type: none"> The area to be protected, the goals of coastal protection such as the level of protection, and the details of the measures to be implemented to achieve these goals shall be determined.
③ Items related to the management, maintenance and conservation of the coastal environment	<ul style="list-style-type: none"> The detail of the measures that are to be implemented to conserve coastal environment, and, if necessary, develop the coastal environment shall be determined.
④ Items related to proper public utilization of the coast	<ul style="list-style-type: none"> The details of the measures that are to be implemented to promote proper coastal utilization by the public shall be determined.
(2) Basic items concerning the development of Coastal Facilities	—
⑤ Items related to new development or improvement of coastal facilities	<ul style="list-style-type: none"> The area in which a series of coastal facilities are to be newly constructed or repaired shall be determined. The type, size, and layout of coastal facilities shall be determined in each area determined in (a). The areas that are expected to be protected from tsunamis, storm surges, coastal erosion, and other disasters by new development or repair of coastal facilities and the land use conditions in those areas shall be identified.
⑥ Items concerning the maintenance or repair of coastal facilities	<ul style="list-style-type: none"> The area in which existing coastal facilities subject to maintenance or repair are located shall be determined. The type, size, and layout of coastal facilities that exist in each of the areas in (a) shall be determined. The method of maintenance or repair of each type of coastal facilities that identified in (b) shall be prescribed.
2. Other important items to be considered in the Basic Coastal Management Plan	—
(1) Ensuring of consistency with relevant plans	<ul style="list-style-type: none"> Basic Coastal Management Plan shall be in line with the relevant plans such as national land use plan, plans on environmental conservation, etc.
(1) Cooperation and coordination with relevant administrative agencies	<ul style="list-style-type: none"> Adequate cooperation and close coordination with relevant administrative agencies related to the coast shall be carried out. Local risks, including climate changes, land subsidence, etc., shall be shared with those involved in community development.
(2) Participation of local residents and information disclosure	<ul style="list-style-type: none"> Participation of local residents shall be facilitated. Disclosure of information related to the coast shall be carried out to enhance the transparency of the project.
(3) Review of plans	<ul style="list-style-type: none"> Basic Coastal Management Plan is basically reviewed approximately every five years to assess the need for updates, and it is revised as necessary. Basic Coastal Management Plan and the development plan of coastal facilities stated in the Basic Coastal Management Plan shall be revised in response to changes in local condition, socio-economic condition, and the effects of climate change.

Source: JICA Study Team

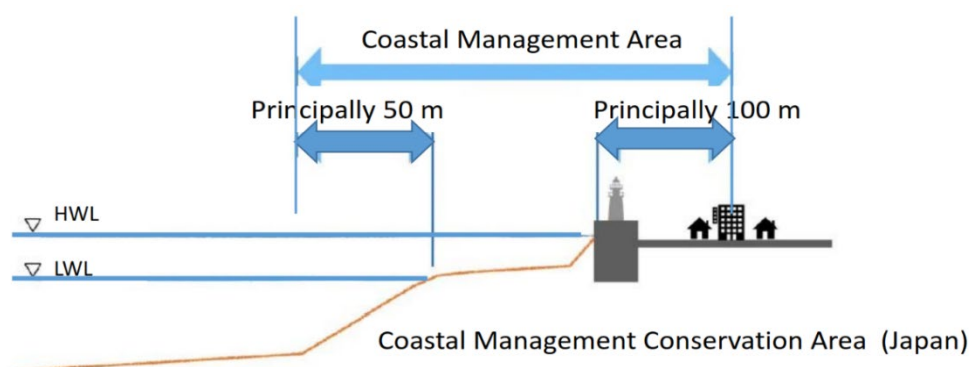
18.4.4 Definition of Terms

Since the definition of terms related to coastal management in Indonesia, and the draft of Basic Policy for Coastal Management, the draft of Basic Coastal Management Plan are added and included in the draft of Basic Policy for Coastal management in Indonesia, these are explained in the followings:

➤ Definition of Coastal Management Area

Coastal management area for the preparation of Basic Coastal Management Plan is defined as follows:

- a. Areas which defined as coastal area are at least 50 meters from lowest water level (LWL) offshore and 100 meters from highest water level (HWS) onshore principally. The final area for each coastline should take into account the shore condition, seabed slope, and other considerations that may widens the area for specific site.
- b. “Buffer zone” against coastal disaster is defined on Presidential Decree 51/2016 as public property. It is recommended to keep consistency efor both its range and public status at onshore side.
- c. Boundary of 12 nautical mile defined as provincial jurisdiction area for offshore side is deemed too far for coastal management, thus, not considered in this plan.



Source: JICA Study Team

Figure 18.4.1 Definition of Coastal Management Area

➤ Definition of Coastal Facility

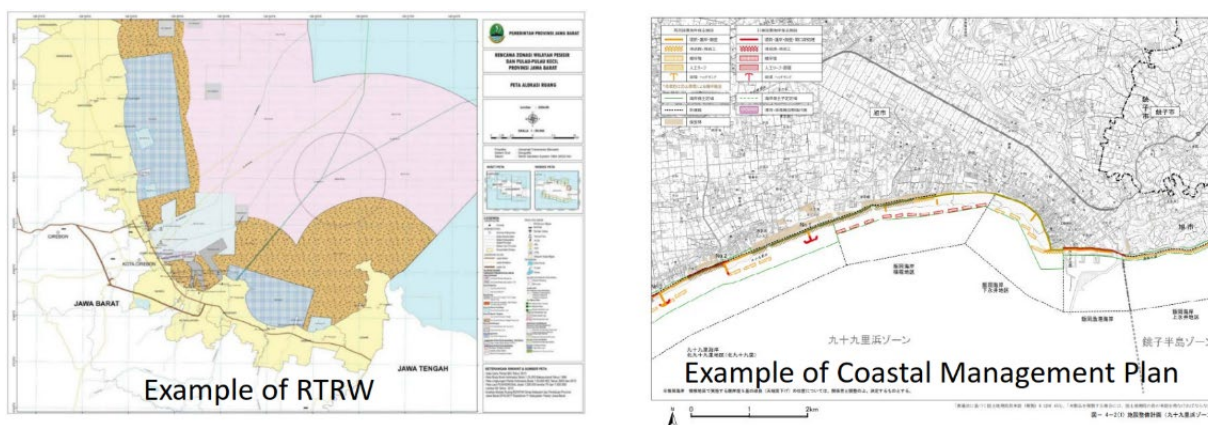
Coastal facilities have a variety of types. Examples of coastal facilities such as both “hard” and “soft” or “gray” and “green” facility (measures) are defined as follows:

- a. Groin, revetment, breakwater, detached break water, artificial headland, etc., as hard and gray facilities/measures.
- b. Beach nourishment, sand back-pass, sand bypassing, etc., as “soft” measures
- c. Mangrove and other vegetation plantation, coral transplantation, etc., as “green” facilities/measures
- d. Combination of above facilities.
- e. Other public facilities to enhance beach utilization such as walkway, parking, rest house, etc.

➤ Position of Basic Coastal Management Plan

To make it clear, the differences of the objective and position of coastal management plan and spatial plan (known as Rencana Tata Ruang Wilayah, RTRW) are defined in this section.

- a. Objective of RTRW is to clarify zoning to show the areas of the existing – and future development – coastal and marine utilization and activities.
- b. On the other hand, “Basic Coastal Management Plan” is to clarify the middle and long-term goals on coastal management and its plan at the coastal area, considering the coastal condition and its process, and socio-cultural condition as well as impact of this future development of infrastructures at the coastal area.



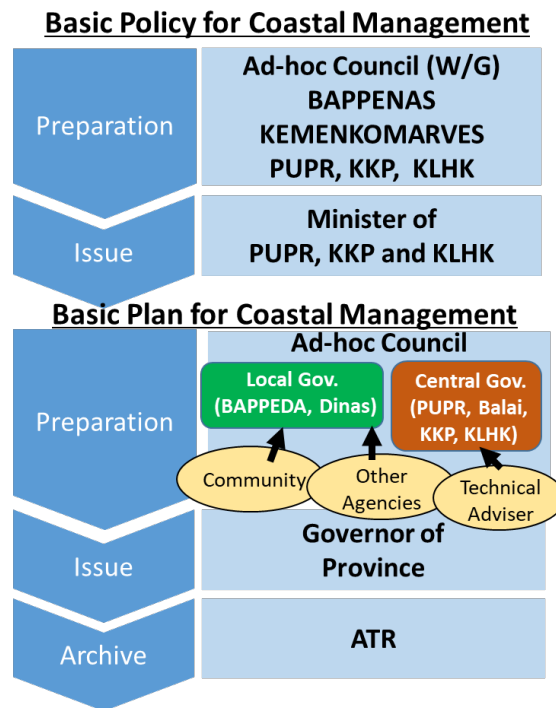
Source: JICA Study Team

Figure 18.4.2 Difference Between RTRW and Coastal Management Plan

➤ Main agencies involved in the preparation and issuance of the Basic Coastal Management Plan;

Agencies involved in the preparation of Basic Coastal Management Plan are defined as follows:

- a. The local governments, mainly DINAS PU and BAPPEDA, prepare the Basic Coastal Management Plan as the leading agencies in cooperation with relevant agencies from the central governments, such as PUPR, KLHK, and KKP.
- b. For the preparation of the Basic Coastal Management Plan in each area, it is recommended to establish an “Ad-hoc Council” which consists of at least PUPR, KKP, and KLHK from Central Government; and Dinas PU, BAPPEDA and other corresponding agencies from Local Government as required; communities, technical adviser of coastal engineering and management, etc.
- c. The Governor of each province shall issue the Coastal Management Plan and submit it to the Central Government (under ATR) to archive and integrate, as same system that for the Spatial Plan.



Source: JICA Study Team

Figure 18.4.3 Sequence and Flowchart of the Coastal Management Plan

CHAPTER 19 Issues and Proposals in Legal System, Organization, and Operation for Realization

19.1 Efforts to Finalize the Draft of the Basic Policy for Coastal Management

The first draft of the Basic Policy for Coastal Management was presented at the 2nd Working Group (WG) meeting on July 28, 2023. Since then, revisions have been made to reflect comments from stakeholders, and the final draft by the Study Team was submitted to the 4th Working Group on October 30, 2023.

It is the role of the Indonesian side to finalize and issue the Basic Policy for Coastal Management using the draft as a basis. The JICA Study Team has proposed the following efforts toward finalization.

1. Holding a Special Council to Finalize and Issue the Basic Policy for Coastal Management

Since the Basic Policy for Coastal Management concerns all organizations involved in coastal management in Indonesia, it is proposed to hold a special council that brings together relevant organizations, similar to the WG, to exchange opinions from each organization.

2. Consideration of Legalization of the Basic Policy for Coastal Management (details are given in Subsections 19.2.2 and 19.2.3)

The Basic Policy for Coastal Management, like other basic policies in Indonesia, should be issued as a law to be effective.

3. Creation of a Timeline for Finalization and Publication

As it is expected that the enactment of laws and regulations will take time, it is proposed to create a timeline for the above processes. This will enable each organization to prepare for the next actions, such as preparing a Basic Coastal Management Plan based on the Basic Policy for Coastal Management, in a timely manner.

19.2 Legal System

19.2.1 Jurisdiction of Coastal Management Projects

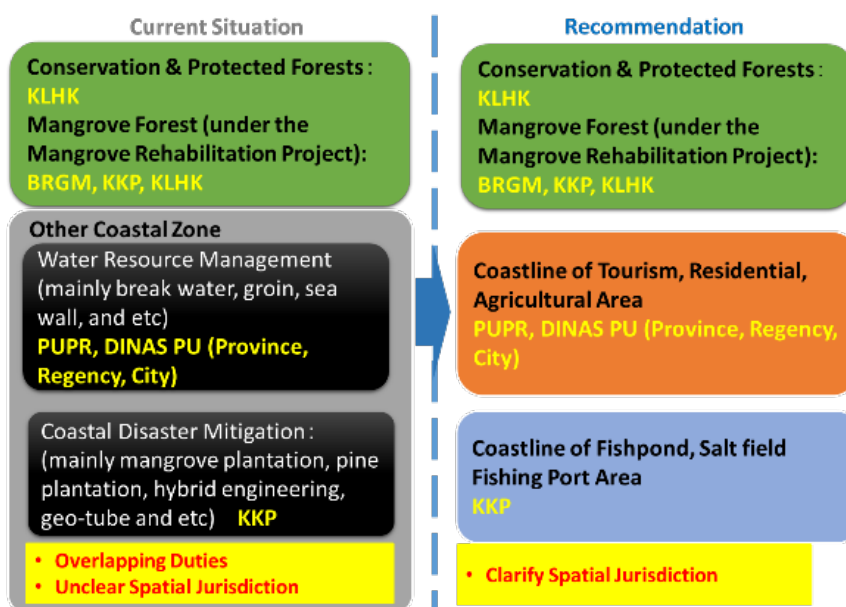
(1) Issues

In Indonesia, the jurisdiction of coastal management is managed by KLHK, as shown in the table below. For the rest of the coast, the coastal management activities for water resource management specified in legal UU No. 17 (2019) are under the jurisdiction of PUPR and the public works authorities of the local governments, provinces, regencies and cities. Additionally, coastal disaster prevention activities stipulated in Decree PP No. 64 (2010) are under the jurisdiction of KKP. Both water resource management and disaster prevention activities overlap in the following ways: First, regarding the methods, although the former focuses on tangible measures and the latter concentrates on green infrastructure, each mainly focuses on activities aimed at coastal erosion countermeasures, so there is some overlap in their roles. In addition, the spatial jurisdiction for each activity is not clear, and there is an actual situation in which business entities and business details differ depending on whether the request from the local community goes to PUPR or KKP.

As mentioned above, the project entity changes depending on which ministry receives the request—KKP or PUPR. Each ministry will act based on its capabilities, leading to coastal management projects being carried out on an ad hoc basis.

(2) Proposal

In response to the above issue, it is proposed that, for the Basic Coastal Management Plan, coastal management organizations for each coast should be clearly defined in line with the land use of the hinterland area, referring to Japan's classification of agricultural coasts, fishing port coasts, port coasts, construction coasts, etc. These coastal management organizations should take the initiative and implement coastal management projects in collaboration with other organizations as necessary, in order to realize strategic coastal management.



Source: JICA Study Team

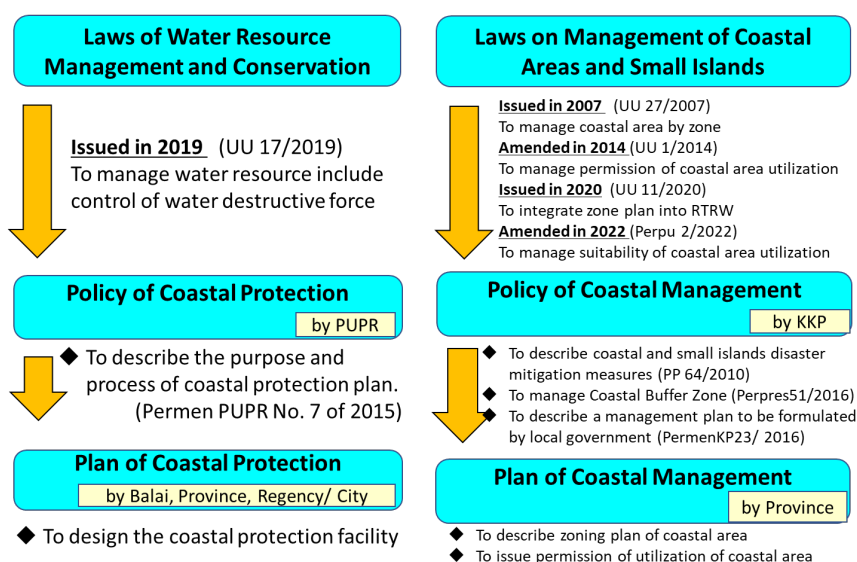
Figure 19.2.1 Proposal for Clarifying the Jurisdiction

19.2.2 Legal Position for the Basic Policy for Coastal Management and of the Coastal Facility Plan

(1) Issues

The laws and regulations related to coasts in Indonesia are UU No. 27 of 2014, UU No. 1 of 2014 and UU No. 17 of 2019. However, they are limited to the definition of coastal areas (UU No. 27 of 2014 and UU No. 1 of 2014) and the description of coastal areas as part of water resource management (UU No. 17 of 2019). Unlike the Japanese Basic Coastal Conservation Plan, they do not stipulate the formulation of plans aimed at coastal protection, utilization, and environmental conservation, nor are such plans specified in any ministerial ordinance. In addition, although there is a concept of Integrated Coastal Zone Management (ICZM), it remains a list of all-around and comprehensive development plan for various development plans rather than an integrated concept that shares the objectives of short- and medium-term coastal conservation, utilization, and protection.

As seen above, coastal conservation and coastal protection are stipulated by separate laws in Indonesia, and the distinct implementing agencies, such as KKP for coastal management and PUPR for coastal protection. This is thought to be the root cause of the lack of integration among protection, environment, and utilization efforts.

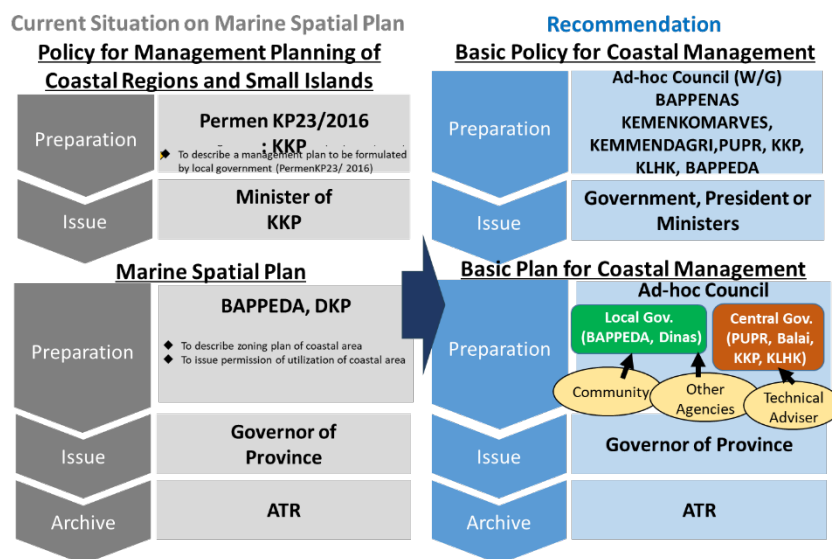


Source: JICA Study Team

Figure 19.2.2 Legal Framework of Coastal Management in Indonesia

(2) Proposal

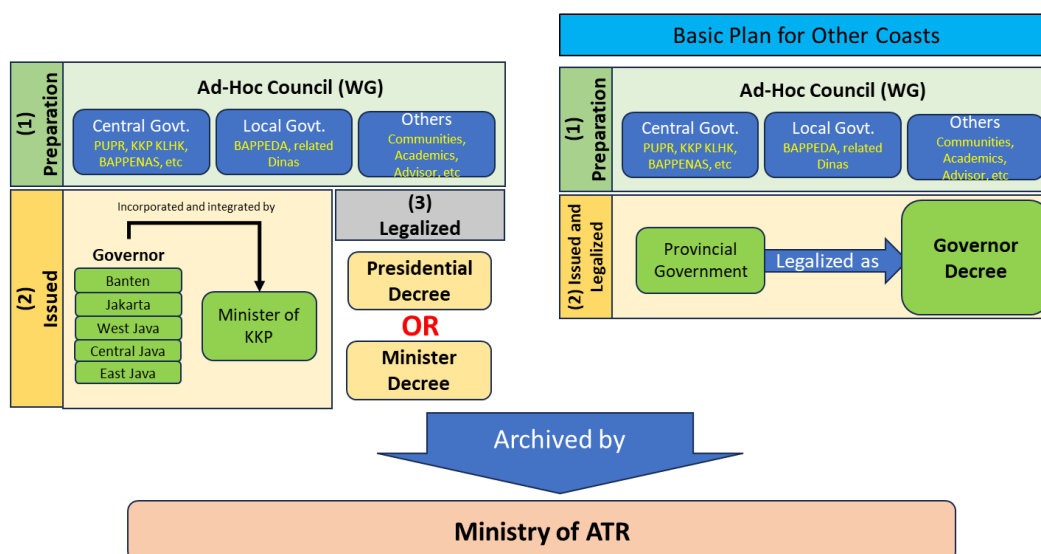
In response to the above issues, it is proposed that the Basic Policy for Coastal Management and the Basic Coastal Management Plan created in this project be jointly created and published by the relevant organizations, as shown in the figure below. The organizations shown in Figure 19.2.3 below are proposed for the creation of the Basic Policy for Coastal Management Plan and the Basic Coastal Management Plan, but adjustments will be made in future discussions. Additionally, in order to make the Basic Policy for Coastal Management and the Basic Coastal Management Plan effective, it is necessary to issue these in a legal form such as law, governmental regulations, presidential decree, etc. It is proposed to determine the mechanism for authorizing these plans.



Source: JICA Study Team

Figure 19.2.3 Proposed Framework of Basic Coastal Management Policy and Basic Coastal Management Plan

Regarding the Basic Coastal Management Plan, considering the importance of economic activity on the northern coast of Java, BAPPENAS proposed differentiating the procedures for formulating and issuing the Basic Coastal Management Plan for the northern coast of Java and other coasts. The Indonesian side will continue to consider this proposal.



Source: JICA Study Team

Figure 19.2.4 Idea for Enactment of Basic Coastal Management Plan

19.2.3 Proposal for Legalization of the Basic Policy for Coastal Management

When transforming the Basic Policy for Coastal Management into a legal framework, appropriate legislation must be considered. Four options were proposed based on other cases. The results of discussions on these options

with the Indonesian side indicate that it would be appropriate to issue it as a Presidential decree, as suggested in option 2 and 3.

➤ Option 1: Enactment of a New Government Regulation

A reference example is Indonesia's "Government Regulation on Marine Sediment Management (PP26/2023)," prepared jointly by relevant agencies such as KKP, KEMENHUB, ESDM, and KLHK. The involvement of multiple agencies is similar to the Basic Policy for Coastal Management.

➤ Option 2: Enactment of a New Presidential Decree

A reference example is the Indonesian Presidential Decree on Water Resources Management Policy (Perpres37/2023). This presidential decree sets out a policy for implementing the Law on Water Resources Management (UU17/2019) and is considered to be at the same level as the Basic Policy for Coastal Management.

➤ Option 3: Amendment of Existing Presidential Decree

The Law on Water Resources Management (UU17/2019), which is the higher-level law of the Presidential Decree on Water Resources Management Policy (Perpres37/2023), includes coastal management within water resources management. Since the current Presidential Decree on Water Resources Management Policy (Perpres37/2023) does not mention coastal management, it could be amended to include the contents of the Basic Policy for Coastal Management.

➤ Option 4: Enactment of a New Ministerial Decree

Japan's Basic Coastal guidelines are established by the Minister of Agriculture, Forestry, and Fisheries and the Minister of Land, Infrastructure, Transport, and Tourism, which are equivalent to ministerial orders in Indonesia.

Table 19.2.1 Legal Form Options of the Basic Policy for Coastal Management

Legal Form	Option of Legal Form for the Basic Policy for Coastal Management
Law/ Undang-Undang (UU)	
Government Regulation in Lieu of Law/ Peraturan Pemerintah Pengganti Undang – Undang (Prp)	
Government Regulation / Peraturan Pemerintah (PP)	Option 1 Develop new policy under existing law
Presidential Decree / Peraturan Presiden (Perpres)	Option 2 Develop new policy under existing law
	Option 3 Integrate the policy into existing policy (Perpres 37 of 2023 about National Water Resource Policy)
Ministerial Decree / Keputusan Menteri Negara (Kepmen, Permen)	Option 4 Develop New Policy by the name of related minister (PUPR, KKP and KLHK) like Japanese coastal management policy.
Ordinance / Peraturan Daerah (Perda)	

Source: JICA Study Team

19.2.4 Licensing for Sand Mining Operations

(1) Issues

The Omnibus Law has changed the procedure for obtaining licenses for mineral mining operations, including sand. KKPL, AMDAL and business license must be obtained when collecting sand. Precedent cases in the BBCP2 project were checked, and it has been found that the procedure was the same with KKPL and AMDAL, but the mining project authorization that is usually issued by ESDM could not be granted, saying that business license for the commercial purpose could be issued, but not for the governmental project, and it was confirmed that the mining was not possible. They are currently confirming what alternative procedures are necessary, and we will continue to gather information from BBCP2 officials.

19.3 Organizational and Operational Aspects (Especially Coastal Management System, Cooperation with Other Related Organizations, etc.)

19.3.1 Management System for Coastal Utilization

(1) Issues

Legally, coastal utilization management is under the jurisdiction of the provincial government. On the other hand, the land is managed by the regency and city governments under the direction of the provincial government. However, there are cases where the regency/city manages sandy beaches and other areas that are legally defined as coastal areas, and there is a concern that strict operation is not being carried out. Additionally, according to Presidential Decree No. 51 (2016), coastal areas (areas with a width of 100m or more from the coastline, as determined by the RTRW of local governments) are considered state property. However, in the Bali Coastal Conservation Project, there have been cases where land that was once submerged and then reappeared due to sedimentation and beach nourishment has been claimed by previous landowners. The challenge is to strictly enforce land ownership in accordance with the aforementioned presidential decree.

(2) Proposal

In the Basic Coastal Management Plan developed in this project, it is proposed to clearly define the coastal manager and coastal zone settings and establish consensus among all concerned parties.

19.3.2 Implementation System for Coastal Facility Development

(1) Issues

As a result of interviews conducted with BBWS, KKP, and Dinas PU (Central Java Province) regarding examples of interorganizational cooperation in the development of coastal protection facilities, it has been found that there were many cases in which BBWS carried out the development (planning, designing, and construction) based on the request from Dinas PU. The general flow can be described as follows: Dinas PU (province) requests PUPR for development based on requests from residents, and BBWS will plan, design, and construct according to PUPR's instructions. Local measures

such as explanations to residents are managed by Dinas PU. Maintenance is the responsibility of the asset owner. However, in cases where Dinas PU is the owner, BBWS maintains it for the reasons such as shortage of budget.

As seen above, there are almost no examples of collaboration between multiple organizations from the planning stage. Coastal management through interorganizational cooperation from the planning stage can be said to be a challenge.

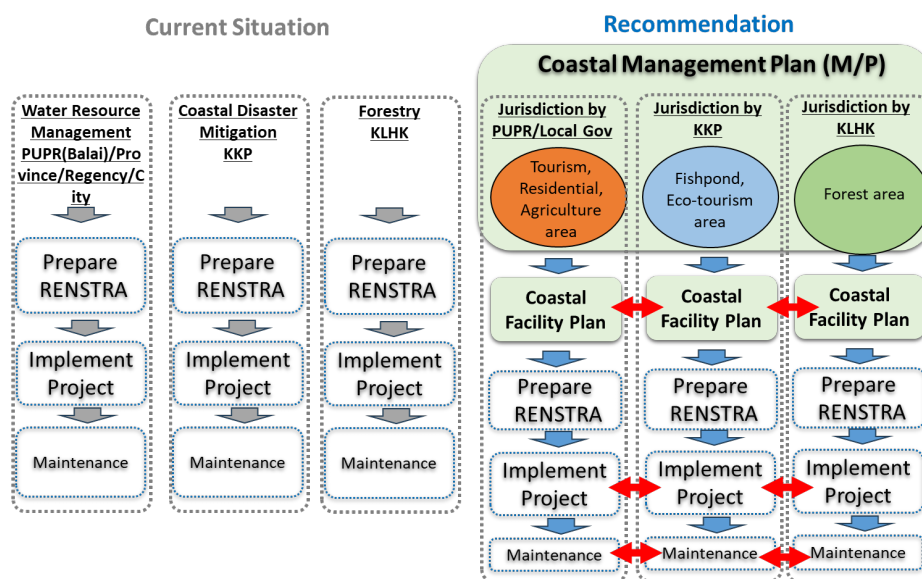
Table 19.3.1 Example of Interorganizational Cooperation

Organization	Details of Cooperative Work	Collaboration Partner and Role Sharing
BBWS Citarum	Levee development	DinasPU: Facility development request BBWS: Planning, designing and construction
BBWS Cimanuk	Breakwater development (Babakan)	Area in charge were divided among KKP and BBWS and constructions works were carried out respectively.
Cisangarung	Breakwater development	DinasPU: Facility development request BBWS: Planning, designing and construction
BBWS Pemali Juana	Breakwater development	DinasPU: Facility development request BBWS: Planning, designing and construction
BBWS Bengawan-Solo	Coastal facilities (Tuban)	Dinas PU: Socioeconomic survey, operation of explanation sessions to residents BBWS: Planning, designing, construction, and maintenance
	Breakwater (Tetrapot) (Lamongan)	KKP: Design-draft, project implementation request to PUPR BBWS: Design-review/review, construction, maintenance
KKP	Development of aquaculture ponds	PUPR: Administrative roadway development KKP: Development of aquaculture ponds
	Dutch-aided anti-erosion projects (Demak)	Deltares (National Institute of Water Resources and Water Environment-Related Independent Institutes): Planning PUPR: Breakwater KKP: Hybrid engineering
Dinas PU (Central Java Province)	Erosion countermeasures	BBWS: Structural measures Dinas PU: Design-draft, social issues research, and operation of explanation sessions to residents

Source: JICA Study Team

(2) Proposal

In response to the above-mentioned issues, given the current situation in which each organization is independently implementing what they can do, it is proposed that the framework/process for determining the necessity of coordination with other institutions in the short-term development planning stage, project implementation stage, etc. be stipulated in the Basic Coastal Management Plan, in order to implement an effective coastal management through collaboration that leverages each organization's strengths.



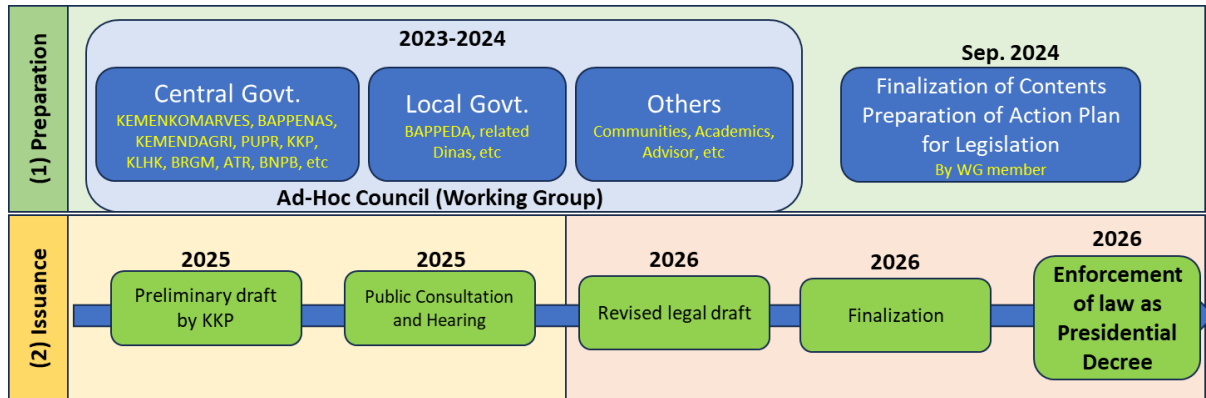
Source: JICA Study Team

Figure 19.3.1 Proposed Framework for Coastal Management Implementation System

19.4 Roadmap for Realization

Regarding the proposed roadmap for finalizing and enacting the Basic Policy for Coastal Management, it is reached the following conclusion after internal discussions within the Indonesian side involving relevant agencies.

1. The Basic Policy for Coastal Management will be enacted as a Presidential Regulation (Peraturan Presiden), Presidential Instruction (Instruksi Presiden), or an equivalent presidential act.
2. The Ministry of Maritime Affairs and Fisheries (KKP) will lead the legislative process with the support and cooperation of other Working Group members. High-level consultations will be held among various ministries and agencies to develop a draft.



Source: JICA Study Team

Figure 19.4.1 Draft of Roadmap for Legislation of the Basic Policy for Coastal Management

CHAPTER 20 Technical Transfer and Capacity Development

20.1 Implementation of WG and CGD

20.1.1 Purpose of Implementation of WG and CGD

The Project held WG (Working Group) and CGD (Close Group Discussion) for the discussion with related agencies, in order to prepare the draft of Basic Policy for Coastal Management, the draft of Basic Coastal Management Plan, and Coastal Facility Plan (Figure 20.1.1). In WG, the draft of Basic Policy for Coastal Management and the draft of Basic Coastal Management Plan are discussed among related agencies responsible for coastal management such as BAPPENAS, PUPR, KKP, KLHK, etc. In CGD, in order to prepare Coastal Facility Plan by PUPR, the discussion is held between PUPR, BBWS in each selected Area, and Balai Teknik Pantai.

These WG and CGD promote technical transfer to the related agencies to understand the knowledge of coastal project and its basic approach. Particularly, through the preparation of the draft of Basic Policy for Coastal Management and the draft of Basic Coastal Management Plan, these WG and CGD promote the understanding on coastal management from a broad and comprehensive perspective based on topographic and oceanographic conditions and the continuity of littoral drift. Moreover, discussions on other ministries' activities and other countries' activity facilitate the understanding of various coastal measures, and the approach of selecting appropriate coastal measures depending on the use of its hinterland, coastal use, and other conditions.



CGD Discussion



WG Discussion

Source: JICA Study Team

Figure 20.1.1 Holding of WG and CGD

(1) Participants of WG and CGD

Table 20.1.1 shows WG members and GCD members. WG members mainly consist of PUPR, KKP, KLHK, and BAPPENAS from the central government and BBWS responsible for selected areas. CGD members consist of PUPR from the central government and BBWS is responsible for selected areas. In selecting members, considering the perspectives of technical transfer, the practitioner in coastal projects was selected. Moreover, after each WG or CGD discussion, the participants reported the contents of their discussions and feedback from the upper-level position with the purpose of obtaining various opinions including non-participants in WG and Furthermore, it promotes an understanding of the basic knowledge of coastal projects. In addition to the members in the table below, other participants have joined from related agencies.

Table 20.1.1 List of WG and CGD Members

Affiliation	WG member	CGD member
PUPR	3 people	3 people
Balai Teknik Pantai	1 person	1 person
BBWS Citarum	2 people	2 people
BBWS Cimanuk Cisanggarung	2 people	2 people
BBWS Pemali Juana	2 people	2 people
BBWS Bengawan Solo	2 people	2 people
BAPPENAS	1 person	-
KLHK	2 people	-
KKP	2 people	-
KEMENKO MARVES (Coordinating Ministry for Maritime and Investment Affairs)	1 person	-
BRG (Peatland and Mangrove Restoration Agency)	1 person	-

*The number of members listed in the table is limited to the members registered officially.

Source: JICA Study Team

(2) Schedule of WG and CGD

Table 20.1.2 shows the schedule and agendas of WG and CGD. In the third WG and CGD, a seminar conducted by Dr. Uda who is an authority of coastal engineering in Japan was held.

In WG and CGD, the JICA Study Team set the agendas and proposed the draft based on the these, likewise, discussion and feedback on the drafts were provided by related agencies. Particularly, in order to facilitate further extensions of the Basic Coastal Management Plan to other regions, it was carefully noted that the procedure of preparation of the draft of Basic Coastal Management Plan is understood well by related agencies, especially when the JICA Study Team commences the side activity.

Table 20.1.2 Schedule and Agendas of WG and CGD

Study Item	Related Agencies	2023												2024				
		2	3	4	5	6	7	8	9	10	11	12	1	2	3	4		
Schedule for JCC	3 times	●												●				●
Schedule for W/G	6 times				△		△	△		△				△				△
Schedule for CGD	6 times				①		②	③		④				⑤				⑥
Agenda of JCC	1	14-Feb-23	Agreement for 3 Areas in which the Proejct prepares draft of coastal management plan															
	2	19-Jan-24	1) Request of actions by Indonesian side for the legalization of Basic Policy for Coastal Management, 2) Discussion of the draft of Basic Coastal Managemen Plan, 3) Agreement of the target sections for Coastal Facility Plan															
	3	2024/06/11	1) Agreement on the three outputs (Basic Policy for Coastal Management, Basic Coastal Management Plan, and Coastal Facility Plan) 2) Agreement on further actions taken by JCC members related to the above three outputs															
Agenda of W/G	△	2023/05/31	1) Explanation for W/G and Discussion of WG Schedule 2) Introduction and discussion for contents of Basic Policy for Coastal Management 3) Discussion and mutual agreement of Areas for Basic Coastal Management Plan															
	△	2023/7/28	1) Mutual agreement for the contents of Basic Policy for Coastal Management 2) Discussion for contents of Basic Coastal Management Plan (Basic procedure & Image) 3) Presentation by Dr. Uda (Authority of Coastal Engineering in Japan)															
	△	2023/8/9 (PM)																
	△	2023/10/30	1) Submission of the draft of Basic Policy for Coastal Management 2) Discussion for contents and procedure of Basic Coastal Management Plan (Area1, 2, 3)															
	△	2024/01/17	1) Discussion for legislation framework and position of Basic Policy for Coastal Management 2) Discussion for contents and procedure of Basic Coastal Management Plan (Area1, 2, 3)															
△	2024/06/10	1) Discussion for legislation framework and position of Basic Policy for Coastal Management 2) Discussion for final contents and legislation framework of Basic Coastal Management Plan																
Agenda of CGD	①	2023/05/31	1) Finalization of boundary for selected 3 areas 2) Discussion for division of zone and section for Basic Coastal Management Plan 3) Discussion for principle of Coastal Facility Plan															
	②	2023/7/27	1) Discussion for imaged Coastal Facility Plan 2) Presentation by Dr. Uda (Authority of Coastal Engineering in Japan)															
	③	2023/8/9 (AM)																
	④	2024/10/30	1) Discussion for concrete Coastal Facility Plan 2) Request of necessary information to related BBWS															
	⑤	2024/01/17	1) Discussion for concrete Coastal Facility Plan 2) Request of necessary information to related BBWS															
⑥	2024/06/10	1) Agreement on Coastal Facility Plan 2) Mutual understanding on further necessary actions to promote Coastal Facility Plan																

Source: JICA Study Team

20.1.2 Outcomes of WG and CGD

From WG and CGD until November 2023, the outcomes of WG and CGD are described as follows:

- In preparing the draft of Basic Policy for Coastal Management, the discussion on coastal issues and basic principle of coastal management has contributed to establishing a foundation for related agencies in Indonesia to collaborate and proactively shape the future of coastal management.
- Preparing the draft of Basic Coastal Management Plan has promoted the understanding of coastal management from broad and comprehensive perspectives through the discussion of coastal divisions such as the Zone division based on topographic and oceanographic conditions, the Section division based on the hinterland and coastal use.
- In preparing the Coastal Facility Plan, the discussions on coastal measures considering coastal protection, coastal utilization, coastal environment enhance the understanding of the variety of coastal measures and approaches for the coast with different coastal characteristics.

20.2 1st Training in Japan

From November 27 to December 15, 2022, the 1st training in Japan was held. The purpose of this training was to transfer technology related to coastal conservation measures to government officials who are involved in coastal conservation in each country. Specifically, knowledge and techniques on coastal conservation and coastal maintenance management were shared, including not only successful cases but also lessons learned from failed cases in Japan by learning the basic concept of coastal conservation, planning, and maintenance. The aim was to acquire both hard and soft measures including management and to utilize it in future activities in their respective country.

Six participants from Indonesia were selected from related agencies, mainly core members of the Project's activities. From countries other than Indonesia, there were four persons from the Maldives, one person from the Philippines, one person from Fiji, from the Marshall Islands participated. A total of 13 participants joined the training. Table 20.2.1 shows Indonesian participants and notable action plans, while Table 20.2.2 shows the training schedule.

- From November 28 to 30, presentations of the participants, lectures related to basic understanding of coastal engineering and site visits to beaches were conducted.
- From December 1 to 12, participants attended lectures on coastal conservation and visited the coast of Okinawa prefecture. On the 13th and 14th, a presentation of the action plan was made by each participant. On 15th, an evaluation meeting and closing ceremony were held. After that, six participants from Indonesia returned to their country.
- They visited Okinawa Main Island and Miyako Island to learn about 1) coastal conservation measures, 2) natural environment conservation measures, 3) urban planning that balances development and coastal conservation, and 4) ICZM (integrated coastal zone management).
- Lecturers for the training were Mr. Uda, Director of the Public Works Research Center, and Mr. Onaka from Nippon Koei (he is a team leader of the Project).
- The trainees considered to utilize what they learned in the training, additionally made a concrete action plan. After presenting the action plan, they received useful feedback from the lecturers.

In their action plan presentations, training participants presented concrete plans related to their agencies and positions. The notable points of each action plan are shown in Table 20.2.1.

Table 20.2.1 List of Participants of the 1st Training in Japan and Notable Points in the Action Plan

Name	Organization	Position	Notable Points in the Action Plan
Ms. SWASTIKA Paula	Ministry of Public Works and Housing/ Directorate of Rivers and Coasts, Directorate General of Water Resources/	Young Engineering Functional	- Preparation of coastal management plan and coastal facility plan - - Proposal and promotion of coastal facilities considering landscape and environment.
Mr. PURNAMA Bayu	Ministry of Public Works and Housing/ Technical Implementation Unit for Coastal Engineer/Water Resources Engineer	Water Resources Engineer	- Preparation of guidelines for monitoring after implementation of beach nourishment projects.
Ms. HAZET Frieda Astrianty	Ministry of National Development Planning/ Directorate of Water Resources	Planner	- Preparation of a basic policy for integrated coastal management - Addition of basic policy in the national mid- to long-term plan for 2025-2029.
Ms. ARDARINI Fina	Ministry of Marine Affairs and Fisheries/ Directorate of Coastal and Small Island Utilization	Sub Coordinator of Disaster Mitigation	- Raise community awareness of coastal conservation through FGDs and public consultations from the project planning stage.
Mr. YUDIARSO Permana	Ministry of Marine Affairs and Fisheries/ DG of Marine Spatial Management/ Coastal and Marine Resources Management Center of Denpasar (BPSPL)	Head of BPSL	- Implementation of monitoring surveys and accumulation of monitoring data to better understand coastal changes. - Sharing information on coastal conservation within the organization center through internal training.
Ms. WARDANI Khusnul Setia	National Research and Innovation Agency/ Research Center for Hydrodynamics Technology	Coastal Engineer	- Strengthening collaboration between ministries and agencies related to coastal conservation.

Source: JICA Study Team

Table 20.2.2 Schedule of the 1st Training in Japan

Date	Time	Content	Location
~11/27	-	visit to Japan	
11/28	10:00-10:30	Opening ceremony	JICA Okinawa
	10:30-11:00	Course briefing	JICA Okinawa
	11:15-16:10	Discussion & Presentation (45min/person *5persons)	JICA Okinawa
11/29	09:00-16:20	Discussion & Presentation (45min/person *8persons)	JICA Okinawa
11/30	09:00-10:40	Discussion (Basic Lecture & Briefing on coasts of site visit)	JICA Okinawa
	12:20-17:20	Site visit and group work	Azama Beach, Miibaru Beach, Komesu Beach
12/1	09:00-10:40	Discussion (Review & Lecture, Briefing on site visit)	JICA Okinawa
	12:20-17:50	Site visit and group work	Araha Beach, Sunset Beach, Miyagi Beach
12/2	09:00-12:10	Discussion (Review & Lecture, Introduction of ICZM)	JICA Okinawa
	13:10-17:30	Discussion (ICZM on overseas project, Beach maintenance, Briefing on coastal observation)	JICA Okinawa
12/5	AM	Move to Miyako from Naha	-
	11:00-17:30	Site visit and Group work	Yonahama Beach, Higashihenna Bora port • Yoshino Beach
12/6	08:45-14:30	Site visit and Group work	Nagayama no Hama Beach, Toguchi Beach, Sawada Beach
	PM	Move to Naha from Miyako	-
12/7	09:00-14:00	Discussion (Review and Lecture, Basic Lecture)	JICA Okinawa
	14:00-16:20	Discussion (Lecture on intermediate review, Briefing on coastal observation)	JICA Okinawa
12/8	AM	Move to Nago from Naha	-
	09:30-17:15	Site visit and Group work	Kayo Coast, 21 st century museum, Agarie Beach
12/9	09:10-13:45	Site visit and Group work	Bise, Yagaji Port
	PM	Move to Naha from Nago	-
12/12	09:00-14:30	Discussion (Review & Lecture, Basic Lecture)	JICA Okinawa
	14:30-16:10	Explanation and instruction for action plan	JICA Okinawa
12/13	09:00-12:00	Explanation and instruction for action plan	JICA Okinawa
	13:30-16:45	Presentation(45min/person*4person)	JICA Okinawa
12/14	09:00-16:45	Presentation(45min/person*8person)	JICA Okinawa
12/15	09:00-09:45	Presentation(45min/person*1person)	JICA Okinawa
	09:45-11:30	Comment from lectures, course evaluation	JICA Okinawa
	11:30-12:00	Closing ceremony	JICA Okinawa
12/15~	-	Departure from Japan	

Source: JICA Study Team



Source: JICA Study Team

Figure 20.2.1 Photos of 1st Training in Japan

20.3 2nd Training in Japan

From November 27 to December 13, 2023, the 2nd training in Japan was held, mainly in JICA Okinawa Office. The purpose of this training was in line with the 1st training in Japan.

Five participants from Indonesia were selected from related agencies, mainly core members of the Project's activities. From countries other than Indonesia, there were three persons each from the Maldives, the Philippines, while one person each from Kiribati, and one person from the Marshall Islands. A total of 13 participants joined the training. Table 20.3.1 shows Indonesian participants and notable action plans, and Table 20.3.2 shows the training schedule.

- From November 27 to 30, presentations made by the participants, lectures related to basic understanding of coastal engineering and site visit to beach were conducted.
- From December 1 to 11, the training participants attended lectures and field visit. On the 12th and 13th, the presentation of the action plan was made by each participant. On the 4th, an evaluation meeting and closing ceremony were held in JICA Headquarters. After that, five participants from Indonesia went back home.
- The training participants visited Okinawa Main Island and Miyako Island to learn about 1) coastal conservation measures, 2) natural environment conservation measures, and 3) urban planning that balances development and coastal conservation.
- The training participants visited the coastal project site of sand back-passing in Shizuoka and Kanagawa Prefecture. They have learned 4) the Integrated Coastal Zone Management (ICZM), in addition to the above
- Lecturers for the training were Mr. Uda, Director of the Public Works Research Center, and Mr. Onaka from Nippon Koei (he is a team leader of the Project).
- The training participants developed action plans based on the training, considering their application in their respective agencies. They then presented their plans and received feedback from the instructors.

In their action plan presentations, training participants presented concrete plans related to their agencies and positions. The notable points of each action plan are shown in Table 20.3.1.

Table 20.3.1 List of Participants of the 2nd Training in Japan and Notable Points in Action Plan

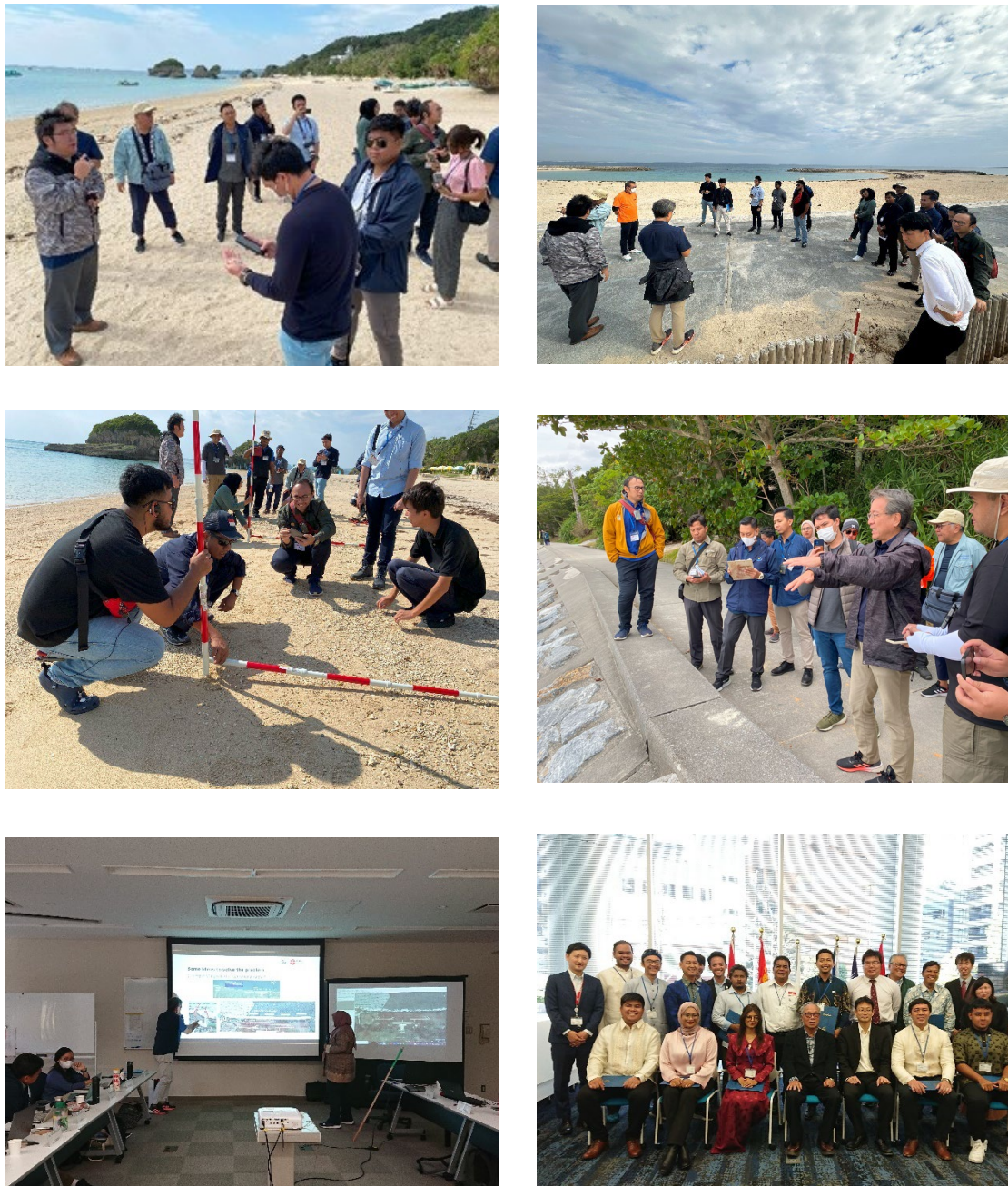
Name	Organization	Position	Notable Points in Action Plan
Mr.MUSLIM Anhar	Ministry of Marine Affairs and Fisheries, Loka of Coastal and Marine Resources Management, Serang	Coastal Area Conservation and Rehabilitation Analyst,	- Preparation of coastal management plan from protection, environment, utilization.
Mr.WILISA NDY Giri	Ministry of Marine Affairs and Fisheries, Directorate of Coastal and Small Island Utilization	Senior Expert of Marine and Coastal Environment,	- Promotion of nature-based solutions such as mangrove planting - Planning of erosion and flood solutions with protection, environment and utilization
Mr.HAKIKI Irham Adrie	Ministry of Public Works and Housing, Applied Engineering, Technical Implementation Unit for Coastal Engineering	Water Resources Engineer	- Implementation of monitoring of shoreline, wind, and wave.
Mr.RIYADI Farhan Putra	Ministry of Public Works and Housing, Directorate of Rivers and Coasts, Directorate General of Water Resources	Junior Water Resources Engineer	- Strengthening cooperation among ministries - Holding workshop on coastal management
Mr.ANGGA RA Ilham Tri	Ministry of Public Works and Housing, Coastal and River Engineer, Bali-Penida River Basin Unit	Water Resources Engineer	- Proposing sustainable coastal management measures by sand backpass.

Source: JICA Study Team

Table 20.3.2 Schedule of the 2nd Training in Japan

Date	Time	Content	Location
~23/11	-	visit to Japan	
27/11	10:00-10:30	Opening ceremony	JICA Okinawa
	11:00-12:00	Course briefing	JICA Okinawa
	13:00-17:50	Discussion & Presentation (45min/person *6 persons)	JICA Okinawa
28/11	09:00-17:15	Discussion & Presentation (45min/person *9persons)	JICA Okinawa
29/11	09:00-16:10	Lecture (Basic lecture, Briefing on site visit)	JICA Okinawa
30/11	10:00-15:50	Site visit and Group work	Nibaru Beach, Asama Sansan Beach, Araha Beach, Miyagi Beach
1/12	09:20-17:00	Site visit and Group work	Bise, Yagaji, Agarie Beach, Kayo Beach
3/12	AM	Move from Naha to Miyako	-
	11:15-15:25	Site visit and Group work	Higashi Henazaki Beach, Bora Port, Yonaha Maehama Beach
4/12	9:00-13:20	Site visit and Group work	Nagayama Beach, Toguchi Beach., Sawada Beach
	14:10-16:50	Review of Okinawa main island, Miyako	JICA Okinawa
	17:00-17:30	Lecture (Basic lecture, Briefing on site visit at Kanagawa and Shizuoka)	JICA Okinawa
5/12	AM	Move from Miyako to Haneda	
	PM	Move from Haneda to Shinagawa, and to Shizuoka	
6/12	11:00-17:00	Site visit and Group work	Oya, Abe River
7/12	09:00-12:00	Site visit and Group work	Miho-no-Matsubara etc.
	PM	Move from Shizuoka to Tokyo	
8/12	09:30-12:00	Site visit and Group work	Chigasaki Coast, Hishinuma Coast
	13:00-14:00	Review of site visit at Shizuoka	Local Civil Engineering Office
	14:00-15:00	Review of site visit at Kanagawa	Local Civil Engineering Office
11/12	09:00-11:10	Case of Integrated Coastal Zone Management	JICA Tokyo
	11:20-12:20	Case of Integrated Coastal Zone Management by Coastal Project	JICA Tokyo
	13:20-17:00	Explanation and instruction for action plan	JICA Tokyo
12/12	09:00-16:20	Presentation (45min/person*8 person)	JICA Tokyo
13/12	09:00-15:35	Presentation (45min/person*7 person)	JICA Tokyo
	15:45-16:45	Comment from lectures	JICA Tokyo
14/12	10:00-11:00	Course evaluation	JICA Headquarter
	11:10-11:40	Closing ceremony	JICA Headquarter

Source: JICA Study Team



Source: JICA Study Team

Figure 20.3.1 Photos of 2nd Training in Japan

20.4 Training Program in Bali Island

20.4.1 Overview of Training Program in Bali Island

During the period from September 5 to 8, 2023, Training Program in Bali Island was held. This training program visited the coastal project sites of the Bali Beach Conservation Project Phase-1 and Phase-2, which is implemented by DGWR of PUPU under the Japanese ODA loan, with a purpose to enhance the understanding of the approach of coastal projects, the difference in coastal conditions, issues of coastal management, and eventually utilizing this knowledge to the activities of the Projects.

Table 20.4.1 shows the participants of the Training Program in Bali Island. The training program participants consisted of 17 members in total, and the related agencies in coastal management, namely: BAPPENAS, PUPR, KKP, and KLHK, were selected. Furthermore, the officers from BBWS responsible for selected areas for Basic Coastal Management in the Project participated. In selecting trainees of this training program, WG and CGD members have been carefully chosen in the interest of utilizing the learnings from this training program in the Project. Additionally, this training program was held as a joint training program with the other JICA project in the Maldives, named “the Project for Building Climate Resilient Safer Islands in the Maldives”, to enhance the opinion exchanges between practitioners of each country, and 7 trainees from the government of Maldives have joined.

Table 20.4.1 Participants of Training Program in Bali Island

Affiliations	Number of Trainees
PUPR	3 trainees (including Balai Teknik Pantai)
BBWS	6 trainees BBWS Citarum (1 trainee) BBWS Cimanuk Cisanggarung (2 trainees) BBWS Bengawan Solo (2 trainees) BBWS Pemali Juana (1 trainee)
BAPPENAS	2 trainees
KKP	3 trainees
KLHK	2 trainees

Source: JICA Study Team

The lecturer of this Training Program is Mr. Onaka Susumu, who is the Team Leader of the Bali Beach Conservation Project Phase-2, the Team Leader of the Project, Mr. Shingo Ichikawa, who is Coastal Expert in the Bali Beach Conservation Project Phase-2, also the Deputy of the Project. In the kick-off meeting, the Project Management Unit from BWS Bali Penida of PUPR, as the implementation agency of the Bali Beach Conservation Project Phase-2, introduced the knowledge on coastal issues in Bali Island and its countermeasures.

The table below shows the schedule of this Training Program and the purpose of visit of each visited site. When considering the schedule, it is carefully noted to take into account consider the difference in coastal characteristics, and the difference in coastal measures depending on coastal characteristics, as well as the difference in coastal issues so that the trainees can experience various coastal conditions.

Table 20.4.2 Schedule and Contents of Training Program in Bali Island

Date	Content of Training Program	Purpose of the content
5 ^h Sep (Tue.)	Kick-off meeting	- Understanding the overview of the Bali Beach Conservation Project - Sharing the coastal situations such as major coastal problems and coastal measures in Indonesia and the Maldives
	Site visit (Sanur Beach)	- Explaining good examples of coastal measures (beach nourishment, groin, headland, offshore breakwater) against coastal erosion and wave overtopping, which was implemented in the Bali Beach Conservation Project Phase-1
	Site visit (Sand stockpile)	- Explaining, issues that occurred in sand stockpile, which was constructed in the Bali Beach Conservation Project Phase-1 for storing sand for future beach maintenance, and is used in the Bali Beach Conservation Project Phase-2, as a issues of coastal management/maintenance
6 th Sep (Wed.)	Site visit (Tanah Lot Temple)	- Explaining coastal measures including artificial rock for Tanah Lot Temple and artificial reef (submerged breakwater), both of which are for coastal measures against cliff erosion.
	Site visit (Nusa Dua Beach)	- Understanding coastal problems that occur after the coastal protection project and explaining adaptive measures as one of the maintenance methods of beach nourishment.
	Site visit (Kuta Beach)	- Explaining beach nourishment project and its related coastal management issues.
7 th Sep (Thu.)	Site visit (Candidasa Beach)	- Explaining wave monitoring camera installed and technical approaches to examine overtopping and coastal erosion.
	Mangrove Information Center	- Understanding of ecosystems of mangrove forests in terms of coastal protection against coastal erosion and wave as one of green infrastructures.
8 th Sep. (Fri.)	Presentation by each trainee and opinion exchange	- Presentation by trainees about their learnings from the training and way of activating the learning to the Project.

Source: JICA Study Team



Kickoff meeting
(Explanation by BWS Bali Penida about the coastal problems in Bali)



Sanur beach
(Coastal mechanisms and coastal measures)



Sand stockpile
(Explanation of sand stock pile)



Tanah Lot beach
(Explanation of coastal measures against cliff erosion)



Nusa Dua beach
(Site visit of construction site of the Bali Beach Conservation Project)



Kuta beach
(Explanation of coastal management issues)



Candidasa beach
(Explanation by hotel owner behind the project coast)



Mangrove Information Center (MIC)
(Explanation by MIC staff by about the ecosystems of mangrove forest)

Source: JICA Study Team

Figure 20.4.1 Photos of the Training Sites

20.4.2 Outcomes of Bali Training

On the final day of the training program, a presentation opportunity was provided to each participant to share their thoughts and learnings from the Training Program in Bali Island and how these can be applied to coastal conservation measures in Indonesia.

Regarding the points learned from the training, some trainees mentioned planning and design, while many others stated coastal management and maintenance, as well as social and environmental issues in coastal projects. As for the points that can be applied to coastal protection measures in Indonesia, a wide range of opinions were obtained, including consideration of coastal protection measures for silty beaches, consideration of social and environmental aspects of coastal projects, and promotion of the private sector's participation.

In this training program, the trainees visited the sites where beach nourishment was carried out as beach maintenance after the implementation of coastal projects. As stated in the points learned from the training, the trainees gained an understanding of the importance of long-term coastal management and maintenance. In terms of the utilization of the training for future Indonesian coastal projects, there was an opinion that cooperation in coastal management with stakeholders would be promoted, and an understanding of the maintenance and management aspects of the project was deepened.

Since this training program included visits to beaches used by tourists and local residents, as well as, visit to a mangrove information center, the trainees gained an understanding of the "utilization" and "environmental" functions of beaches. From the viewpoint of activations of the learnings for future coastal projects, there were some opinions raised such as emphasizing the "environmental" aspect of the coast and considering green infrastructure using mangroves.

Table 20.4.3 Opinions Obtained from Trainees of Bali Training

Learnings from the training
<p>[Regarding the Role Expected in Coastal Projects]</p> <ul style="list-style-type: none"> - Implementation of projects with a balanced concept that includes “protection”, as well as “utilization” and harmony with the “environment”. - The importance of preserving and restoring nature and ecosystems in the project's content. - The coastal project not only attracts tourists but also contributes to the local community. <p>[Regarding Planning and Design]</p> <ul style="list-style-type: none"> - Conducting detailed surveys before implementing the project is crucial. - Attention to changes in the coastal conditions during the planning stage. - Long-term observations are necessary for wave and wind data used in design. <p>[Regarding Coastal Management and Maintenance]</p> <ul style="list-style-type: none"> - Emphasis on the importance of long-term coastal management and maintenance (monitoring). - Deterioration of sandy beach conditions due to coastal structures constructed by other projects and landowners. <p>[Other (Social Aspects of Coastal Projects, Land Ownership, Legal Framework, etc.)]</p> <ul style="list-style-type: none"> - Concerns about the sand stockpile area being used for other purposes and illegal sand extraction. - Various "regulations" are needed for maintenance and management. - Addressing social issues such as land rights near the coast and illegal coastal protection construction involving private parties. - Consideration of the social environment is also important. - Some local residents oppose coastal projects due to the construction of promenades behind coastal protections and their impact on fishing.
For future Indonesian coastal projects
<ul style="list-style-type: none"> - Encouraging residents' awareness of coastal usage and environmental aspects through coastal conservation. - Promoting cooperation between relevant agencies and stakeholders in terms of maintenance and management. - The northern coast of Java Island is known for its thriving fishing and local tourism industries, necessitating solutions for social and environmental challenges. - Enhancing the role of the private sector in technical and legal aspects, reducing dependency on government projects. - Exploring coastal measures for fine-grain sandy beaches. - Considering coastal protection measures through mangrove reforestation.

Source: JICA Study Team

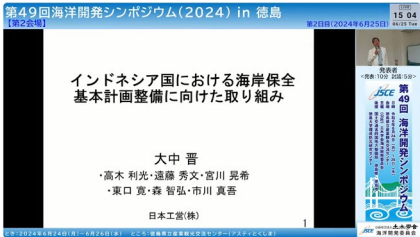
20.5 Public Relations Activities

Table 20.5.1 shows public relations activities conducted in the Project. The Project will conduct further public relations activities in the remaining period of the Project.

Table 20.5.1 Promotion Activities of the Project

Items	Implementation period	Description	Target
<p>1) Public relations activities through JICA</p>  <p>(Translated by using web translation) Source: JICA ODA Visualization Website</p>	Since the year, 2022	Through JICA ODA Visualization Website ¹⁾ , the Project is being introduced.	General public
<p>2) Opinion exchanges between practitioners of Bali Beach Conservation Project</p>  <p>Source: JICA Study Team</p>	September 2023 (During Bali Training)	An exchange of opinions meeting with BWS Bali-Penida has been conducted to present case studies and enhance understanding of coastal conservation projects, e.g., Bali Beach Conservation Project.	Related ministries of Indonesia
<p>3) JICA exchange of opinions with JICA disaster preparedness project in Indonesia (Name: Inter-Project Exchange of Opinions)"</p>  <p>Source: JICA Study Team</p>	1st session: October 2022 2nd session: April 2023	A project information sharing meeting has been conducted with stakeholders closely related to coastal conservation projects in Indonesia.	Personnel involved in JICA disaster-related projects in Indonesia

¹⁾JICA ODA Visualization Website (<https://www.jica.go.jp/oda/project/202006003/index.html>)

<p>4) Dissemination of project outcomes to The Indonesian related agencies and research institutions in the international conference in Jakarta (8th Hydraulics Engineering International Seminar (HEIS))</p>  <p>Source: JICA Study Team</p>	<p>Nov. 2023</p>	<p>The project member participated in the international conference in Jakarta conducted by the Indonesian Association for Hydraulic Engineers (IAHE), and disseminated the significance, activities, and outputs of the Project.</p>	<p>Related agencies and research institutions in the international conference in Indonesia and other counties.</p>
<p>5) Submission of the paper about the Project outputs to the Proceedings of Oceanographic Engineering of Japanese Society of Civil Engineering, and the presentation on the conference.</p>  <p>Source: Symposium on Ocean Development, You Tube Live (Accessed on 8th July, 2024)</p>	<p>Under press (As of July, 2024)</p>	<p>The Project member submitted the paper about the Project outputs, named the “Preparation of the Basic Coastal Management Plan in Indonesia”, to the Proceedings of Oceanographic Engineering of Japanese Society of Civil Engineering, which are under press. Simultaneously, the Project member presented on the paper in the conference, held in 2024, Japan.</p>	<p>Research institutions in Japan</p>

Source: JICA Study Team

CHAPTER 21 Review of Sayung Area, Demak

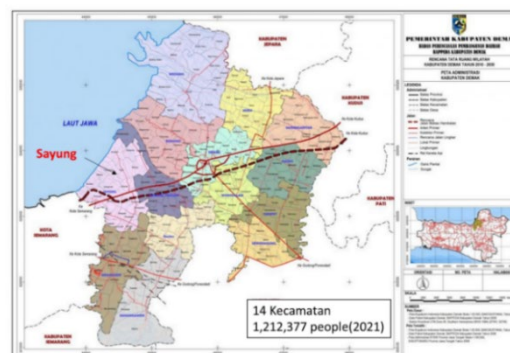
21.1 Background of Review Work

Demak is one of the five priority cities defined in the National Medium-Term Development Plan (RPJMN) for 2020-2024. In addition, Demak is adjacent to the large city Semarang. On the other hand, in recent years, Demak has been suffering from serious flood damage due to land subsidence and urgent measures are required in Indonesia. Considering this background, BAPPENAS strongly requested the JICA study team to conduct a survey in the Sayung area in Demak. After JICA study team discussed with JICA, it was decided to review the existing survey conducted in the Demak Sayung area.

21.2 Present Condition

21.2.1 Outlook of Present Condition

Sayung district is located in the west of Demak regency, adjacent to Semarang city and the Java Sea. There are three tourist resources in Sayung district, including Morosari Beach, mangrove forests, and the tomb of Sheikh Mudzakir (Sheikh Mudzakir).



Source: Demak Regency with some additions by JICA Study Team

Figure 21.1.1 Location Map of Sayung District

21.2.2 Natural Characteristic

(1) Terrain

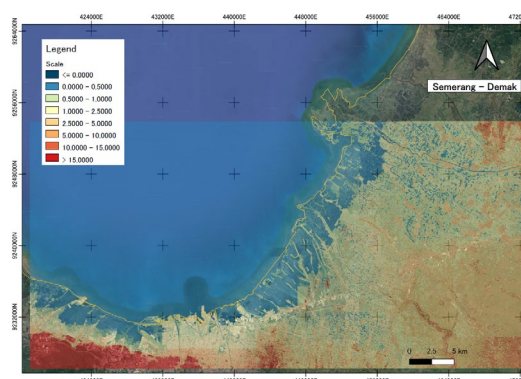
The area seaward from the national road Route 1 in Sayung district is widely distributed with elevations of less than 0.5 m above sea level. (see Figure 21.2.1)

(2) Geological Features

The Sayung district is formed by alluvial deposits (Qa). (see Figure 21.2.3) The component materials of the coastal alluvial plain consist of river sediments and coastal deposits.

(3) Land Use

The land use in Sayung district is mainly fishponds, paddy fields, and residential areas. (see Figure 21.2.2)



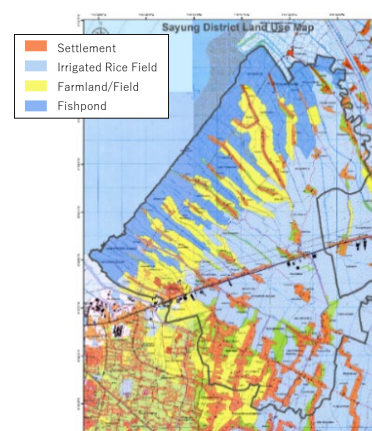
Source: JICA Study Team based on DEMNAS data.

Figure 21.2.1 Ground Elevation Distribution Map



Source: MEMR, 2012 with some additions

Figure 21.2.3 Geological Map of Central Java



Source: Prepared by JICA Study Team based on BIG data.

Figure 21.2.2 Topographic Maps
(1: 25,000, 1996, 1999)

(4) Inflow River

Four rivers (Babon River, Dombo Sayung River, Dolog River, and Jragung River) flow into and around the Sayung area.

(5) Shoreline Change

Satellite images of the area around Sayung district in 1984, 2000, and 2020 are extracted from Google Earth (see Figure 21.2.4). The red circled line in the figure indicates the boundary of the Sayung district, it can be confirmed that the sea area extended to the western part of the Sayung area between 2000 and 2020.

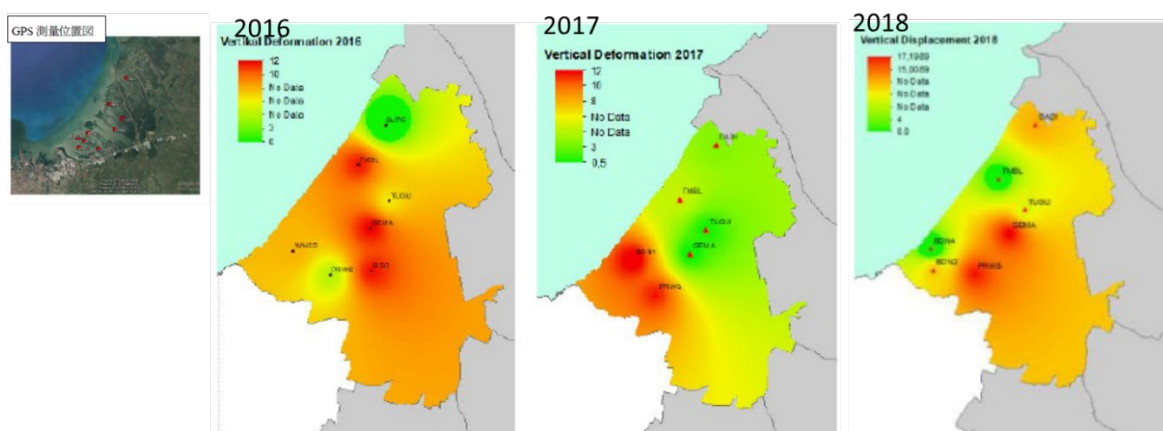


Source: Edited by JICA Study Team based on Google Earth

Figure 21.2.4 Satellite Image of the Sayung District

(6) Land Subsidence

Land subsidence in Demak has been organized by B. D. Yuwono et.al. (2019). The GPS surveys conducted by the Geodetic Research Group of Diponegoro University from 2015 to 2018 provides land subsidence distribution shown in Figure 21.2.5. According to this distribution, the subsidence rate in Demak ranges from 0.8 cm/year to 17.9 cm/year with spatial variability; the central part of Sayung district is reported to have a higher subsidence rate compared to the northern and southern parts.

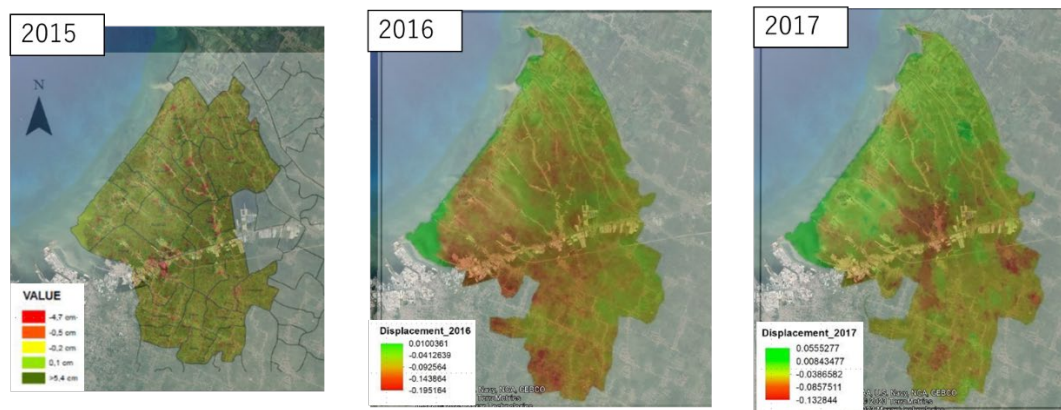


Source: B. D. Yuwono et.al. (2019)

Figure 21.2.5 Land Subsidence (cm/year) by GPS Survey (2015-2018)

The Geodetic Research Group of Diponegoro University has analyzed the amount of land subsidence by satellite image analysis (DInSAR: Differential Interferometry) from 2015 to 2017.

- Land subsidence was estimated to be up to 4.7 cm in 2015, 19.5 cm in 2016, and 13.5 cm in 2017.
- Large areas of land subsidence are found in the central part of the Sayung area.



Source: addition to B. D. Yuwono et.al. (2019)

Figure 21.2.6 Land Subsidence Analysis Results by DInSAR (cm/year) (Year 2015 to 2018)

21.2.3 Social Environment Characteristics

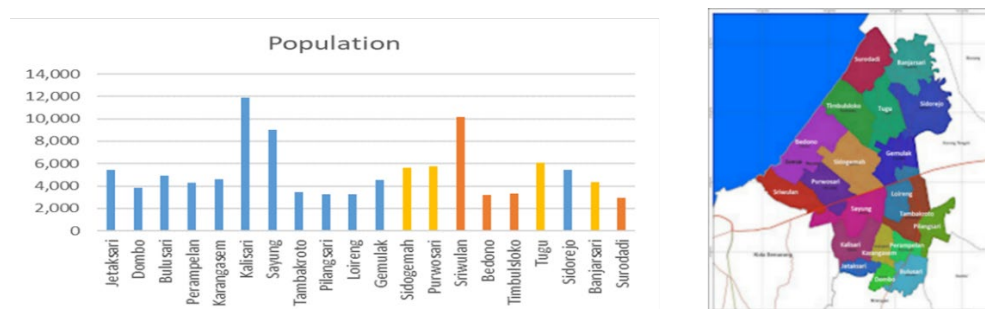
(1) Administrative Divisions and Population

Sayung district that consists of 20 villages has 106,005 population in 2021, which corresponds to about 10 % of the total population of Demak regency.

The population of the 10 villages (Sriwulan, Bedono, Timbulsloko, Surodadi, Purwosari, Sidogemah, Tugu, Banjarsari, Gemulak, and Sidorejo) located on the sea side from national road Route 1 is about 51,491. This population is about 49 % of the total population of Demak.

(2) Major Industries

Manufacturing, agriculture forestry and fishing, and wholesale and retail and trade repair of motor vehicle are a large percentage of the GRDP in Demak regency.



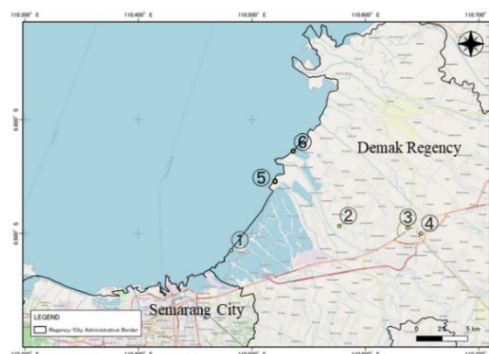
Source: Demak Regency with some additions by JICA Study Team

Figure 21.2.7 Administrative Division Map of Sayung District and Population by Desa (Village) in Sayung District, 2021

(3) Cultural heritage and Tourist Resources

In the Sayung district, Tomb of Syekh Mudzakir exists as a cultural heritage site.

There are tourism resources such as sandy beaches and eco-tourism sites using mangrove forests around Sayung district. (see Table 21.2.1, Figure 21.2.8)



Source: JICA Study Team

Figure 21.2.8 Location Map of Cultural Heritage Sites and Tourist Resources

Table 21.2.1 Cultural Heritage and Tourism Resources in Demak Regency

No.	Name of Cultural Heritage	Category	No.	Name of Tourism Resources	Category
①	Tomb of Syekh Mudzakir	Building	⑤	Istanbul Glagah Wangi Beach	Tourism Beach
②	Astana Gedhong Kenep Tomb Complex, Glagah Wangi	Site	⑥	Mangrove Park, Moro Demak	Mangrove Park
③	Demak Great Mosque (Masjid Agung Demak)	Building			
④	Notobratan Kadilangu Hall (Pendopo Notobratan Kadilangu)	Building			

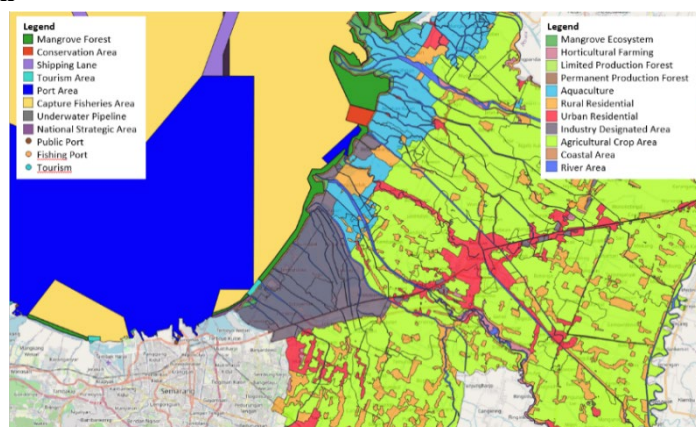
Source: <https://referensi.data.kemdikbud.go.id/kebudayaan/cagarbudaya/>

(4) Marine spatial planning and Spatial Plan

Marine spatial planning and Spatial Plan around/in Demak are shown in Figure 21.2.9

In the marine spatial planning (2018), the coast of Sayung district falls under Tourism area and Mangrove forest in the coastal area, and Capture fishery area and Port area in the offshore area.

Sayung area is classified as Industry designated area, River area, Aquaculture, and Rural residential in the spatial plan (2020). Industry designated areas occupy most of the Sayung area.



Source: Sea Spatial Plan from DKP of Central Java, Land Spatial Plan from Bappeda Demak

Figure 21.2.9 Marine/Land Spatial Plan in Demak

21.2.4 Existing Measures and Related Plans

In the Sayung district of Demak, the following three types of projects are being implemented against coastal erosion

1. Hybrid Engineering (HE)
2. APO (seawall)
3. Mangrove reforestation program

(1) Hybrid Engineering (HE)

In Demak, in order to address a coastal erosion control, the measures such as construction of permeable structures on the hard side and creation of learning opportunities for fishermen through the Bio-rights system, afforestation, and use of aquaculture ponds on the soft side are being implemented from 2015 to 2021 in the Building with Nature project. The Building with Nature project is a coastal erosion control approach implemented by an environmental organization called Eco Shape through collaboration with various local C/Ps across multiple regions.

According to Building with Nature's technical guidelines¹⁾, 9 km of permeable structures are being constructed in Demak from 2015 to 2019. 4.4 km of 9 km are by the Ministry of Marine Fisheries (KKP).

Permeable structures are structures made of brushwood, bamboo, etc., tied to wooden poles (see Figure 21.2.10). The purpose is to reduce coastal erosion damage by restoring both mangrove forests and beaches through the structures' ability to trap sediment (here mainly mud) and mangrove seeds by its structural effect on damping of wave.

In Demak, the first permeable structure was built in 2013 as a pilot project in the Timbul Sloko area. The structure was subsequently followed by the deposition of up to approximately 0.5 m of sediment behind the structure over a period of 4 months.

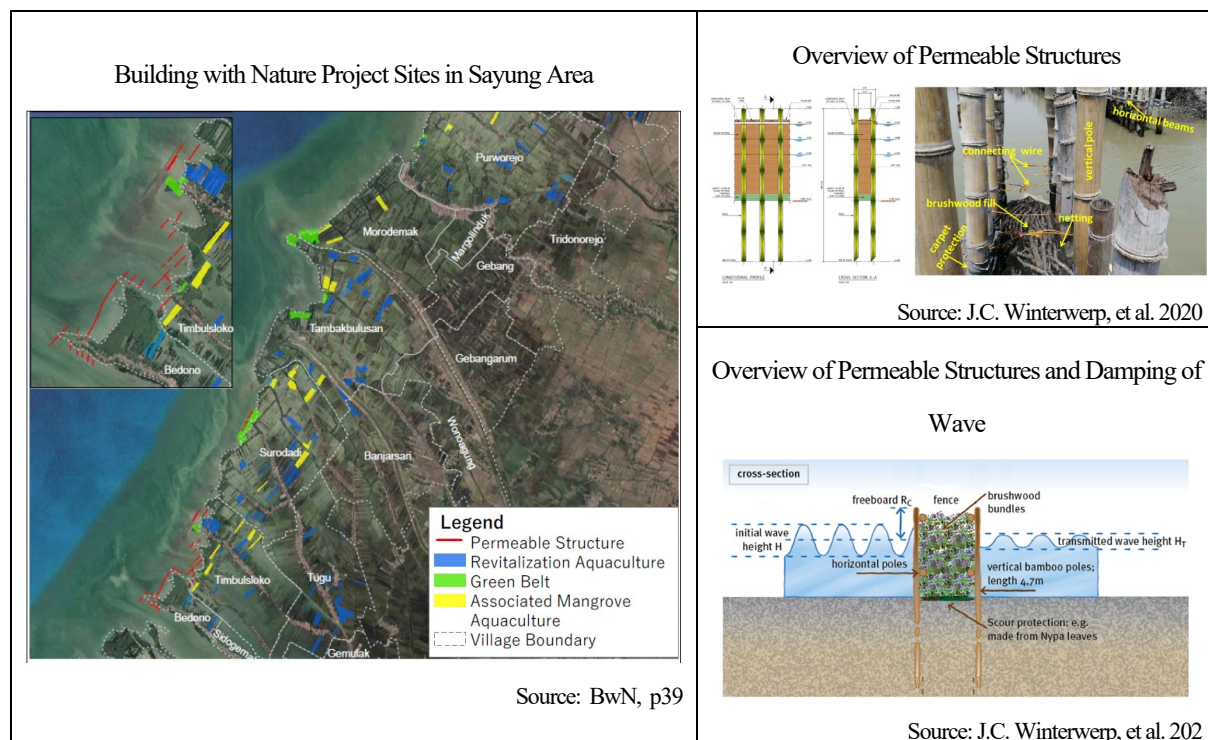


Figure 21.2.10 Building with Nature Project Sites in Demak and Sayung Area

(2) Example of Countermeasures by APO (Seawall)

In the Timbul Sloko area of Demak, a seawall made of stacked concrete columns, called an APO, had been constructed before the pilot project of HE was implemented. (See Figure 21.2.11)

Over the years, vegetation has formed behind the structure, but due to the low permeability of the structure, it is unlikely that the vegetation will extend beyond the structure to the offshore side. The structure's foundation has also been subject to collapse from year to year, but the debris may provide continuous protection to the mangrove forest behind it by attenuating the waves. In the future, temporary structural measures may be considered for areas with large water depths where it is difficult to construct permeable structures, taking post-collapse effects into consideration.



Source: J.C. Winterwerp, et al. 2020

Figure 21.2.11 APO (Seawall) Overview

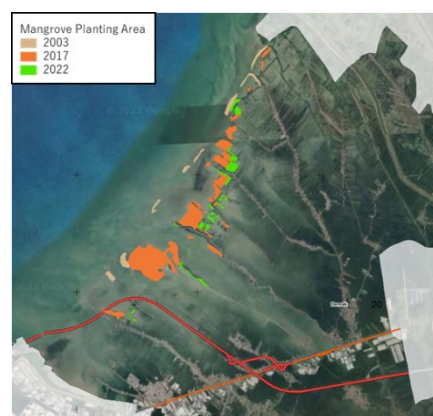
(3) Mangrove Planting

According to data from Demak regency, 17.15 ha (which has been already lost) in 2003, 158.77 ha in 2017, and 32.68 ha in 2022 of mangroves have been planted. As of 2022, about 191 ha of mangroves have been planted.

(4) Semarang-Demak Toll Road Project

The Semarang-Demak Toll Road is being constructed integrated with preventing tidal inundation in the Sayung district, with the construction of the first section (section: Kaligawe Sayung, about 10 km in length, including a 6 km coastal dike) scheduled for completion in February 2025.

The cross section of the coastal dike consists of ground improvement using the paper drain method + bamboo mats + geotextile + soil layer. The top height of the coastal dike is set considering MSL + Highest Tide + subsidence (5 cm x 10 years = 50 cm) + sea level rise.



Source: Dinas Pekerjaan Umum dan Penataan Ruang, Kabupaten Demak

Figure 21.2.12 Status of Mangrove Plantations in the Coastal Area of Sayung District

21.2.5 Field Survey Results

(1) Survey Point ①

There is a waterway in the center, with residential roads and houses on both sides, extending out to sea. Fish Pond are located around the waterway (see Photo1). The amount of land subsidence in the surrounding area is 10-12 cm/year, and a restaurant at the tip of the study site had to be closed three years ago due to subsidence and flooding (see Photo 2, based on field interviews). Due to the progressive subsidence, reinforcement of seawall (approximately 1 m) were also remained. (see Photo 3).

(2) Survey Point ②

The land subsidence is also serious, having sunk approximately 1.5 m since 1965 to the present ($1.5 \text{ m}/57 \text{ years} = 0.03 \text{ m/year}$) according to field interviews. This is evidenced by the fact that a number of small bridges over the channel have lost all clearance (see Photo5).



Source: JICA Study Team

Figure 21.2.15 Field Survey Location in Sayung



Photo 1 Situation around the Survey Point



Photo 2 Restaurant and Surrounding Seawalls at the Survey Site



Photo 3 Seawall Condition (left) and Heightening of Seawalls (right)

Source: JICA Study Team

Figure 21.2.16 Situation around the Survey Point 1



Photo 4 Status of Roads and Houses across the Channel, and Surrounding Fish Ponds

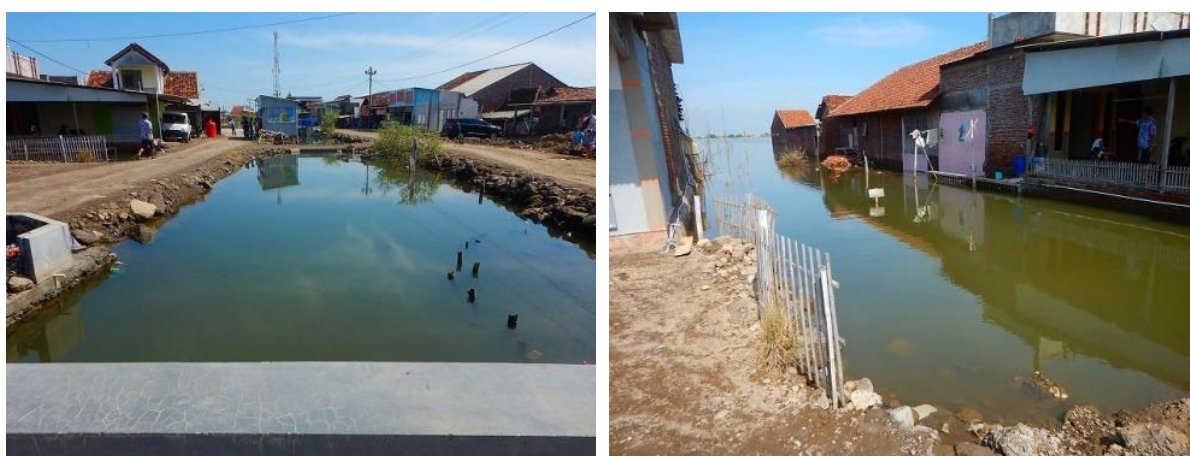


Photo 5 No Clearance Bridge and Houses over the Channel (left) and Houses about to be Submerged (right)

Source: JICA Study Team

Figure 21.2.17 Situation around the Survey Point 2

21.3 Review of Existing Studies and Reports

21.3.1 Results and Issues

Table 21.3.1 summarizes the results and issues of the existing studies conducted in the Sayung District, Demak. Individual details of existing studies are shown in Appendix 21, “Report for Review of Sayung Area, Demak”. Although the impact assessment of land subsidence has been conducted, some issues still need to be solved. The issues include the lack of continuous land subsidence monitoring and inadequate accuracy in predicting land subsidence. In addition, surveys to identify the causes of land subsidence have not been sufficiently conducted.

Table 21.3.1 Summary of Results and Issues of Existing Studies and Reports

Results	Issue	No.*
(1) Understanding of oceanographic phenomena and natural characteristics		
Understanding ocean currents with ADCP	Data Accumulation	No.3
Understanding Sediment Movement with 3D Models	Model refinement and data updating	No.3
Erosion and sedimentation trends due to shoreline change	Proof of association between shoreline change factors, update data	No.4
Rate of Land Subsidence	Building a BM network	No. 7
	Continuous Monitoring	No. 7
(2) Disaster risk assessment		
Identification of Tidal Flood inundation area (current and future)	Development into disaster risk assessment and damage estimation	No. 1
	Update external force conditions through data accumulation	No.1, No.2
	Consideration of the impact of land subsidence and sea level rise	No.1, No.2
	Improved land subsidence prediction accuracy	No. 13
Disaster Risk Assessment	Evaluation by hydrologic and hydraulic analysis and land subsidence analysis	No. 8,
	Consideration of the effects due to land subsidence and climate change	No.8, No.11
Economic damage according to land subsidence scenario	Reflecting unassessed items of economic damage	No.12
	Improvement of accuracy in predicting land subsidence	No.12
(3) Proposed countermeasures		
Practicing an Integrated Approach	Cooperation with Related Organizations	No.6
Maintenance and effectiveness of permeable structures and how to maintain their function	Continuous Monitoring	No.6, No.10
Proposed mitigation and adaptation measures	Concretization of proposed countermeasures, technical studies	No.11
Seawall/road structure type	Update soil survey data, modeling of embankment aging	No. 9
	Comparative study of each proposal including economic analysis	No. 9
Draft River Improvement Plan	Validity assessment by comparison of alternatives	No. 5
(4) M/P		
Proposed Spatial Arrangement Plan	Establishment of basic specifications based on technical studies of each countermeasure proposal	No.14

* No.: Number of Existing Studies and Reports shown at the end of the chapter

Source: JICA Study Team

21.4 Items to be Investigated and Studied in the Future

Based on the current status of the Sayung area and the results of the review of existing studies and reports, this section summarizes the items to be investigated and studied in the future in order to examine measures to reduce or eliminate flooding damage due to land subsidence in the Sayung area.

In the existing survey, although the Sayung area is seriously affected by flooding due to land subsidence, observation records on land subsidence are limited, the current status of land subsidence is not fully understood, and the main causes of land subsidence are not clear. Therefore, in considering measures (mitigation and adaptation measures) to deal with land subsidence in the Sayung area, the first step to be undertaken is a survey to "identify the main causes of land subsidence". Based on this main cause, it is important to consider mitigation and adaptation measures for land subsidence.

(1) Identification of the Main Causes of Land Subsidence

In Indonesia, there are generally four possible causes of land subsidence: (a) building loading, (b) consolidation settlement, (c) excessive groundwater pumping, and (d) plate tectonics.

It is important to identify which factor is the most significant cause of subsidence in the Sayung area and to implement countermeasures against that factor.

For reference, Table 21.4.1 lists possible countermeasures (mitigation and adaptation measures) for each cause of land subsidence. The menu of mitigation measures against land subsidence will vary depending on the cause of land subsidence.

Table 21.4.1 Causes of Land Subsidence and Possible Countermeasures (reference)

Cause	Mitigation Measure	Adaptation Measure
Building Loading	Building regulations + ground improvement, etc.	Seawall construction, resettlement, etc.
Consolidation Settlement	Development regulations + ground improvement, etc.	Seawall construction, resettlement, etc.
Excessive groundwater pumping	Regulation of groundwater pumping + securing alternative water sources	Seawall construction, resettlement, etc.
Plate Tectonics	—	Resettlement, etc.

Mitigation measures : Measures to reduce the causes of land subsidence

Adaptation measures : Measures to avoid or reduce damage caused by land subsidence

(2) Schedule for Investigation and Study

To identify the causes of land subsidence, necessary investigation and study items and their schedule are summarized in Table 21.4.2.

In order to understand the current status of land subsidence and identify the main causes, it is considered necessary to conduct a basic investigation to understand the current status of land subsidence, clarify the land subsidence mechanism and identify the causes, establish a land subsidence monitoring system, and examine a land subsidence prediction.

Table 21.4.2 Draft Schedule for Investigation and Study

Item	Short-Term (1~3 year)	Midium-Term (4~5 year)	Long-Term (6~10 year)
1.Understanding the Current Situation of Land Subsidence, Identifying the Main Causes, and Predicting the Future	→		
1) Basic Survey	→		
· Understanding of the current situation of land subsidence (Topographical survey, Satellite image analysis (InSAR analysis))	→		
· Understanding of the current situation of groundwater level	→		
· Understanding of groundwater pumping rate	→		
· Understanding of geological structure (Boring survey, AMT* measurement, etc.)	→		
2) Clarification of land subsidence mechanism and identification of factors	→		
3) Monitoring of land subsidence and groundwater level (Establishment of monitoring system, Development of observation network/wells)	→	Monitoring	→
4) Land Subsidence Prediction (one-dimensional subsidence prediction model, groundwater analysis model, etc.)	→		

Source: JICA Study Team

21.5 Consideration of Options for the Direction of Countermeasures

Based on the existing conditions and the results of the review of existing studies, the following five options were assumed for the direction of adaptation measures to avoid or eliminate tidal floods due to land subsidence.

Option 1: Offshore protection by large sea dike on the first line (Offshore large sea dike similar to toll road project in Semarang)

Option 2: Offshore protection by large-scale green infrastructure (hybrid engineering) on the first line

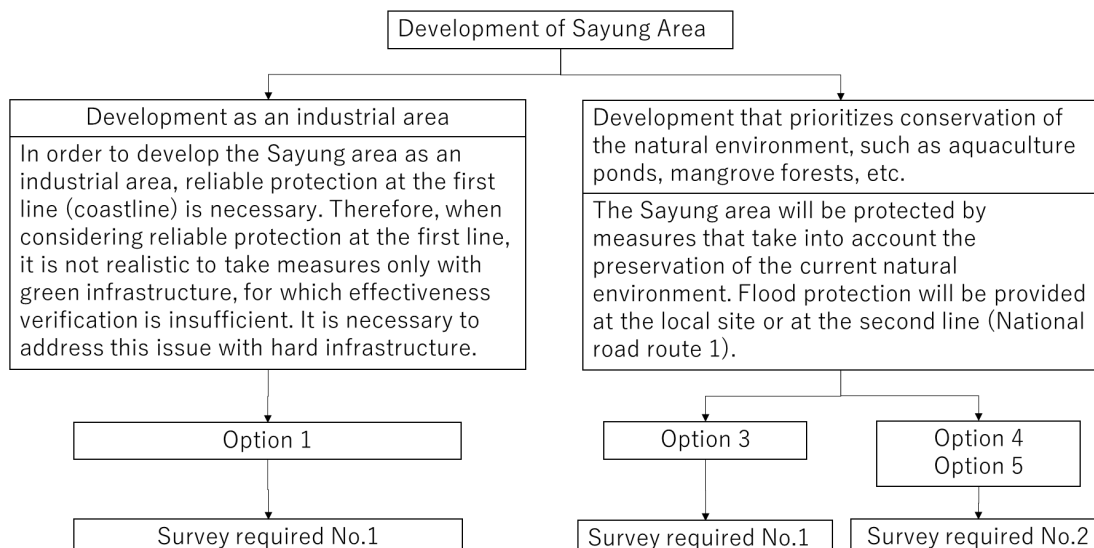
Option 3: Heightening of existing settlements land along the river + Secondary Levee along Route 1

Option 4: Construction of satellite islands and relocation of existing residents along the river (+ Secondary Levee along Route 1 if necessary)

Option 5: Settlement relocation (+ Secondary Levee along Route 1 if necessary)

A qualitative preliminary evaluation of the above options with respect to the following evaluation items: outline image, safety, cost, feasibility, sustainability, flexibility, social impact, and environmental impact, was summarized in Table 21.5.2.

At this point, it is difficult to select one recommendation option due to issues such as the lack of a basic survey to identify the primary cause of subsidence and the fact that the area is designated as an industrial area in the spatial plan despite the fact that it is severely flood-prone. For this reason, options and necessary studies are organized depending on if this area is to be developed as an industrial area or not.



Source: JICA Study Team


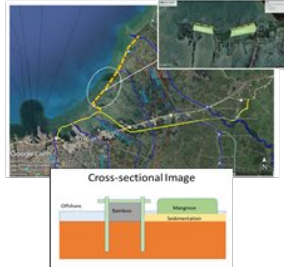



Figure 21.5.1 Future Study Policy for Sayung Area

Table 21.5.1 Draft Schedule for Investigation of Necessary Adaptation Measures

Item	Short-Term (1~3 year)	Midium-Term (4~5 year)	Long-Term (6~10 year)
1.Understanding the Current Situation of Land Subsidence, Identifying the Main Causes, and Predicting the Future	→		
1) Basic Survey	→		
· Understanding of the current situation of land subsidence (Topographical survey, Satellite image analysis (InSAR analysis))	→		
· Understanding of the current situation of groundwater level	→		
· Understanding of groundwater pumping rate	→		
· Understanding of geological structure (Boring survey, AMT* measurement, etc.)	→		
2) Clarification of land subsidence mechanism and identification of factors	→		
3) Monitoring of land subsidence and groundwater level (Establishment of monitoring system, Development of observation network/wells)	→	Monitoring →	→
4) Land Subsidence Prediction (one-dimensional subsidence prediction model, groundwater analysis model, etc.)	→		
2. Study of menu of measures to adapt to ground subsidence		→	
· Study of countermeasure method		→	
· Basic design		→	
· Estimated construction cost calculation		→	
· Environmental and social considerations		→	
· Evaluation of economic feasibility		→	
3. Resettlement Planning		→	
· Basic survey		→	
· Resettlement Plan		→	
· Livelihood reconstruction plan		→	

Source: JICA Study Team

Table 21.5.2 List of Options for Adaptation Measures

	Option 1	Option 2	Option 3	Option 4	Option 5
	Protection by Hard measures in the 1st line (large offshore breakwater similar to Semarang)	Protection by Green infrastructure (hybrid engineering) in the 1st line	Raise existing settlements along the river + Hard measures on the 2nd line (Route 1)	Construction of satellite islands and relocation of existing residents along the river (+ hard measures on the 2nd line, if necessary)	Residential migration plan (+ if necessary, Hard measures on the 2nd line (Route 1) necessary)
Image					
Outline	Protect against high tide levels by hard countermeasures at the 1st line. - Offshore sea dike* & revetment development (1st line) *The sea dike is expected to be of the same scale as the Semarang-Demak road, which is currently under construction in a road-integrated	Protect against high tide levels with green infrastructure (hybrid engineering) on the 1st line - Development of permeable structures (1st line) - Mangrove Plantation	Protect against high tide levels by raising existing settlements along rivers/ drainage channels, and by hard countermeasures at the 2nd line (National Road). - Raising of residential area - Seawalls and Embankments development (2nd line)	Protect against high tide levels by building satellite islands and relocating existing residents along the river, in addition to hard countermeasures at the 2nd line (national road), - Satellite islands development - Seawalls and Embankments development (2nd line)	Protect against high tide levels by migrating to residential areas and by hard countermeasures at the 2nd line (national road), - Resettlement - Seawalls and Embankments development (2nd line)
Safety(Goals & Effectiveness))	Elimination of Tidal Floods	Elimination of Tidal Floods (No prescribed effect is expected during mangrove growth)	Elimination of Tidal Floods(Longer maintenance and more time required for the effects to appear)	Elimination of Tidal Floods	Elimination of Tidal Floods
Cost	Middle	Small	Huge (Compensation for temporary relocation of residence)	Huge (Compensation for relocation houses)	Huge (Compensation for relocation houses)
Feasibility	Can be handled with existing technology. Can be constructed independently without land acquisition or relocation of residents.	Traditional construction method. Effectiveness verification through demonstration testing required. Monitoring required. Can be constructed independently without land acquisition or relocation of residents.	Can be handled with existing technology. Temporary relocation of residence is required during construction.	Can be handled with existing technology. Time is needed to reach a consensus with relocated residents. Can be constructed independently without land acquisition.	Time is needed to reach a consensus with relocated residents. Appropriate relocation sites are needed
Durability	Yes (monitoring and maintenance required)	Yes (monitoring and maintenance required)	Yes (monitoring and maintenance required)	Yes (monitoring and maintenance required)	Yes (monitoring and maintenance required)
Flexibility	Yes (can be handled by Heightening)	Yes (can be handled by Heightening)	Yes (can be handled by Heightening)	Yes (can be handled by Heightening)	Yes (can be handled by Heightening)
Socail Impact	Some navigation restrictions for fishermen. Subsidence of residential areas needs to be handled separately	Some navigation restrictions for fishermen. Subsidence of residential areas needs to be handled separately	Temporary relocation of residence during construction required. No impact on fishermen.	Some navigation restrictions for fishermen.	No Impact for fishermen.
Environmental Impact	Loss of previous landscape. Consideration for mangrove forest habitat is required.	Loss of previous landscape. Possible growth of mangrove forests	Loss of previous landscape. Possible growth of mangrove forests	Loss of previous landscape. Consideration for mangrove forest habitat is required.	No impact on landscape. Mangroves can grow well
Issues	- Soil survey for basic design is required. - Estimation of future land subsidence is necessary for setting the height of the embankment. - The problem of land subsidence in residential areas will not be solved, thus mitigation measures will be required - Appropriate maintenance is necessary.	- Soil survey for basic design is required. - Estimation of future land subsidence is necessary for setting the height of the embankment. - The problem of land subsidence in residential areas will not be solved, thus mitigation measures will be required - Appropriate maintenance is necessary.	- Soil survey for basic design is required. - Estimation of future land subsidence is necessary for setting the height of the embankment. - Regular monitoring of subsidence in residential areas is needed. - Appropriate maintenance is necessary.	- The access to the artificial islands needs to be considered - Soil survey for basic design is required. - Estimation of future land subsidence is necessary for setting the height of the embankment. - Appropriate maintenance is necessary.	- Necessary to build consensus with residents to be relocated and to secure appropriate relocation sites. - Appropriate maintenance is necessary.

Source: JICA Study Team

<Existing studies and reports>

- 1) Impact of Coastal inundation on ecology and agricultural land use case study in central Java, Indonesia (Muh Aris Marfai, 2011)
- 2) Genangan Banjir Pasang Pada Kawasan Pemukiman di Kecamatan Sayung, Kabupaten Demak– Provinsi Jawa Tengah (Petrus Subardjo, et al., 2015)
- 3) Modelling of Suspended Sediment Transport in Coastal Demak Indonesia by using Currents Analyzing (Denny Nugroho Sugianto, et al., 2017)
- 4) Shoreline Change Analysis in Demak, Indonesia (Komariah Ervita, 2017)
- 5) Pengendalian Banjir Sungai Wulan, Demak, Jawa Tengah/ Flood Control of Wulan River, Demak, Central Java (Rasyid Kanza, et al., 2017)
- 6) Coastal protection by means of natural mangrove recovery: experiences from Demak (Pieter van Eijk, et al., 2018)
- 7) Time Series of Land subsidence rate on Coastal Demak Using GNSS CORS UDIP and DINSAR (B. D. Yuwono, et al., 2018)
- 8) Kajian Risiko Bencana Pesisir (Wetland International Indonesia 2018)
- 9) Alternative Designs for Semarang-Demak Coastal Dike and Toll Road (Rasyid Kanza, et al., 2019)
- 10) Managing erosion of mangrove-mud coasts with permeable dams –lessons learned (Winterwerp, J.C., et al., 2020)
- 11) Penilaian Risiko Bencana Kawasan Pariwisata Pantai Sayung, Kabupaten Demak (Achmad Andi Rif'an, et al., 2020)
- 12) Economic assessment of subsidence in Semarang and Demak, Indonesia (Deltares, 2021)
- 13) Analisis Multibahaya di Wilayah Pesisir Kabupaten Demak (Ni Md. Widya A. Suryanti, et al.)
- 14) Competition for spatial planning in Sayung district (Bappeda, Central Jawa, 2022)

<Reference>

TECHNIACAL GUIDELINES #3 PERMEABLE STRUCTURES:

https://www.ecoshape.org/app/uploads/sites/2/2017/08/Technical-Guidelines-Permeable-Structures_Building-with-Nature-Indonesia-LR.pdf

CHAPTER 22 Conclusions and Recommendations

The conclusions obtained from the project are summarized below.

(1) General

- Most of the coastal protection in Indonesia have been individualized and localized measures taken after problems occurred in the absence of a unified coastal protection plan, and this has caused a detrimental effect. In order to break away from this conventional stile on coastal protection in Indonesia, a unified basic plan for coastal protection was formulated based on coastal characteristics, coastal properties, and sediment transport mechanisms. The Project studied the establishment of a framework to realize planned coastal protection in cooperation with related organizations.
- As a coastal development and management system to be aimed for, the following three outputs were prepared, which were, (1) Draft of “Basic Policy for Coastal Management” as a high-level policy of the Indonesian government regarding coastal implementation and management with reference to the coastal policy of Japan, aiming at the planning and project implementation under the unified idea and policy of each related organization involved in the coastal policy, (2) Draft of “Basic Coastal Management Plan” as a medium-term master plan for coastal protection plan for the purpose of implementing planned coastal protection under the unified policy of each organization involved in coastal measures in the coastal area, and (3) “Coastal Facility Plan” as a study of coastal protection measures at the Pre-F/S level.
- The coastal area of northern Java, which is the center of economic and social activities in the country, has many coastal problems such as tidal flood due to high waves and storm surge, coastal erosion, land subsidence, etc. The case study in (2) above was conducted in Indramayu (Area-I), Pemalang-Pekalongan (Area-II), and Rembang-Tuban (Area-III). In addition, the study described in (3) above was conducted at the Pre-F/S level in the three Sections from the Areas to be implemented by PUPR as coastal protection projects, and one Section extracted from the coastal area adjacent to Area-III, for a total of Four sections.
- In proceeding with the above three studies, it is necessary to consider and revise them as necessary based on discussions and exchanges of opinions with the related agencies of the Indonesian government. Therefore, the Working Group (WG) and Close Group Discussions (CGD) were established as a forum for regular discussions with the Indonesian government agencies concerned with coastal projects, and held a total of six meetings to exchange opinions. The WG mainly discussed the “Basic Policy for Coastal Management” and “Basic Plan for Coastal Management”, while the CGD discussed the “Coastal Facility Plan”.
- It was indicated that, in order to realize the coastal management proposed in the Project, the Indonesian country parties will continue to discuss and deliberate on the finalization of each study and efforts to institutionalize it into the legal system.

(2) Coastal characteristics of the three selected Areas

- Three selected Areas were found to have different coastal characteristics: Indramayu (Area-I) is a beach where coastal erosion is manifested by long-term shoreline changes at surrounding river mouth, the discharge of silt and clay subsoil mainly toward offshore by wave action, etc. Pemalang - Pekalongan (Area-II) is fine sand beaches with an overall westward littoral drift. The beaches have been eroded by the installation of artificial coastal facilities such as groins and revetments, and by the recession of the water line and flood damage due to land subsidence that has been occurring in this area in a wide area. Rembang - Tuban (Area-III) is sandy beaches with westward littoral drift, and coastal erosion is progressing at the down-drift side of the beach due to localized individual coastal measures, and also infrastructure, and residential areas at the urban area located just behind the shoreline, causing disturbance to the hinterland due to high waves and wave overtopping.
- In the north coast of Java Island, about 98 % of the coastal area has been already utilized for residential areas, infrastructure facilities, agricultural land, aquaculture ponds, etc. The proportion of natural beaches with no use of the backshore area is about 2 %, which is extremely small compared to other coastal areas in Indonesia. Some of beaches are used as local tourism area in these three areas.

(3) Basic Policy for Coastal Management (Draft)

- Based on the existing “Basic Policy for Coastal Management” in Japan, a draft “Basic Policy for Coastal Management” was prepared taking into account the coastal characteristics, coastal issues, and the current status of coastal development and management in Indonesia, and a draft for both English and Indonesian versions was submitted after revising several times based on discussions and comments from Working Group (WG) members of related organizations.
- The WG held a series of discussions with the relevant organizations regarding the legislation as a government high-level policy of Indonesia and concluded that it would be appropriate to put it as a “presidential decree (PERPRES)” for this time.
- All parties agreed to continue discussions among the Indonesian parties for the finalization of the contents of the Basic Policy for Coastal Management and concrete actions for achievement of legislation.

(4) Basic Coastal Management Plan (Draft)

- Based on “Basic Coastal Management Plan” in Japan, the procedures for planning, items and contents to be included in the “Basic Coastal Management Plan” in Indonesia, were discussed in the WG.
- The procedure for planning and concrete technical approach for each item for preparation of draft of “Basic Coastal Management Plan” in Indonesia, which is mid-term comprehensive coastal facility plan as the Master Plan, were studied through the case-study at selected three Areas.
- The proposed master plan is based on a thorough understanding of the coastal characteristics and coastal issues at each coast and is designed to achieve the "ideal coast" which was set based on the use of hinterlands and coastal

areas, with applying various types of coastal protection measures including gray and green infrastructures and hard and soft measures.

- After a series of discussions on the procedure for approval and enforcement of the developed “Basic Coastal Management Plan”, it was obtained a consensus among the WG members at this time that the approach of approving the plan at each prefectural governor and centralizing the developed plan at the central government, similar to that for the spatial plan in Indonesia.
- All parties agreed that the relevant parties in Indonesia will continue to clarify and accept on the draft conservation plans for three areas and discuss the procedure for approval and enforcement, as same as the draft of “Basic Policy for Coastal Management”. It was also indicated that the parties concerned will discuss how to proceed for expansion of this idea to other coastal areas in the north of Java coast and other islands.

(5) Coastal Facility Plan

- From the three selected Areas, two sections from Area-I and one section from Area-II were selected as the target areas (sections) for the coastal protection project to be implemented by PUPR. In Area-III, no appropriate area was found, so after consulting with PUPR, a section was selected, in Tuban adjacent to Area-III. As the result, four sections for Coastal Facility Plan in total were selected and the Pre-F/S level study was conducted.
- The project cost was roughly estimated for the Coastal Facility Plan at four sections, and the economic analysis was conducted. The project formation scenarios were studied assuming loan project of Japan. In addition, based on the JICA Guidelines for Environmental and Social Considerations, an Initial Environmental Examination (IEE) level Strategic Environmental Assessment (SEA) study was conducted in each region, including the study of alternatives, prediction and evaluation of environmental and social impacts, mitigation measures, monitoring plans, and consultations with local stakeholders. Assessment (SEA) studies were conducted.
- It was confirmed that, in order to achieve the realization of proposed the coastal facility plan for the four sections studied in this project, the implementation of coastal management at the north of Java coast will be included in the next medium-term development plan (RPJMN 2025-2029) following the current RPJMN 2020-2024 by BAPPENAS, and that relevant organizations of GOI and JICA will proceed with discussion and coordination for the project formulation as Japanese loan project.

Recommendations are described below.

- As indicated in Chapter 15, Section 15.3, there are several remaining issues that should continue to be discussed and finalized by the related agencies in Indonesia as a first step in the effort to realize the coastal management system proposed in this project. Continued discussion and coordination among the related agencies in Indonesia on these issues and necessary actions should be taken.

- The proposed protection measures are not only the hard-structure measures that have been commonly implemented by PUPR, but also various measures including green/gray and hard/soft measures (such as beach nourishment) with considerations of protection, environment, and utilization. In particular, there are issues to be addressed in implementing coastal measures using green infrastructure such as mangrove plantations, including the appropriateness of effectiveness, selection of suitable sites, implementation methods, and implementation systems. It is necessary to collect more information and conduct further studies in order to realize the implementation of applying these measures.
- It is desirable for the proposed coastal protection measures, such as both mangrove plantation and beach nourishment, to be carried out in a way that allows for adaptive project implementation as the situation is observed. In Chapter 15, the Project examined scenarios for project formation assuming a Japanese loan project, but it is desirable to examine ways and mechanisms that allow for the implementation of projects based on “adaptive management” that is different from other common infrastructure facility projects.

ANNEX

1. Revised Record of Discussion

2. Minutes of Meeting of Joint Coordination Committee

- 1st JCC Meeting (February 14, 2023)
- 2nd JCC Meeting (January 19, 2024)
- 3rd JCC Meeting (June 11, 2024)

ANNEX1

Revised Record of Discussion

**MINUTES OF MEETING
FOR
FIRST AMENDMENT OF THE RECORD OF DISCUSSION
ON
PROJECT FOR COASTAL DISASTER RISK REDUCTION PLAN
STUDY ON THE NORTH COAST OF JAVA ISLAND
IN
THE REPUBLIC OF INDONESIA
BETWEEN
MINISTRY OF PUBLIC WORKS AND HOUSING
AND
JAPAN INTERNATIONAL COOPERATION AGENCY**

Jakarta, February 17th, 2023



Mr. YASUI Takehiro
Chief Representative
JICA Indonesia Office

Mr. Jarot Widyoko
Director General
Directorate General of Water Resources
Ministry of Public Works and Housing
Indonesia

The Japan International Cooperation Agency (hereinafter referred to as “JICA”) and Ministry of Public Works and Housing (hereinafter referred to as “PUPR”) hereby agree that the Record of Discussions on the Project on the Project for Coastal Disaster Risk Reduction Plan Study on the North Coast of Java Island signed on March 31st 2022 (Annex 1) is amended and confirmed as follows.

1. Target Coastal Areas (Amendment on R/D)

Based on the minutes of meetings on the priority area selection for the Project (Annex 2) and the successive discussions between PUPR and JICA, both sides agreed that number and coverage of coastal areas to prepare the basic coastal management plan and the coastal facilities plan was amended as shown in the Table-1.

Table-1 Target Coastal Areas for Coastal Management Plan and Coastal Facilities Plan

Outputs	Target Coastal Areas	
	Original R/D (Annex-1)	Amendment
Basic Coastal Management Plan	Two areas in the Northern Coastal Areas of Java Island	Three areas as follows: - Indramayu West – Indramayu East - Pemalang – Pekalongan - Rembang – Tuban
Coastal Facilities Plan	Two areas in the Northern Coastal Areas of Java Island	To be selected the sections ¹⁾ properly from the three areas above

1): Definition of areas which are related to Coastal Management Plan and Coastal Facilities Plan is refer to Annex-3

2. Criteria to Select the Sections for the Coastal Facilities Plan (Supplement to R/D)

In additions to the selection criteria listed in R/D, which are 1) Representativeness, 2) Priority by the PUPR and local governments, 3) Priority on coastal utilization / land use, 4) Potential adverse impact on the environment and society, the following three criteria will be evaluated to select the sections for the coastal facilities plan under the jurisdiction of the PUPR.

- Feasibility in realization:
Having no limiting factors such as competitive projects, limitations due to the spatial plan and environmental and social issues.
- Feasibility in cost and benefit aspect
- Consistency with basic policy on Coastal Management Plan considering harmonization of coastal protection, environment, utilization and development

3. Conducting Preliminary Study at Demak (Supplement R/D)

Both sides agreed that the preliminary study at Sayung Area in Demak will be conducted in this study refereeing to available documents and information. The following studies are assumed, which are different from the study of basic coastal management plan and coastal facility plan for

selected 3 areas above.

- Data and information collection for previous studies, investigations, etc.
- List up the expected required actions against tidal flood due to land subsidence
- List up the options for preliminary idea of risk reduction plan against tidal food

4. Revise of JCC members

Both sides agreed that the Peatland and Mangrove Restoration Agency will be involved as the member of JCC and as one of members of Working Group (W/G), which was proposed by JICA Study Team and will be established in the Project to discuss for preparation of draft of Basic Coastal Management Plan and Basic Policy of Coastal Management among related agencies.

Further, both sides agreed to revise the position of National Development and Planning Agency (BAPPENAS) member in JCC from “Observers” to “Representative Members of JCC”, and to support the coordination of related agencies in established W/G.

The amendment will become effective as of February 17th, 2023

Annex 1: Record of Discussions (signed on March 31st 2022)

Annex 2: Letter from JICA Study Team to Director for River and Coastal Directorate General of Water Resources on 3rd November 2022

Annex 3: Definition of Area Division on Coastal Management Plan and Coastal Facilities Plan

RECORD OF DISCUSSIONS
ON
PROJECT FOR COASTAL DISASTER RISK REDUCTION PLAN STUDY ON
THE NORTH COAST OF JAVA ISLAND
IN
THE REPUBLIC OF INDONESIA
AGREED UPON BETWEEN
MINISTRY OF PUBLIC WORKS AND HOUSING
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

Jakarta, ~~January~~ 2022
31 March


Mr. OGAWA Shigenori
Chief Representative
JICA Indonesia Office


Mr. Jarot Widyoko
Director General
Directorate General of Water Resources
Ministry of Public Works and Housing
(PUPR)
Indonesia 

Based on the minutes of meetings on the Basic Planning Survey for “the Project for Coastal Disaster Risk Reduction Plan Study on the North Coast of Java Island” (hereinafter referred to as “the Project”) signed on 10th January 2022 between Ministry of Public Works and Housing (hereinafter referred to as “PUPR”) and the Japan International Cooperation Agency (hereinafter referred to as “JICA”), JICA held a series of discussions with the PUPR and relevant organizations to develop a detailed plan of the Project.

Both parties agreed the details of the Project and the main points discussed as described in the Appendix 1 and the Appendix 2 respectively.

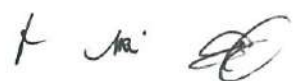
Both parties also agreed that PUPR, the counterpart to JICA, will be responsible for the implementation of the Project in cooperation with JICA, coordinate with other relevant organizations and ensure that the self-reliant operation of the Project is sustained during and after the implementation period in order to contribute toward social and economic development of the Republic of Indonesia.

The Project will be implemented within the framework of the Colombo Plan Technical Cooperation Scheme between the Government of Japan and the Government of Indonesia (hereinafter referred to as “GOI”)

Appendix 1: Project Description

Appendix 2: Main Points Discussed

Appendix 3: Minutes of Meetings on the Basic Planning Survey



PROJECT DESCRIPTION

I. BACKGROUND

The North Coast of Java Island is known through the Pantura Line (North Coast) which is a national road along 1,316 km between Merak to Ketapang, Banyuwangi along the north coast of Java Island, especially between Jakarta and Surabaya.

The Pantura line crosses 5 provinces: Banten, DKI Jakarta, West Java, Central Java, and East Java. The westernmost tip in the Merak Harbor, which links it to the Bakauheni Port on the island of Sumatra, the southernmost end of the Trans Sumatra Road. The easternmost tip is the Ketapang Port which connects it to the Gilimanuk Port on the island of Bali. Pantura line is a road that connects the western part of Java Island and its eastern part.

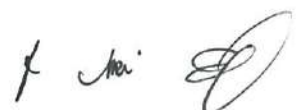
At present the condition of the marine and coastal environment is increasingly worrisome. Almost along the North Coast of Java, coral ecosystems and mangrove/mangrove trees or other coastal plants that can function as a tidal wave repellent are already extinct. Every time the sea season is high tide, waves and waves crashing on people's homes and highways because there are no more coastal plants that can withstand the tidal wave rate.

Cities on the north coast of Java as Jakarta, Semarang, Pekalongan, and Surabaya are vulnerable to environmental pressures such as sea level change and land subsidence. Land subsidence can be caused by natural and anthropogenic processes. Geologically, the north coastal plain of Java consists of unconsolidated Holocene alluvial deposit. The recent alluvial deposit is prone to compaction, and further aggravated by anthropogenic forces such as groundwater extraction and land development. Understanding the complex interaction of natural and manmade factors is essential to establish mitigation realize that land subsidence is taking place.

To solve the problems in the north coast of Java, formulating Master Plan of the seacoast management is needed. Which then will be the basis for the implementation of the projects.

II. OUTLINE OF PROJECT

1. Title of the Project
The Project for Coastal Disaster Risk Reduction Plan Study on the North Coast of Java Island
2. Expected Goals which will be attained after implementing the Proposed Plan
Selected coastal area of the North Coast of Java Island is properly managed based on the draft Basic Policy for Coastal Management and the draft Basic Coastal Management Plans (Master Plans) considering harmonization of coastal protection, environment, utilization and development.
3. Outputs
 - (a). Draft Basic Policy for Coastal Management (Tentative name)
 - (b). Draft Basic Coastal Management Plan (Tentative Name) in the Two Northern Coastal Areas of Java Island
 - (c). Coastal Facilities Plan (Tentative Name) in the Two Northern Coastal Areas of



Java Island

(d). Technology transfer to the relevant GOI staff through the project

4. Activities

- (a). Basic survey
- (b). Draft Basic Policy for Coastal Management (Tentative name)
- (c). Draft Basic Coastal Management Plan (Tentative Name)
- (d). Coastal Facilities Plan
- (e). Technical Transfer and Capacity Building

5. Input

1). Input by JICA

(a). Dispatch of mission

(Title is tentative and subject to change)

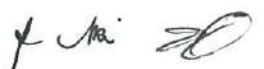
- Team Leader: Coastal Management
- Coastal Conservation Management
- Seacoast / Sediment Management
- Hydraulic Analysis
- Facility Design / Construction Planning
- Institutional, Financial Analysis
- Hydrogeologist, Groundwater Analysis, Land subsidence
- Environmental and Social Consideration

Input other than indicated above will be determined through mutual consultations between JICA and PUPR during the implementation of the Project, as necessary.

2). Input by PUPR

PUPR will take necessary measures to provide at its own expense:

- (a) Services of PUPR's counterpart personnel and administrative personnel as referred to in II-6;
- (b) Suitable office space with necessary equipment;
- (c) Supply or replacement of machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the equipment provided by JICA;
- (d) Means of transport and travel allowances for C/P joining for official travel within Indonesia;
- (e) Information as well as support in acquiring suitable furnished accommodation for members of the JICA missions and their families;
- (f) Information as well as support in obtaining medical service;
- (g) Credentials or identification cards;
- (h) Available data (including maps and photographs) and information related to the Project;
- (i) Running expenses necessary for the implementation of the Project;
- (j) Expenses necessary for transportation within Indonesia of the equipment referred to in II-5 (1) as well as for the installation, operation and maintenance thereof, if needed; and
- (k) Necessary facilities to the members of the JICA missions for the remittance as well as utilization of the funds introduced into Indonesia from Japan in



connection with the implementation of the Project, if needed.

6. Implementation Structure

The project implementation structure is given in the Annex 1. The roles and assignments of relevant organizations are as follows:

(1) Project Director

Director General of Water Resources will bear overall responsibility for implementation, administration, monitoring and evaluation of the Project as Project Director.

(2) Project Manager

Director of River and Coastal will bear overall responsibility for managerial matter of the Project as Project Manager.

(3) C/P Personnel

C/P personnel are expected to work closely with the JICA Experts.

(a). Staff of Directorate of River and Coastal

(b). Staff of Directorate of Technical Development for Water Resources

(c). Staff of River Basin Headquarter (BBWS)/ River Basin Office (BWS) of pilot sites

(d). Staff of Directorate of System & Strategy of Water Resources Management

(e). Staff of Technical Centre for Coastal

(4) The members of JICA missions

The members of JICA missions will give necessary technical guidance, advice and recommendations to PUPR on any matters pertaining to the implementation of the Project.

(5) Joint Coordinating Committee

Joint Coordinating Committee (hereinafter referred to as "JCC") will be established in order to facilitate inter-organizational coordination. JCC will be held whenever deems it necessary. A list of proposed members of JCC is shown in the Annex 2.

7. Project Site(s) and Beneficiaries

Both sides agreed that the target area of the Project is tentatively defined as follows.

1). Target area for basic survey

The target areas will cover whole of the north of Java Island.

2). Target area for developing basic coastal management plan, and coastal facilities plan

Two project sites will be selected from those areas where PUPR can carry out the direct control with criteria, which are tentatively agreed between both sides as below;

- Representativeness

(a). Various typical measures are included in the target areas

(b). Typical problems cases occurring in Indonesia are included in the target areas

- Priority by the PUPR and local governments (priority as a coastal problem)

- Priority on coastal utilization / land use

- Potential adverse impacts on the environment and society

3). Draft basic policy for coastal management will be developed to be applied to whole Indonesian coastal area, however it will be developed with the

information of basic survey only in the Project. Therefore, additional survey of whole Indonesian coastal area might be needed for finalization of the policy after the Project.

Direct beneficiaries are PUPR and indirect beneficiaries are Indonesian citizens.

8. Duration

The duration of the Project is two (2) years. The Project will start after a first expert arrival in Indonesia. In case of the impact of COVID-19 is still remaining, the both sides will make discussion once again about the timing of commencement of the Project.

9. Reports

JICA will prepare and submit the following reports to the PUPR in Indonesia.

- (1) 6 copies of Inception Report at the commencement of the first work period in Indonesia
- (2) 6 copies of Interim Report at the time about 6 months after the commencement of the first work period in Indonesia
- (3) 6 copies of Progress Report at the time of 12 months after the commencement of the first work period in Indonesia
- (4) 6 copies of Draft Final Report at the end of the last work period in Indonesia
- (5) 6 copies of Final Report within one (1) month after the receipt of the comments on the Draft Final Report

10. Environmental and Social Considerations

- (1) PUPR will abide by 'JICA Guidelines for Environmental and Social Considerations' (April 2010) in order to ensure that appropriate considerations will be made for the environmental and social impacts of the Project.

III. UNDERTAKINGS OF PUPR

1. PUPR will take necessary measures to:

- (1) ensure that the technologies and knowledge acquired by the Indonesia nationals as a result of Japanese technical cooperation contributes to the economic and social development of Indonesia, and that the knowledge and experience acquired by the personnel of Indonesia from technical training as well as the equipment provided by JICA will be utilized effectively in the implementation of the Project; and
- (2) grant privileges, exemptions and benefits to members of the JICA missions referred to in II-4 above and their families, which are no less favorable than those granted to experts and members of the missions and their families of third countries or international organizations performing similar missions in Indonesia.

2. PUPR will take necessary measures to:

- (1) provide security-related information as well as measures to ensure the safety of members of the JICA missions;
- (2) permit members of the JICA missions to enter, leave and sojourn in Indonesia for the duration of their assignments therein and exempt them from foreign

- registration requirements and consular fees.
- (3) exempt members of the JICA missions from taxes and any other charges on the equipment, machinery and other material limited for the implementation of the Project;
 - (4) exempt members of the JICA missions from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to them and/or remitted to them from abroad for their services in connection with the implementation of the Project; and
3. PUPR will bear claims, if any arises, against members of the JICA missions resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Project, except when such claims arise from gross negligence or willful misconduct on the part of members of the JICA missions.

IV. MONITORING AND EVALUATION

JICA will conduct the following evaluations and surveys to verify how the proposed plan is utilized and draw lessons. The PUPR is required to provide necessary support for them.

Ex-post evaluation: three (3) years after the project completion, in principle
Follow-up surveys on necessity basis

V. PROMOTION OF PUBLIC SUPPORT

For the purpose of promoting support for the Project, PUPR will take appropriate measures to make the Project widely known to the people of Indonesia.

VI. MISCONDUCT

If JICA receives information related to suspected corrupt or fraudulent practices in the implementation of the Project, PUPR and relevant organizations will provide JICA with such information as JICA may reasonably request, including information related to any concerned official of the government and/or public organizations of the Indonesia.

PUPR and relevant organizations will not, unfairly or unfavorably treat the person and/or company which provided the information related to suspected corrupt or fraudulent practices in the implementation of the Project.

VII. MUTUAL CONSULTATION

JICA and PUPR will consult each other whenever any major issues arise in the course of Project implementation.

VIII. AMENDMENTS

The record of discussions may be amended by the minutes of meetings between JICA and PUPR. However, PO may be amended in the Monitoring Sheets.


The minutes of meetings will be signed by authorized persons of each side who may be different from the signers of the record of discussions.

Annex 1 Project Organization Chart

Annex 2 A List of Proposed Members of Joint Coordinating Committee

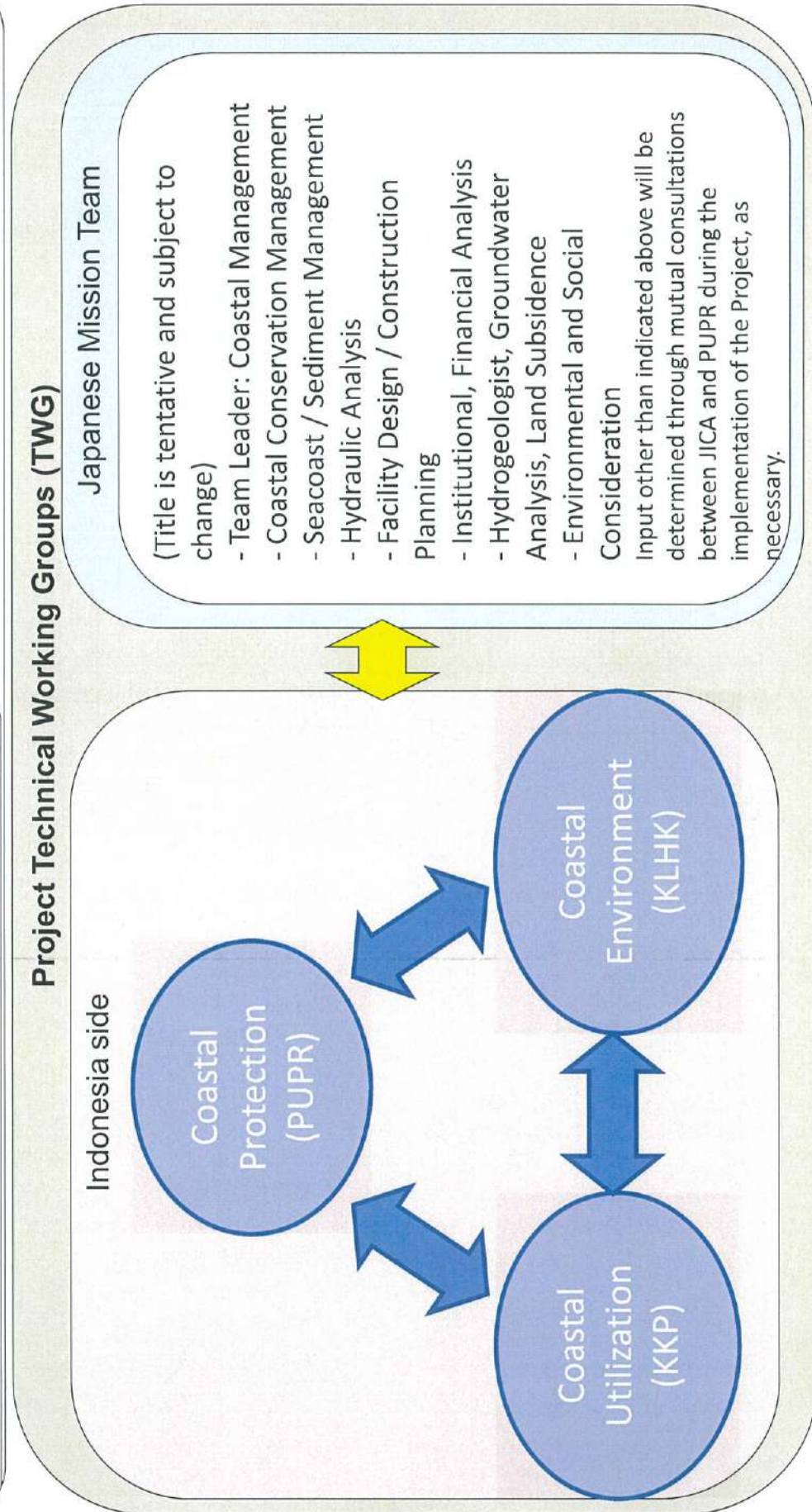
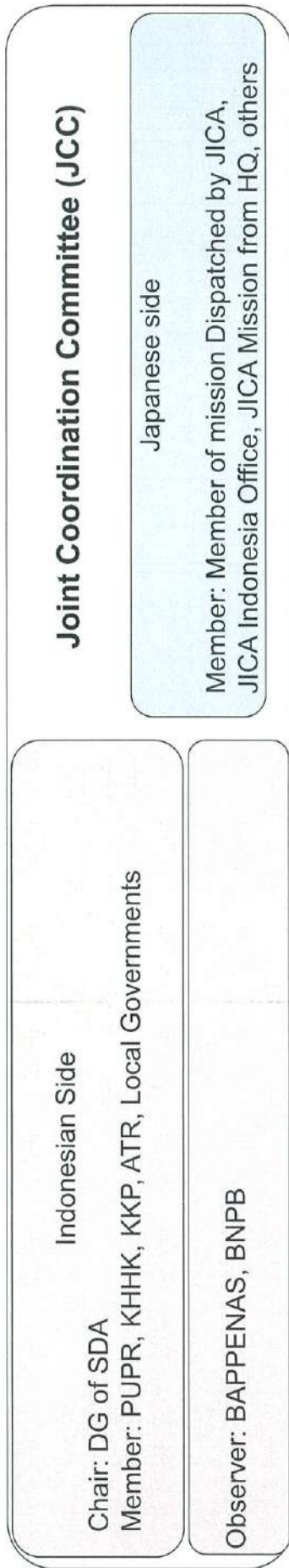


Annex 3 Terms of Reference for the Environmental and Social Considerations

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Project Organization Chart

Annex 1



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**A List of Proposed Members of Joint Coordinating Committee for the Project
for Coastal Disaster Risk Reduction Plan Study on the North Coast of Java
Island**

PUPR will hold Joint Coordinating Committee (Hereinafter referred to as “JCC”) at least once a year and wherever deems it necessary

The function of the JCC are as follows:

- To submit authorized organization to approve an annual work plan;
- To review the progress of the Project;
- To conduct evaluation of the Project;
- To exchange views and ideas on major challenges which will arise during the implementation period of the Project; and
- Any other related issues.

Composition of JCC is as follows

a) Chairperson:

- a) Director of General of Water Resources Members on Indonesia side:
- Representatives of Directorate of River and Coastal
 - Representatives of Directorate of Technical Development for Water Resources
 - Representatives of BBWS/BWS of pilot sites
 - Representatives of Directorate of System & Strategy of Water Resources Management
 - Representatives of Technical Centre for Coastal
 - Representatives of Technical Centre for River
 - Representatives of Local Governments in the selected pilot sites
 - Representatives of Ministry of Marine and Fisheries (KKP)
 - Representatives of Ministry of Environment and Forestry (KLHK)
 - Representatives of Ministry of Agrarian Affairs and Spatial Planning (ATR)

Observers

- Representatives of National Development and Planning Agency (BAPPENAS)
- Representatives of National Disaster Management Authority (BNPB)

b) Members on Japanese side:

- Chief Representative of JICA Indonesia Office
- Member of Mission Dispatched by JICA
- Other person(s) concerned appointed by JICA



Terms of Reference for the Environmental and Social Considerations

A Strategic Environmental Assessment (SEA) shall be conducted during the Project in accordance with JICA Guidelines for Environmental and Social Considerations in addition to the regulations in Indonesia. Terms of Reference for the SEA include, but not limited to, the followings:

Discuss whether the basic planning for the coastal protection by the Project needs SEA in conformity with the regulations in Indonesia such as Government Regulation No.46/2016 and Regulation of the Minister of Environment and Forestry No.P.69/MENLHK/SETJEN/KUM.1/12/2017. Gaps between the JICA Guidelines and the legal framework of Indonesia on environmental and social considerations and how they will be filled in the Project. If it is needed, the SEA shall follow the processes and contents required by those regulations in addition to the followings;

1. Establishing SEA team with PUPR, relevant organizations, and JICA study team;
2. Review of existing development policies, plans, projects, studies, and public/private investment at/around the project sites;
3. Analysis to identify environmental and social constrains to the coastal protection;
4. Identify the basic planning to achieve the objectives and goals as the subject of SEA with alternatives proposed considering strategic scenarios, concepts and prioritization;
5. Baseline survey of the existing environmental and social conditions (land use, natural environment, living area of indigenous people, economic and social condition, etc.);
6. Scoping (identify environmental and social issues to be evaluated and the methods with indicators and criteria for evaluation);
7. Analysis of possible impacts based on the scoping;
8. Comparative analysis of possible impacts of alternatives including 'without project' option and 'zero' option;
9. Preparing recommendations for reflecting to the basic planning which includes mitigation measures to avoid, minimized and compensate the impacts and/or monitoring methods (monitoring items, frequencies and methods) for the selected plan;
10. Provisional scoping for Basic Coastal Management Plan and the Coastal Facilities Plan prioritized in the basic planning;
11. Support to have stakeholder meetings by identifying the purpose of the meetings, participants, consultation methodologies and agenda, etc. to be held at least two occasions, 1) at the time of scoping and 2) at the time of preparation of a draft SEA report;
12. Preparing and finalizing a SEA report.

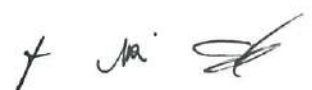
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F. M. S.

MAIN POINTS DISCUSSED

1. BAST (handover delivery certificate of goods/services)
 - (1) Both parties confirmed that the Project is categorized as “Goods / Services” as stipulated in Article 42 (1) c of the Government Regulation No. 10/2011.
 - (2) In accordance with the Regulation of the Minister of Finance No. 99/ PMK.05 /2017, PUPR shall submit BAST (handover delivery certificate of goods/services) to the Ministry of Finance. In order to secure the accuracy of BAST, JICA Indonesia Office will provide PUPR with data on semester basis as follows:
 - Goods: name and price (in effective currency and Indonesian currency) per item of equipment handed over during last six months
 - Services: total expenditure (in Japanese currency and Indonesian currency) of last six months for experts, trainings, and missions
 - (3) PUPR will make and sign BAST based on the data provided by JICA, and after obtaining JICA's confirmation, submit it to the Ministry of Finance.
 - (4) The other points discussed between PUPR and JICA are referred to Appendix 3 Minutes of Meetings on Basic Planning Survey

END



**MINUTES OF MEETING
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
MINISTRY OF PUBLIC WORKS AND HOUSING
ON JAPANESE TECHNICAL COOPERATION
FOR
PROJECT FOR COASTAL DISASTER RISK REDUCTION PLAN STUDY ON THE
NORTH COAST OF JAVA ISLAND**

In response to the request of the Government of Republic of Indonesia (hereinafter referred to as "GoI"), the Basic Planning Survey Team (hereinafter referred to as "the Team") of the Japan International Cooperation Agency (hereinafter referred to as "JICA"), headed by Mr. MATSUMOTO Hideaki, had series of discussion with Indonesia through remote basis from 24th of August 2021 to 22nd of December 2021, for the purpose of formulating "the Project for Coastal Disaster Risk Reduction Plan Study on the North Coast of Java Island" (hereinafter referred to as "the Project").

During its series of discussion, the Team exchanged its views for the purpose of working out the framework and details of the Project with the officials of Ministry of Public Works and Housing (hereinafter referred to as "PUPR") and other organizations concerned.

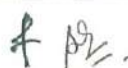
As a result of the discussions, both sides agreed on the matters referred to in the document attached hereto.

10th January 2022

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Mr. MATSUMOTO Hideaki
Team Leader
Basic Planning Survey Team
Japan International Cooperation Agency
Japan

Mr. Jarot Widyoko 
Director General
Directorate General of Water Resources
Ministry of Public Works and Housing (PUPR)
Indonesia



ATTACHED DOCUMENT

1. Title of the Project

The title of the Project was requested as “the Project for Coastal Management Master Plan Study on the North Coast of Java Island”.

Considering the content of the Project and PUPR jurisdiction, both sides agreed to change title of the Project as “the Project for Coastal Disaster Risk Reduction Plan Study on the North Coast of Java Island”.

2. Record of Discussions

The Both sides agreed on the draft Record of Discussions (hereinafter referred to as “R/D”), shown in Attachment 1 which stipulates the framework of the Project, which shall be finalized and signed by the representative of JICA Indonesia Office and PUPR after notification of approval from implementation of the Project by JICA Headquarters.

3. Framework of the Project

3.1. Project implementing agency

(1) Implementing agency:

Directorate General of Water Resources (hereafter referred to as “DGWR”), Ministry of Public Works and Housing (PUPR) will bear overall responsibility for the Project

(2) Relevant sections of PUPR in the Project:

- i. Directorate General of Water Resources (DGWR)
 - a) Directorate of River and Coastal (Dir S&P)
 - b) Directorate of Technical Development for Water Resources
 - c) Directorate of System & Strategy of Water Resources Management
 - d) Technical Centre for Coastal
 - e) Technical Centre for River
 - f) River Basin Headquarter (BBWS)/ River Basin Office (BWS) in pilot sites

3.2. Target areas

Both sides agreed that the target area of the Project is tentatively defined as follows.

1) Target area for basic survey

The target areas will cover whole of the north of Java Island.

2) Target area for developing basic coastal management plan, and coastal facilities plan

Two project sites will be selected from those areas where PUPR can carry out the direct control with criteria, which are tentatively agreed between both sides as below;

(1) Representativeness

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- a) Various typical measures are included in the target areas
- b) Typical problems cases occurring in Indonesia are included in the target areas
- (2) Priority by the PUPR and local governments (priority as a coastal problem)
- (3) Priority on coastal utilization / land use
- 3) Draft basic policy for coastal management will be developed to be applied to whole Indonesian coastal area, however it will be developed with the information of basic survey only in the Project. Therefore, additional survey of whole Indonesian coastal area might be needed for finalization of the policy after the Project.

3.3. Duration of the Project

The duration of the Project is two (2) years. The Project will start after a first expert arrival in Indonesia. In case of the impact of COVID-19 is still remaining, the both sides will make discussion once again about the timing of commencement of the Project.

4. Administration of the Project

4.1. Input by JICA

a) Dispatch of mission

(Title is tentative and subject to change)

- Team Leader: Coastal Management
- Coastal Conservation Management
- Seacoast / Sediment Management
- Hydraulic Analysis
- Facility Design / Construction Planning
- Institutional, Financial Analysis
- Hydrogeologist, Groundwater Analysis, Land Subsidence

Input other than indicated above will be determined through mutual consultations between JICA and PUPR during the implementation of the Project, as necessary.

4.2. Project implementation structure of the Indonesia side

(1) Project Director

Director General of Water Resources will bear overall responsibility for implementation, administration, monitoring and evaluation of the Project as Project Director.

(2) Project Manager

Director of River and Coastal will bear overall responsibility for managerial matter of the Project as Project Manager.

(3) C/P Personnel

C/P personnel are expected to work closely with the JICA Experts.

- a) Staff of Directorate of River and Coastal
- b) Staff of Directorate of Technical Development of Water Resources
- c) Staff of BBWS/BWS of pilot site(s)

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- d) Staff of Directorate of System & Strategy of Water Resources Management
- e) Staff of Technical Centre for Coastal

(4) Joint Coordinating Committee among responsible agency, related organizations, technical supporting organizations

PUPR will hold Joint Coordinating Committee (Hereinafter referred to as "JCC") wherever deems it necessary

The function of the JCC are as follows:

- To submit authorized organization to approve an annual work plan;
- To review the progress of the Project;
- To conduct evaluation of the Project;
- To exchange views and ideas on major challenges which will arise during the implementation period of the Project; and
- Any other related issues.

Composition of JCC is as follows

a) Chairperson:

Director General of Water Resources

b) Members on Indonesia side:

- Representatives of Directorate of River and Coastal
- Representatives of Directorate of Technical Development of Water Resources
- Representatives of BBWS/BWS of pilot site(s)
- Representatives of Directorate of System & Strategy of Water Resources Management
- Representatives of Technical Centre for Coastal
- Representatives of Technical Centre for River
- Representatives of Local Governments in pilot site(s)
- Representatives of Ministry of Marine and Fisheries (KKP)
- Representatives of Ministry of Environment and Forestry (KLHK)
- Representatives of Ministry of Agrarian Affairs and Spatial Planning (ATR)

Observer

- Representatives of National Development and Planning Agency (BAPPENAS)
- Representatives of National Disaster Management Authority (BNPB)

c) Members on Japanese side:

- Chief Representative of JICA Indonesia Office
- Member of Mission Dispatched by JICA
- Other person(s) concerned appointed by JICA

4.3. Measures to be undertaken by the Indonesia side

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Indonesia side has responsibility to undertake the items of “II. OUTLINE OF THE PROJECT 5. (2) Input by PUPR” as well as “III. UNDERTAKINGS OF PUPR” described in draft Record of Discussion (R/D)

5. Verification and Agreement of basic policy for cooperation framework

5.1 Confirmation of the background of application

PUPR aims to make overall plan for the whole coastal area, and make it a guiding document in planning coastal risk reduction or coastal protection against floods and erosion which PUPR is in charge of.

5.2 Basic Stance with the existing plans

Both parties agreed that the plan to be developed for this project should be consistent with the existing plan, but the basic stance is as follows;

- (1) After reviewing existing plans and initiatives, consider the suitable plan from the perspectives of coastal utilization, environment, and protection.
- (2) Any plans or initiatives later than this plan will seek to ensure consistency with this plan and its policies.
- (3) If an existing plan has a significant negative impact on coastal conservation and coastal management in the context of proposing plan, which cannot be resolved without changes to the existing plan, consultation and coordination with the competent authorities, including changing the existing plan will be taken place.

5.3 Structure or layer of the output of the Project

In Indonesia at present, projects such as coastal utilization, protection and environmental conservation are being carried out by the respective ministries and agencies in charge, but there is no overall plan or policy to harmonize them. Thus, both parties agreed to make the following policy and plans in the Project.

- (1) Draft Basic Policy for Coastal Management (Tentative name): This is the overall policy of the government regarding coastal management, which guides the harmonious implementation of coastal development, utilization, protection and environmental conservation, and it stipulates the formulation of the Basic Plan for Coastal Management as described below.
- (2) Draft Basic Coastal Management Plan (Tentative Name): An overall plan that includes coastal development, utilization, protection and environmental conservation. This is referred to as a master plan.
- (3) Coastal Facilities Plan (Tentative Name): A project plan for the development of coastal protection facilities to be implemented by PUPR based on the Basic Coastal Management Plan (Master Plan).

* The purpose to propose draft policy and plan in the Project is to promote the understanding of (i) the relationship between basic policy, basic plan and the facility plan, and (ii) the necessity

and usefulness of this basic plan together with the basic policy, by presenting the basic policy and the basic plan in concrete form as a draft.

5.4 Details of each policy and plan

Both parties agreed with a detailed explanation of 5.2 above;

(1) Basic Policy for Coastal Management

At least three relevant ministries (PUPR, the Ministry of Environment and Forestry, and the Ministry of Marine Affairs and Fisheries) need to discuss in order to formulate this basic policy. In addition, local governments and KKP are significant organizations as they are responsible for Zoning Plan for Coastal Zone and Small Islands (Rencana Zonasi Wilayah Pesisir Dan Pulau-Pulau Kecil (RZWP-3-K). Contents of the policy can be (i) basic guidelines (issues and background, philosophy, elements of coastal management (protection, environment, utilization), basic matters of each element), (ii) classification, (iii) basic matters of the basic coastal management plan (matters to be determined, matters to be noted), provides for the formulation of the basic coastal management plan. In the Project, a draft policy will be proposed, which need further study and discussions by three relevant ministries and may need to be formalized by government regulations.

(2) Basic Coastal Management Plan

Study and discussion by at least three relevant ministries and agencies are necessary.

Local academics and researchers, heads of local governments, and organizations concerned with coastal utilization and protection might be involved for formulation.

The content is set out in the basic policy and it can be the following matters and other points to note. (i) Basic matters concerning the coastal management (the current status of the coast and the policy of conservation, protection of the coast (area, level and goal of protection, the content of the policy), maintenance and conservation of the coastal environment, appropriate use of the public, (ii) Basic matters concerning the maintenance of coastal protection facilities (regarding the maintenance and repair of facilities: area of facilities, type, size and layout of facilities, beneficiary areas) and conditions, protected areas and land use conditions, etc.).

In the Project, a draft plan will be proposed, which need further study and discussions by three relevant ministries and might need formalization of basic policy clarify the position of the basic plan.

(3) Coastal Facilities Plan

This is a project plan for coastal protection facilities under the jurisdiction of the PUPR, and a pre-Feasibility Study will be conducted. The observation of tides and waves required for Feasibility Study will be conducted within the Project.

5.5 Targeted events and hazards

Both parties agreed with targeted events and hazards as follows;

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(1) The events and hazards to be dealt with in the Project are all those that cause damage to or affect the coast and structures located. The draft basic plan and the draft facilities plan will be prepared in consideration of the following phenomena: (i) events such as coastal erosion, coastal flooding, sedimentation, and structural damage; (ii) hazards such as high ocean waves, storm surges and tsunamis; (iii) natural phenomena such as tides, ocean waves, currents and drifting sand from coastal areas and rivers; (iv) anthropogenic phenomena such as the effects of structure construction, development activities in rivers and upstream areas and land subsidence.

(2) With regard to land subsidence, the plan should consider the prediction of future land subsidence and its impact, but the land subsidence countermeasures such as regulating groundwater pumping should be excluded from the plan.

5.6 Target Level

The target protection level (probability scale for example 50 years return period high wave etc.) is not officially set yet in Indonesia, therefore, it shall be studied in the Project. Idea of the target protection level is to set a government's target to protect areas with structural measures by the government's responsibility.

5.7 Technology transfer

Indonesian side requested technology transfer from the Japanese side through the Project. The Team explained that the type of the project is to conduct a study targeting making plan, and some technology transfer will be done through discussing the policy and the plans in the Project. In addition, project will conduct and create the followings;

- (1) Implementation of workshops and seminars on coastal structure and coastal management
- (2) Procedure of the Basic Coastal Management Plan
- (3) Case studies on basic measures for coastal protection, utilization and environmental conservation
- (4) Training in Japan or the third countries

6. Other Matters

6.1. Two Steps Planning Method for Technical Cooperation Project

Two Steps Planning Method is a planning method in which the Project immediately starts once a basic plan is formulated (STEP 1) and a detailed plan is formulated (STEP 2) to start core activities after the Project has begun.

Both parties agree that the Detailed Planning Survey will be conducted in the first year of the Project. The purpose of the Detailed Planning Survey is to collect and analyze additional information concerning the Project and to agree on the details of the Project by the end of the first year of the Project.

6.2 Formulation of Technical Working Group (hereinafter referred to as "TWG")

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The Team explained that coordination and collaboration with related organization is key of effective project activities. Therefore, JICA proposed to formulate TWG to accelerate technology-focused activities.

Both sides agreed tentative TWG in accordance with Project output and activities shown in Annex 1 of the draft R/D. The Indonesia side agreed to nomination of each member for TWG will be made before the commencement of the Project.

6.3. Overall Schedule before commencement of the Project as an earliest scenario

August – September, 2021: Basic Planning Survey

October, 2021: Approval of Draft R/D in JICA HQ

November, 2021: Approval of R/D in Indonesia side and signing R/D between both sides

October, 2021 to March, 2022: Preparation of the Project

March – April, 2022: Starting the Project

6.4. Contribution to DRR investment and the Sendai Framework for Disaster Risk Reduction 2015-2030

The Third UN World Conference on Disaster Risk Reduction was held in Sendai in March 2015 Japan and the Sendai Framework for Disaster Risk Reduction 2015-2030 (hereinafter referred to as “SFDRR 2015-2030”) was adopted, which is latest worldwide principle for DRR.



The Team explained JICA would like to support the Indonesia side's efforts toward DRR investment through the implementation of the Project and the concept of the Project have to be in line with priorities for priority action in SFDRR 2015-2030, particularly, the Project contributes to implement “Priority Action 3: Investing in disaster risk reduction for resilience” through acceleration of formulation and implementation of coastal management M/P. The Indonesia side also agreed above main purpose of the Project.

6.5. Climate Change Consideration

In Indonesia, the adverse impacts of climate change induced by global warming have been notable as evidenced by natural hazards and extreme events more frequently and with increased intensity. To adapt to the impacts of climate change, it is absolutely necessary to consider increasing sea level rise, tidal wave, tidal current, high wave, storm surge caused by climate change, etc. Therefore, the Project is expected to contribute to climate change adaptation and both sides agreed that the Project will contribute to the adaptation to climate change.

Hence, it is indispensable to integrate Climate Change considerations into coastal management M/P. As for policy of climate change projection in Indonesia, BAPPENAS will bear responsibility to coordinate relevant organizations for comprehensive Climate Change policies and BMKG will bear responsibility to monitoring and predicting the climate changes in Indonesia. On the other hand, PUPR as a formulation/implementation agency for coastal protection measures will bear responsibility to integrate Climate Change assessment policy into their plan. PUPR will coordinate among relevant organizations mentioned above under the

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Project activities to determine the details of Climate Change considerations such as scenario, model and etc.

6.6. Environment and Social Considerations

Since the Project is categorized as B under the “JICA Guidelines for Environmental and Social Considerations (April 2010)” (hereinafter referred to as “the Guidelines”), the necessary procedures are taken in accordance with the Guidelines. PUPR agreed to follow the Guidelines in order to ensure that appropriate consideration shall be made for the possible environmental and social impacts of the Project. At the same time, PUPR understood that the project category may be changed, after the on-site confirmation in the Project. Terms of reference for the Environmental and Social Considerations is attached in draft R/D.

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Attachment 1: Draft Record of Discussions (R/D)

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**DRAFT
RECORD OF DISCUSSIONS
ON
PROJECT FOR COASTAL DISASTER RISK REDUCTION PLAN STUDY ON
THE NORTH COAST OF JAVA ISLAND
IN
THE REPUBLIC OF INDONESIA
AGREED UPON BETWEEN
MINISTRY OF PUBLIC WORKS AND HOUSING
AND
JAPAN INTERNATIONAL COOPERATION AGENCY**

Jakarta, XX XX 2022

Mr. OGAWA Shigenori
Chief Representative
JICA Indonesia Office

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Mr. Jarot Widyoko
Director General
Directorate General of Water Resources
Ministry of Public Works and Housing
(PUPR)
Indonesia

Based on the minutes of meetings on the Basic Planning Survey for “the Project for Coastal Disaster Risk Reduction Plan Study on the North Coast of Java Island” (hereinafter referred to as “the Project”) signed on XX 2022 between Ministry of Public Works and Housing (hereinafter referred to as “PUPR”) and the Japan International Cooperation Agency (hereinafter referred to as “JICA”), JICA held a series of discussions with the PUPR and relevant organizations to develop a detailed plan of the Project.

Both parties agreed the details of the Project and the main points discussed as described in the Appendix 1 and the Appendix 2 respectively.

Both parties also agreed that PUPR, the counterpart to JICA, will be responsible for the implementation of the Project in cooperation with JICA, coordinate with other relevant organizations and ensure that the self-reliant operation of the Project is sustained during and after the implementation period in order to contribute toward social and economic development of the Republic of Indonesia.

The Project will be implemented within the framework of the Colombo Plan Technical Cooperation Scheme between the Government of Japan and the Government of Indonesia (hereinafter referred to as “GOI”)

Appendix 1: Project Description

Appendix 2: Main Points Discussed

Appendix 3: Minutes of Meetings on the Basic Planning Survey

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PROJECT DESCRIPTION

I. BACKGROUND

The North Coast of Java Island is known through the Pantura Line (North Coast) which is a national road along 1,316 km between Merak to Ketapang, Banyuwangi along the north coast of Java Island, especially between Jakarta and Surabaya.

The Pantura line crosses 5 provinces: Banten, DKI Jakarta, West Java, Central Java, and East Java. The westernmost tip in the Merak Harbor, which links it to the Bakauheni Port on the island of Sumatra, the southernmost end of the Trans Sumatra Road. The easternmost tip is the Ketapang Port which connects it to the Gilimanuk Port on the island of Bali. Pantura line is a road that connects the western part of Java Island and its eastern part.

At present the condition of the marine and coastal environment is increasingly worrisome. Almost along the North Coast of Java, coral ecosystems and mangrove/mangrove trees or other coastal plants that can function as a tidal wave repellent are already extinct. Every time the sea season is high tide, waves and waves crashing on people's homes and highways because there are no more coastal plants that can withstand the tidal wave rate.

Cities on the north coast of Java as Jakarta, Semarang, Pekalongan, and Surabaya are vulnerable to environmental pressures such as sea level change and land subsidence. Land subsidence can be caused by natural and anthropogenic processes. Geologically, the north coastal plain of Java consists of unconsolidated Holocene alluvial deposit. The recent alluvial deposit is prone to compaction, and further aggravated by anthropogenic forces such as groundwater extraction and land development. Understanding the complex interaction of natural and manmade factors is essential to establish mitigation realize that land subsidence is taking place.

To solve the problems in the north coast of Java, formulating Master Plan of the seacoast management is needed. Which then will be the basis for the implementation of the projects.

II. OUTLINE OF PROJECT

1. Title of the Project
The Project for Coastal Disaster Risk Reduction Plan Study on the North Coast of Java Island
2. Expected Goals which will be attained after implementing the Proposed Plan
Selected coastal area of the North Coast of Java Island is properly managed based on the draft Basic Policy for Coastal Management and the draft Basic Coastal Management Plans (Master Plans) considering harmonization of coastal protection, environment, utilization and development.
3. Outputs
 - (a). Draft Basic Policy for Coastal Management (Tentative name)
 - (b). Draft Basic Coastal Management Plan (Tentative Name) in the Two Northern Coastal Areas of Java Island
 - (c). Coastal Facilities Plan (Tentative Name) in the Two Northern Coastal Areas of

Java Island

(d). Technology transfer to the relevant GOI staff through the project

4. Activities

- (a). Basic survey
- (b). Draft Basic Policy for Coastal Management (Tentative name)
- (c). Draft Basic Coastal Management Plan (Tentative Name)
- (d). Coastal Facilities Plan
- (e). Technical Transfer and Capacity Building

5. Input

1). Input by JICA

(a). Dispatch of mission

(Title is tentative and subject to change)

- Team Leader: Coastal Management
- Coastal Conservation Management
- Seacoast / Sediment Management
- Hydraulic Analysis
- Facility Design / Construction Planning
- Institutional, Financial Analysis
- Hydrogeologist, Groundwater Analysis, Land subsidence

Input other than indicated above will be determined through mutual consultations between JICA and PUPR during the implementation of the Project, as necessary.

2). Input by PUPR

PUPR will take necessary measures to provide at its own expense:

- (a) Services of PUPR's counterpart personnel and administrative personnel as referred to in II-6;
- (b) Suitable office space with necessary equipment;
- (c) Supply or replacement of machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the equipment provided by JICA;
- (d) Means of transport and travel allowances for C/P joining for official travel within Indonesia;
- (e) Information as well as support in acquiring suitable furnished accommodation for members of the JICA missions and their families;
- (f) Information as well as support in obtaining medical service;
- (g) Credentials or identification cards;
- (h) Available data (including maps and photographs) and information related to the Project;
- (i) Running expenses necessary for the implementation of the Project;
- (j) Expenses necessary for transportation within Indonesia of the equipment referred to in II-5 (1) as well as for the installation, operation and maintenance thereof, if needed; and
- (k) Necessary facilities to the members of the JICA missions for the remittance as well as utilization of the funds introduced into Indonesia from Japan in connection with the implementation of the Project, if needed.

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6. Implementation Structure

The project implementation structure is given in the Annex 1. The roles and assignments of relevant organizations are as follows:

- (1) Project Director
Director General of Water Resources will bear overall responsibility for implementation, administration, monitoring and evaluation of the Project as Project Director.
- (2) Project Manager
Director of River and Coastal will bear overall responsibility for managerial matter of the Project as Project Manager.
- (3) C/P Personnel
C/P personnel are expected to work closely with the JICA Experts.
 - (a). Staff of Directorate of River and Coastal
 - (b). Staff of Directorate of Technical Development for Water Resources
 - (c). Staff of River Basin Headquarter (BBWS)/ River Basin Office (BWS) of pilot sites
 - (d). Staff of Directorate of System & Strategy of Water Resources Management
 - (e). Staff of Technical Centre for Coastal
- (4) The members of JICA missions
The members of JICA missions will give necessary technical guidance, advice and recommendations to PUPR on any matters pertaining to the implementation of the Project.
- (5) Joint Coordinating Committee
Joint Coordinating Committee (hereinafter referred to as "JCC") will be established in order to facilitate inter-organizational coordination. JCC will be held whenever deems it necessary. A list of proposed members of JCC is shown in the Annex 2.

7. Project Site(s) and Beneficiaries

Both sides agreed that the target area of the Project is tentatively defined as follows.

- 1). Target area for basic survey
The target areas will cover whole of the north of Java Island.
- 2). Target area for developing basic coastal management plan, and coastal facilities plan
Two project sites will be selected from those areas where PUPR can carry out the direct control with criteria, which are tentatively agreed between both sides as below;
 - Representativeness
 - (a). Various typical measures are included in the target areas
 - (b). Typical problems cases occurring in Indonesia are included in the target areas
 - Priority by the PUPR and local governments (priority as a coastal problem)
 - Priority on coastal utilization / land use
 - Potential adverse impacts on the environment and society
- 3). Draft basic policy for coastal management will be developed to be applied to whole Indonesian coastal area, however it will be developed with the information of basic survey only in the Project. Therefore, additional survey of

whole Indonesian coastal area might be needed for finalization of the policy after the Project.

Direct beneficiaries are PUPR and indirect beneficiaries are Indonesian citizens.

8. Duration

The duration of the Project is two (2) years. The Project will start after a first expert arrival in Indonesia. In case of the impact of COVID-19 is still remaining, the both sides will make discussion once again about the timing of commencement of the Project.

9. Reports

JICA will prepare and submit the following reports to the PUPR in Indonesia.

- (1) 6 copies of Inception Report at the commencement of the first work period in Indonesia
- (2) 6 copies of Interim Report at the time about 6 months after the commencement of the first work period in Indonesia
- (3) 6 copies of Progress Report at the time of 12 months after the commencement of the first work period in Indonesia
- (4) 6 copies of Draft Final Report at the end of the last work period in Indonesia
- (5) 6 copies of Final Report within one (1) month after the receipt of the comments on the Draft Final Report

10. Environmental and Social Considerations

- (1) PUPR will abide by 'JICA Guidelines for Environmental and Social Considerations' (April 2010) in order to ensure that appropriate considerations will be made for the environmental and social impacts of the Project.

III. UNDERTAKINGS OF PUPR

1. PUPR will take necessary measures to:

- (1) ensure that the technologies and knowledge acquired by the Indonesia nationals as a result of Japanese technical cooperation contributes to the economic and social development of Indonesia, and that the knowledge and experience acquired by the personnel of Indonesia from technical training as well as the equipment provided by JICA will be utilized effectively in the implementation of the Project; and
- (2) grant privileges, exemptions and benefits to members of the JICA missions referred to in II-4 above and their families, which are no less favorable than those granted to experts and members of the missions and their families of third countries or international organizations performing similar missions in Indonesia.

2. PUPR will take necessary measures to:

- (1) provide security-related information as well as measures to ensure the safety of members of the JICA missions;
- (2) permit members of the JICA missions to enter, leave and sojourn in Indonesia for the duration of their assignments therein and exempt them from foreign registration requirements and consular fees.

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- (3) exempt members of the JICA missions from taxes and any other charges on the equipment, machinery and other material limited for the implementation of the Project;
 - (4) exempt members of the JICA missions from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to them and/or remitted to them from abroad for their services in connection with the implementation of the Project; and
3. PUPR will bear claims, if any arises, against members of the JICA missions resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Project, except when such claims arise from gross negligence or willful misconduct on the part of members of the JICA missions.

IV. MONITORING AND EVALUATION

JICA will conduct the following evaluations and surveys to verify how the proposed plan is utilize and draw lessons. The PUPR is required to provide necessary support for them.

Ex-post evaluation: three (3) years after the project completion, in principle
 Follow-up surveys on necessity basis

V. PROMOTION OF PUBLIC SUPPORT

For the purpose of promoting support for the Project, PUPR will take appropriate measures to make the Project widely known to the people of Indonesia.

VI. MISCONDUCT

If JICA receives information related to suspected corrupt or fraudulent practices in the implementation of the Project, PUPR and relevant organizations will provide JICA with such information as JICA may reasonably request, including information related to any concerned official of the government and/or public organizations of the Indonesia. PUPR and relevant organizations will not, unfairly or unfavorably treat the person and/or company which provided the information related to suspected corrupt or fraudulent practices in the implementation of the Project.

VII. MUTUAL CONSULTATION

JICA and PUPR will consult each other whenever any major issues arise in the course of Project implementation.

VIII. AMENDMENTS

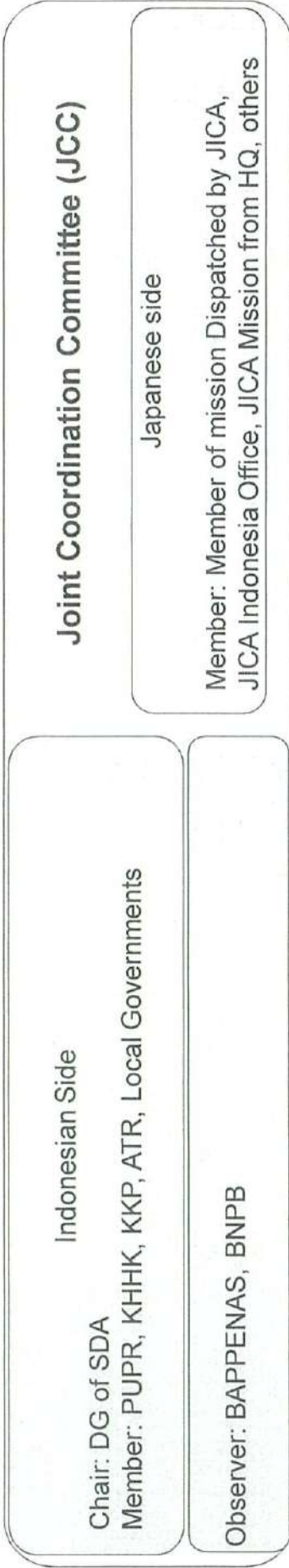
The record of discussions may be amended by the minutes of meetings between JICA and PUPR. However, PO may be amended in the Monitoring Sheets. The minutes of meetings will be signed by authorized persons of each side who may be different from the signers of the record of discussions.

- Annex 1 Project Organization Chart
- Annex 2 A List of Proposed Members of Joint Coordinating Committee
- Annex 3 Terms of Reference for the Environmental and Social Considerations

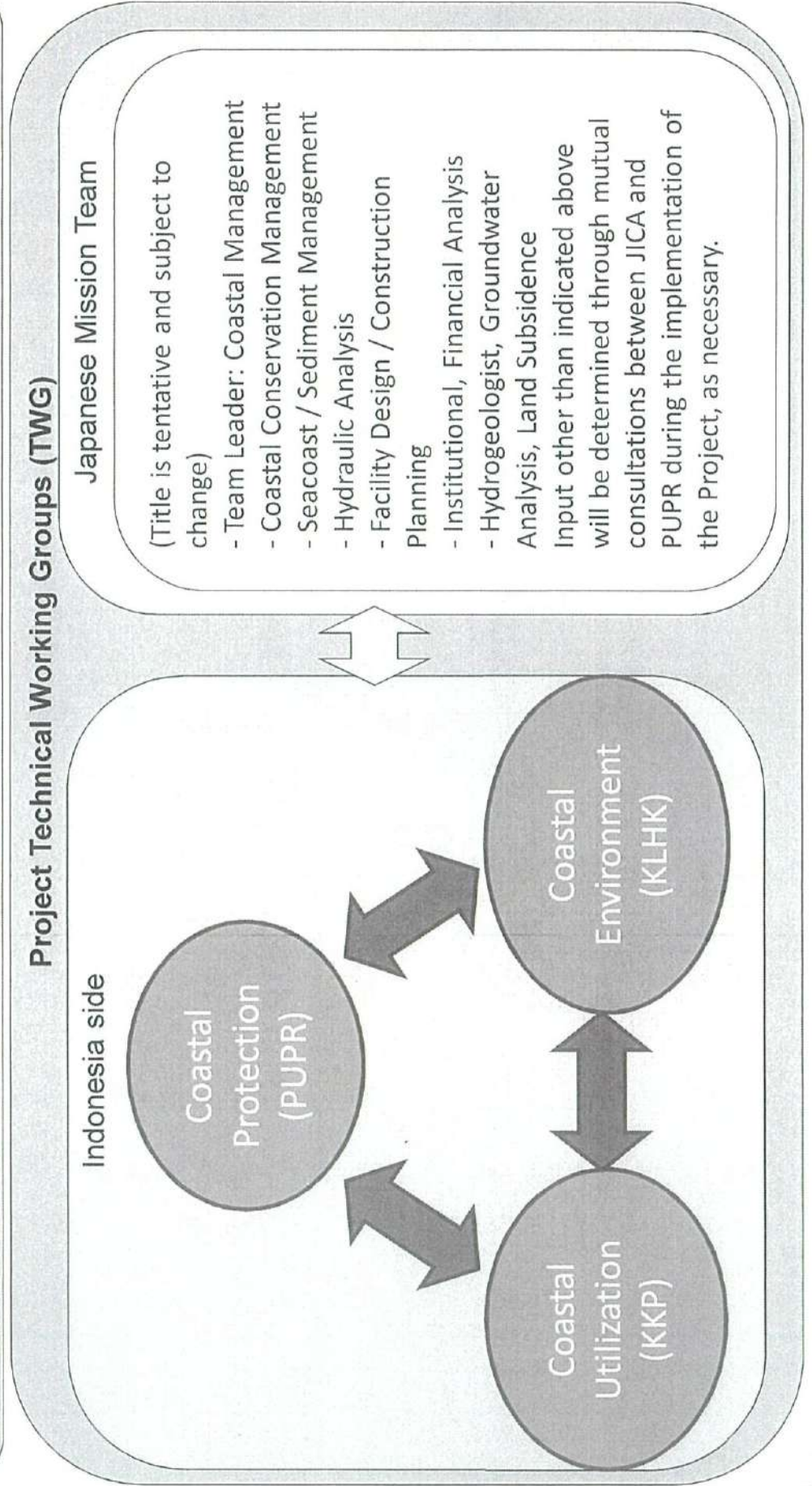
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Project Organization Chart

Annex 1



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Handwritten signature and initials.

**A List of Proposed Members of Joint Coordinating Committee for the Project
for Coastal Disaster Risk Reduction Plan Study on the North Coast of Java
Island**

PUPR will hold Joint Coordinating Committee (Hereinafter referred to as "JCC") at least once a year and wherever deems it necessary

The function of the JCC are as follows:

- To submit authorized organization to approve an annual work plan;
- To review the progress of the Project;
- To conduct evaluation of the Project;
- To exchange views and ideas on major challenges which will arise during the implementation period of the Project; and
- Any other related issues.

Composition of JCC is as follows

a) Chairperson:

- a) Director of General of Water Resources Members on Indonesia side:
- Representatives of Directorate of River and Coastal
 - Representatives of Directorate of Technical Development for Water Resources
 - Representatives of BBWS/BWS of pilot sites
 - Representatives of Directorate of System & Strategy of Water Resources Management
 - Representatives of Technical Centre for Coastal
 - Representatives of Technical Centre for River
 - Representatives of BPSDM
 - Representatives of Local Governments in the selected pilot sites
 - Representatives of Ministry of Marine and Fisheries (KKP)
 - Representatives of Ministry of Environment and Forestry (KLHK)
 - Representatives of Ministry of Agrarian Affairs and Spatial Planning (ATR)

Observers

- Representatives of National Development and Planning Agency (BAPPENAS)
- Representatives of National Disaster Management Authority (BNPB)

b) Members on Japanese side:

- Chief Representative of JICA Indonesia Office
- Member of Mission Dispatched by JICA
- Other person(s) concerned appointed by JICA

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Terms of Reference for the Environmental and Social Considerations

A Strategic Environmental Assessment (SEA) shall be conducted during the Project in accordance with JICA Guidelines for Environmental and Social Considerations in addition to the regulations in Indonesia. Terms of Reference for the SEA include, but not limited to, the followings:

Discuss whether the basic planning for the coastal protection by the Project needs SEA in conformity with the regulations in Indonesia such as Government Regulation No.46/2016 and Regulation of the Minister of Environment and Forestry No.P.69/MENLHK/SETJEN/KUM.1/12/2017. Gaps between the JICA Guidelines and the legal framework of Indonesia on environmental and social considerations and how they will be filled in the Project. If it is needed, the SEA shall follow the processes and contents required by those regulations in addition to the followings;

1. Establishing SEA team with PUPR, relevant organizations, and JICA study team;
2. Review of existing development policies, plans, projects, studies, and public/private investment at/around the project sites;
3. Analysis to identify environmental and social constrains to the coastal protection;
4. Identify the basic planning to achieve the objectives and goals as the subject of SEA with alternatives proposed considering strategic scenarios, concepts and prioritization;
5. Baseline survey of the existing environmental and social conditions (land use, natural environment, living area of indigenous people, economic and social condition, etc.);
6. Scoping (identify environmental and social issues to be evaluated and the methods with indicators and criteria for evaluation);
7. Analysis of possible impacts based on the scoping;
8. Comparative analysis of possible impacts of alternatives including 'without project' option and 'zero' option;
9. Preparing recommendations for reflecting to the basic planning which includes mitigation measures to avoid, minimized and compensate the impacts and/or monitoring methods (monitoring items, frequencies and methods) for the selected plan;
10. Provisional scoping for Basic Coastal Management Plan and the Coastal Facilities Plan prioritized in the basic planning;
11. Support to have stakeholder meetings by identifying the purpose of the meetings, participants, consultation methodologies and agenda, etc. to be held at least two occasions, 1) at the time of scoping and 2) at the time of preparation of a draft SEA report;
12. Preparing and finalizing a SEA report.

-END-

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MAIN POINTS DISCUSSED

1. BAST (handover delivery certificate of goods/services)
 - (1) Both parties confirmed that the Project is categorized as “Goods / Services” as stipulated in Article 42 (1) c of the Government Regulation No. 10/2011.
 - (2) In accordance with the Regulation of the Minister of Finance No. 99/ PMK.05 /2017, PUPR shall submit BAST (handover delivery certificate of goods/services) to the Ministry of Finance. In order to secure the accuracy of BAST, JICA Indonesia Office will provide PUPR with data on semester basis as follows:
 - Goods: name and price (in effective currency and Indonesian currency) per item of equipment handed over during last six months
 - Services: total expenditure (in Japanese currency and Indonesian currency) of last six months for experts, trainings, and missions
 - (3) PUPR will make and sign BAST based on the data provided by JICA, and after obtaining JICA's confirmation, submit it to the Ministry of Finance.
 - (4) The other points discussed between PUPR and JICA are referred to Appendix 3 Minutes of Meetings on Basic Planning Survey

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END






Date: 3 November 2022

Ref. No. 011/NCJI/JICA-PRJ/Nov/2022

Mr. Ir. Bob Arthur Lombogia, M.Si

Director for River and Coastal
Directorate General of Water Resources
Ministry of Public Work and Housing

Subject: Chronology of Discussion/Coordination of Selection Candidate Areas of the Project for Coastal Disaster Risk Reduction Plan Study on the North Coast of Java Island

Dear Sir,

First of all, we would like to express our deeply grateful for your support in several activities since June 2022 such as the Kick-Off Meeting, Site Visit, Coordination Meeting, and Seminar, also for the willingness to prepare the workspace at the DGWR Building in regard to the “Coastal Disaster Risk Reduction Plan Study on the North Coast of Java Island” under Technical Cooperation Project by Japan International Cooperation Agency (JICA).

In this regard, we would like to inform the chronology of the discussion with the Directorate of River and Coastal, PUPR, and BAPPENAS to obtain mutual understanding between the Directorate of River and Coastal, BAPPENAS, and JICA Study Team (JST) regarding the selection of target area for preparation of coastal management plan.

The chronology of the discussions which were held until now is as follows.

- 1) Kick-off Meeting (7 July 2022)
 - According to the current Record of Discussion (R/D) which was agreed between DGWR of PUPR and JICA on March 2022, it was stated that the *two sites* will be selected as a target area for the preparation of the coastal management plan. However, it was requested by the Directorate of River and Coastal *from 2 sites to 3 sites, and JST was accepted.*
- 2) 1st Coordination Meeting with Director of River and Coastal (27 September 2022)
 - JST explained the candidate’s 4 areas and selected 3 areas based on study results and site investigation on July 2022.
 - The Directorate of River and Coastal requested to show the quantitative reason for the selection of candidates and selected areas for preparation of a coastal management plan based on

appropriate evaluation criteria.

- Also, it is requested from the Directorate of River and Coastal to cover the west part of Indramayu which was excluded from the proposed candidate area by JST.
- 3) 2nd Coordination Meeting with Director of River and Coastal (7 October 2022)
- JST presented the selected 3 sites which are Area-1' (Indramayu West - East), Area-2 (Pekalongan - Pemalang), and Area-4 (Rembang - Tuban) based on quantitative analysis applying appropriate evaluation criteria which were stated and agreed in R/D adding two more criteria, as requested in the 1st coordination meeting.
 - As a result of the discussion, the Directorate of River and Coastal basically accepted the procedure for analysis and selected 3 areas.
- 4) Coordination Meeting with BAPPENAS (26 October 2022)
- A coordination meeting with BAPPENAS was held to share the selected 3 areas and ask their opinion based on their (Minister of Bappenas) site visit to Demak in October. BAPPENAS requested to add one more site which was Sayung Area in Demak Regency.
 - As a result of the discussion, finally the JST accepted to add the study at Sayung Area in Demak, as far as the study level is a preliminary level which is a different level from the other selected 3 areas. BAPPENAS also realized and agreed.
- 5) 3rd Coordination Meeting with Director of River and Coastal (1 November 2022)
- Based on the above-mentioned discussion with BAPPENAS, Directorate of River and Coastal requested again to include Demak area as one of target area, even though total target area will increase from 3 to 4.
 - JST explained the difficulty to carry out the M/P study in Demak considering uncertain factors of phenomena, limited manpower, and specialty for existing dispatched JICA Study members.
 - As the result, the Directorate of River and Coastal realized and accepted the selected 3 target areas and to add to carry out the preliminary level study in Demak, which results were the same as that agreed in the discussion in BAPPENAS on 26 October 2022.

Based on the above-mentioned chronology of discussion between the Directorate of River and Coastal, BAPPENAS, and JST, we will continue further study at selected 3 areas for the preparation of the Coastal Management Plan and Coastal Facility Plan.

Also, we would like to inform you that the current R/D shall be amended including the information of above mentioned results between DGWR of PUPR and JICA.

For your kind cooperation, support and attention, we would like to express our deep greeting and we look forward to working and further discussing the "Project for Coastal Disaster Risk Reduction Plan Study on the North Coast of Java Island".



Sincerely yours,



Susumu ONAKA

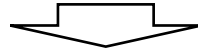
Team Leader of JICA Study Team

CC:

- JICA Indonesia Office

ANNEX-3: Definition of Area Division on Coastal Management Plan and Coastal Facilities Plan

1. Section of "Area" for Coastal Conservation



2. Division from "Area" to "Zone"



3. Selection of "Section" for Coastal Facility Plan from "Zone"



ANNEX2

Minutes of Meeting of Joint

Coordination Committee

MINUTES OF MEETING
ON
PROJECT FOR COASTAL DISASTER RISK REDUCTION PLAN STUDY
ON THE NORTH JAVA ISLAND

AGREED UPON BETWEEN


MINISTRY OF PUBLIC WORKS AND HOUSING
AND
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
PROJECT TEAM OF JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA STUDY TEAM)

Jakarta, February 14th, 2023

大 中 晋

Mr. Susumu ONAKA
Team Leader/Coastal Disaster Risk Reduction Plan
JICA Study Team



Mr. Bob Arthur Lombogia
Director of Rivers and Coasts, DGWR
Project Manager of the Project 

Witnessed by:

小 野 望

Mr. Nozomu ONO
Senior Representative
JICA Indonesia Office

In response to the official request submitted by the Indonesian Government, the Record of Discussion (hereinafter referred to as "R/D") on PROJECT FOR COASTAL DISASTER RISK REDUCTION PLAN STUDY ON THE NORTH COAST OF JAVA ISLAND (hereinafter referred to as "the Project") was signed on March 31st, 2022 between the Indonesian Side (Ministry of Public Works and Housing, hereinafter referred to as "PUPR") and Japan International Cooperation Agency (hereinafter referred to as "JICA") (collectively hereinafter referred to as "Both Parties"). Based on the R/D, the Project commenced on June 17th, 2022. In accordance with the Implementation Schedule of the Project, the First Joint Coordinating Committee (hereinafter referred to as "1st JCC") was held on February 14th, 2023, and had a series of discussions on selection of three priority areas for preparation of basic coastal management plan, basic understanding of the objective of the Project and necessity for exchange opinion among related agencies proposed by the JICA Study Team among the participants.

In the course of discussions, all the participants confirmed the main items on the 1st JCC given in Appendix 1.

Appendix 1: Main Points Confirmed

Appendix 2: Image of Working Group (W/G) & Close Group Discussion (CGD)

Appendix 3: Site Visit to Bali Beach Conservation Project

Appendix 4: Attendance List of JCC

Appendix 5: Presentation Materials of JCC

Main Points Confirmed

1. Selection of Target Area

- JCC Members confirmed that the target areas for developing the basic coastal management plan had been decided to change from two areas (stated in the original R/D) to three areas based on the discussions with Project implementing agency, PUPR.
- JCC members agreed on three selected areas as target areas for developing basic coastal management plan, which are Area I: Indramayu (about 100 km coastal length), Area II: Pematang - Pekalongan (about 46 km) and Area III: Rembang – Tuban (52 km), by applying 2-step selection with three evaluation criterias as 1st step selection and six evaluation criterias as 2nd step selection as presented in JCC.
- JICA Study Team informed that the preliminary level study at Sayung Area in Demak will be conducted by referring to the existing available documents and information, but the study level will be different from basic coastal management plan and coastal facility plan on the three selected areas above.
- The boundary of each selected area will be finalized by taking into account the further discussion among PUPR and each Balai Besar Wilayah Sungai (hereinafter referred to as "BBWS") of selected areas as far as the changes or revisions of boundary is within an adjustable level.

2. Expected Goal on Coastal Management

- JCC members agreed to have the same understanding on coastal management that the planned and implemented coastal protection/conservation measures shall basically considered not only "Protection" but also "Environment" and "Utilization" with a wide viewpoint of coastal process, mechanism and impact due to artificial modification of the coast.

3. Formulation of Working Group (W/G) and Closed Group Discussion (CGD) (shown in the Appendix 2)

- JCC members agreed to formulate the Working Group with selected members from related agencies and JICA Study Team (hereinafter referred to as "W/G) and support to join and discuss in the W/G in order to prepare the draft of [Basic Policy for Coastal Management] and [Basic Coastal Management Plan].
- JCC Members realized that the frequent discussions are required to finalize the three output plans by consensus with the Indonesian side.

- PUPR suggested to formulate a Close Group Discussion with PUPR, each BBWS and JICA Study Team (hereinafter referred to as "CGD") as shown in the Appendix 2 to have in-depth discussions for the preparation of the three outputs and to expect the smooth coordination and discussion in the W/G with other agencies.
- JICA Study Team agreed to consider the possibility for above suggestion on holding W/G and CGD frequently by taking into account the assignment schedule of JICA Study Team.

4. Selection of Working Group (W/G) Members

- JCC Members agreed that the proposed W/G members in the Government of Indonesia side will be selected from PUPR, KKP, KLHK, BRGM, BAPPENAS, Kemenko Marves to discuss and exchange opinion with JICA Study Team for draft preparation of 「Coastal Management Plan」 and 「Basic Policy of Coastal Management」 based on draft ideas prepared by JICA Study Team from technical and institutional points of view.
- PUPR agreed to request and coordinate with KKP, KLHK, BRGM, BAPPENAS and Kemenko Marves for the selection of members and inform to JICA Study Team. Also, these parties agreed to participate the W/G discussions according to the planned schedule as shown in the Appendix 2.

5. Selection of Participants for Site Visit to Bali Beach Conservation Project

- Three parties (PUPR, KKP and KLHK) confirmed to select the participants who attend the site visit for Bali Beach Conservation Project (planned on May) and inform to JICA Study Team according to the planned image as shown in the Appendix 3.

6. Others

- JICA Study Team informed that the JICA Knowledge Co-Creation Program entitled 「Sustainable Coastal Protection Measures at Island Countries」 will be planned in this year (tentatively in November 2023 for 3 weeks) which has the same concept as the Training on similar title in 2022). JICA Study Team requested to consider the selection of training participants from related agencies (PUPR, KKP, KLHK), accordingly.

(End of document)

Appendix 2

Image of Working Group (W/G) & Close Group Discussion (CGD)

1. Purpose of W/G

To discuss and exchange opinion with PUPR, KKP, KLHK, BAPPENAS, BRGM, Kemenko Marves and JICA Study Team based on draft idea prepared by JICA Study Team for preparation of:

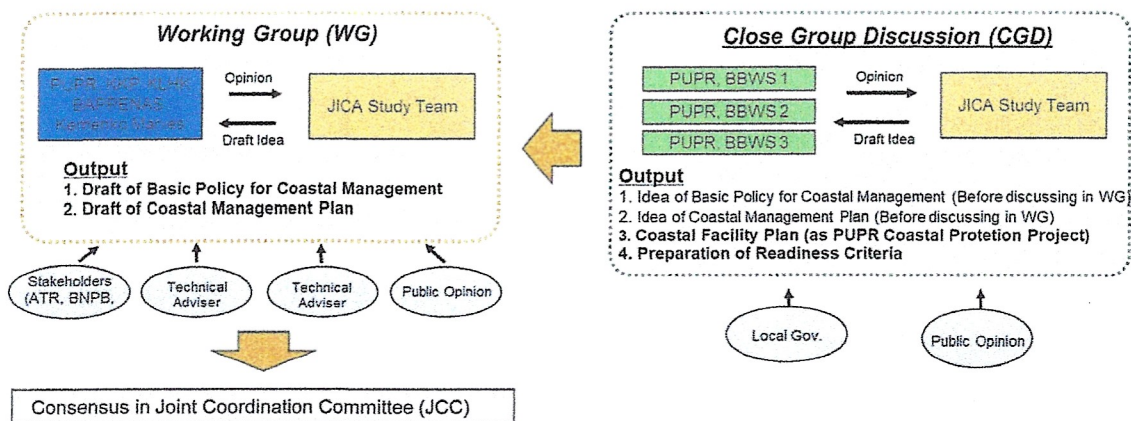
- 1) "Draft of Basic Coastal Management Plan" for selected three areas
- 2) "Draft of Basic Policy for Coastal Management"

2. Purpose of CGD

To discuss and exchange opinion with PUPR, BBWS for each area and JICA Study Team based on draft idea prepared by JICA Study Team for:

- 1) Idea of Basic Policy for Coastal Management (Before discussing in WG)
- 2) Idea of Coastal Management Plan (Before discussing in WG)
- 3) Coastal Facility Plan (as PUPR Coastal Protection Project)
- 4) Preparation of Readiness Criteria

3. Image of W/G & CGD



4. Planned Schedule of W/G and CGD (Tentative Idea)

Study Item	Related Agencies	2024														
		2	3	4	5	6	7	8	9	10	11	12	1	2	3	4
1. Draft of Basic Policy for Coastal Management	PUPR KKP, KLHK															
2. Draft of Basic Coastal Management Plan	BAPPENAS, Kemenko Marves															
3. Preparation of Coastal Facility Plan (Pre-F/S Level) for Selected Section	PUPR, BBWS															
Planned Assignment of JICA Study Team																
Schedule for JCC	1 time/year	●													●	
Schedule for W/G	6 times			▲▲			▲▲			▲▲						
Schedule for CGD (Tentative)	12 times	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫			

Site Visit to Bali Beach Conservation Project

1) Purpose

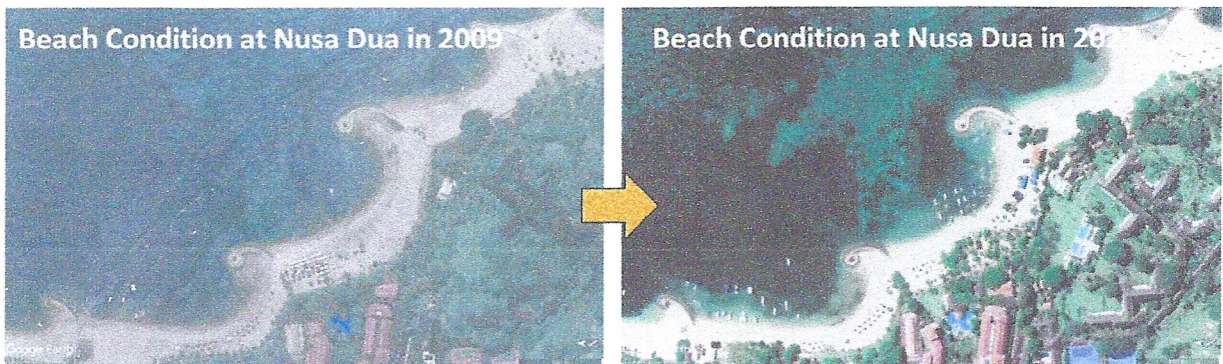
- To enhance understanding of coastal conservation measure with harmonization of "protection", "utilization", "environment", and adaptive management.
- To exchange opinions with executed Project Management Unit (BBWS)

2) Estimated Schedule

- May in 2023 (about for 3 days)

3) Members

- 2 officials from PUPR
- 2 officials from KKP
- 2 officials from KLHK
- JICA Study Team
- (JICA Technical Adviser, but not decide yet)



Appendix 4

Attendance List:

No	Name	Institutions/ Division	Position	Remarks
PUPR – DG of Water Resources				
1	A. Zubaidi	PUPR	Directorate of Rivers and Coasts	
2	Anggun Etika P.		Directorate of Rivers and Coasts	
3	Nimas Ayu		Directorate of Rivers and Coasts	
4	Wachidah N.		Directorate of Rivers and Coasts	
5	Mukhlis Arief Irvandi		Directorate of Rivers and Coasts	
6	Sevi Inasih		Directorate of Rivers and Coasts	
7	Paula Swastika		Directorate of Rivers and Coasts	
8	Nadia Salsabila		Directorate of Rivers and Coasts	
9	Jonathan Sebastian E. H.		Directorate of Rivers and Coasts	
10	Ersty Nurul		Directorate of Rivers and Coasts	Online
11	Abdul Hanif F.		Directorate of Rivers and Coasts	Online
12	Bagas M.		Directorate of Rivers and Coasts	Online
13	Thomson		Directorate of Rivers and Coasts	Online
14	Hatta Putra		Directorate of Rivers and Coasts	Online
15	Wahyu		Directorate of Rivers and Coasts	Online
16	Rahmad A.		Directorate of Rivers and Coasts	Online
17	Yuddi Yudistira		Directorate of Rivers and Coasts	Online
18	Farhan Putra Riyadi		Directorate of Rivers and Coasts	Online
19	Anthony Harlly Sasono		Directorate of Rivers and Coasts	Online
20	Willy Lucyta Nugraha		Directorate of Rivers and Coasts	Online
21	Muhammad Nur Azmi		Directorate of Rivers and Coasts	Online
22	Gauri A. Kartika		Directorate of Water Resources Management System and Strategy	
23	M. Arsy D.	Directorate of Water Resources Management System and Strategy		
24	Mariyanti Sabuna	Directorate of Water Resources Management System and Strategy	Online	
25	Muhammad Fauzi	Directorate of Water Resources Engineering Development	Online	
26	Irham Adrie Hakiki	Balai Teknik Pantai	Online	
27	Willy Raharjo	BBWS Citarum	Online	
28	Uki	BBWS Cimanuk Cisanggarung	Online	
29	Dewi Shinta Rulisyani	BBWS Pemali Juana	Online	
30	Fuad	BBWS Pemali Juana	Online	
31	Yulius	BBWS Pemali Juana	Online	
32	Sugeng Wiratna	BBWS Bengawan Solo	Online	
33	Riana	KLHK	Directorate of Regional and Sectoral Policy of Environmental Impact Prevention	Online
34	Mohammad Irfan Saleh	BAPPENAS	Directorate of Water Resources	Online
35	Ewin Sofian Winata		Directorate of Water Resources	Online
36	Siti Amira		Directorate of Water Resources	Online
37	Eva Afifah		Directorate of Water Resources	Online
38	Dian Azmi		Directorate of Water Resources	Online
JICA (Japan International Cooperation Agency)				
39	Mr. Ono	JICA Indonesia		
40	Ms. Kashihara	JICA Indonesia		
41	Ms. Hastin Dian	JICA Indonesia		
42	Mr. Kikuta	JICA Expert		
JICA Study Team				
43	Mr. Onaka	Team Leader		
44	Mr. Ichikawa	Deputy Team Leader		
45	Mr. Endo	Team member		
46	Mr. Takagi	Team member		

No	Name	Institutions/ Division	Position	Remarks
47	Mr. Yonekura	Team member		
48	Mr. Mori	Team member		
49	Mr. Ochi	Team member		
50	Mr. Yamanami	Team member		
51	Mr. Kurata	Team member		
52	Mr. Higashiguchi	Team member		
53	Ms. Ueda	Team member		
54	Mr. Murakami	Team member		
55	Ms. Yohana	Local Staff		
56	Ms. Yuniar	Local Staff		
57	Ms. Amalia	Local Staff		

**MINUTES OF MEETING
ON
PROJECT FOR COASTAL DISASTER RISK REDUCTION PLAN STUDY
ON THE NORTH JAVA ISLAND**

AGREED UPON BETWEEN

**AUTHORITIES CONCERNED IN INDONESIA
AND
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
PROJECT TEAM OF JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA STUDY TEAM)**

Jakarta, January 19, 2024

大 中 望

Mr. Susumu ONAKA
Team Leader/Coastal Disaster Risk Reduction Plan
Study JICA Study Team



Dr. Dwi Purwanto, S.T., M.T
Director of Rivers and Coasts, DGWR
Project Manager of the Project



Witnessed by:

小 野 望

Mr. Nozomu ONO
Representative
JICA Indonesia Office

In response to the official request submitted by the Indonesian Government, the Record of Discussion (hereinafter referred to as “R/D”) on PROJECT FOR COASTAL DISASTER RISK REDUCTION PLAN STUDY ON THE NORTH COAST OF JAVA ISLAND (hereinafter referred to as “the Project”) was signed on March 31, 2022 between the Indonesian Side (Ministry of Public Works and Housing, hereinafter referred to as “PUPR”) and Japan International Cooperation Agency (hereinafter referred to as “JICA”) (collectively hereinafter referred to as “Both Parties”). Based on the R/D, the Project commenced on June 17, 2022. In accordance with the Implementation Schedule of the Project, the Second Joint Coordinating Committee (hereinafter referred to as “2nd JCC”) was held on January 19, 2024 and had a series of discussions for obtained outputs by the JICA Study Team (hereinafter referred to as “JST”) until this period and further required actions by the end of the Project. The meeting had presentation from JST on 1) Confirmation on Obtained Outputs (until January 2024) and 2) Further Required Actions by the end of the Project (June 2024).

In the course of discussions, all the participants confirmed the main items on the 2nd JCC given in Appendix 1.

Appendix 1: Main Points Confirmed

Main Points Confirmed

1. Confirmation on Obtained Outputs (until Jan. 2024)

Output 1: Draft of Basic Policy for Coastal Management

- JST has already prepared and submitted the draft of Basic Policy for Coastal Management for both English and Indonesian versions and idea for legalization based on the discussions through the Working Group (hereinafter referred to as W/G)

Output 2: Draft of “Basic Coastal Management Plan”

- Three areas were selected as target area for developing the draft of basic coastal management plan, which are Area I: Indramayu (about 100 km coastal length), Area II: Pemalang - Pekalongan (about 46 km) and Area III: Rembang – Tuban (52 km) and agreed with JCC members in the 1st JCC.
- JST has prepared and presented the basic procedure for preparation of the Basic Coastal Management Plan, which is expected to be prepared by the Government of Indonesia (hereinafter referred to as “GOI”) extensively, following this Projects.
- JST has prepared and presented the recommended Basic Coastal Management Plan for selected three areas, considering coastal physical characteristics, current condition and urgency, utilization of coastal area and hinterland, etc. as the case study.
- Also, the required structures and action for issuing of the Basic Coastal Management Plan has been discussed through W/G based on the basic idea prepared by JST.

Output 3: Coastal Facility Plan at Selected Sections

- Three sections (2 sections in Area I and 1 section in Area II) were selected as study area for preparation of coastal facility plan through the Close Group Discussions (CGD).
- Both parties (PUPR and JICA) were agreed to add one more section at neighboring coastal area in Area III with about 18 km, taking into account strong request from the PUPR and importance on protection at this coast (refer to Attachment (b), p 56).
- JST has prepared and presented the recommended Coastal Facility Plan for selected four sections and continued to discuss with PUPR about the contents of proposed measures as well as prioritization of each section, construction cost and formulation as loan project.

Output 4: Technical Transfer / Capacity Development

- Understanding of the idea and procedure for coastal management system for the members of W/G based on those in Japan has been enhanced through several opportunities of discussions in W/G and CGD.
- Understanding of coastal protection measures with harmonizing environment and utilization, and management issues afterward has been enhanced by the training program of coastal conservation project in Bali Island (BBCP1 & 2) and JICA Knowledge Co-Creation Program on Sustainable Coastal Protection Measures in Japan

Output (Additional): Preliminary Study at Sayung Area in Demak

- Preliminary Study at Sayung Area in Demak was conducted following the amended R/D (signed by both parties on 17 February 2023). The study result was presented to PUPR and BAPPENAS on 19 October 2023 and the final output will be submitted as the part of final report.

2. Further Required Actions by the end of the Project (June 2024)

Basic Policy for Coastal Management

- The W/G members in Indonesia shall continue to discuss for finalization of the contents of Basic Policy for Coastal Management and its legislation based on the proposed idea by JST. Finalization of the contents shall be completed by the end of the Project, and the action plan toward the legislation shall be discussed and agreed in the final 3rd JCC which will be scheduled in May or June of 2024.
- JST will continue to support above actions as required by the end of the Project.

Basic Coastal Management Plan

- The W/G members in Indonesia shall review and provide their comments for the draft of basic coastal management plan at three sites recommended by the JST for finalization. The JST shall update/revise the draft of basic coastal management plan at three areas based on the comment from the W/G members by the end of the Project.
- The W/G members in Indonesia shall prepare the roadmap to roll up the preparation of Basic Coastal Management Plan to other main islands (as stated in the draft of Basic Policy for Coastal Management) in Indonesia.
- JST will continue to support above actions as required by the end of

the Project.

Coastal Facility Plan at Selected Sections

- PUPR (including each BBWS in the target sites) shall provide further information regarding unit price of each construction item for coastal facilities, procurement of construction materials such as sand, rock, etc. and review the draft of construction cost prepared by JST. JST shall continue to update the prepared coastal facility plan based on such information.
- As a part of technical transfer, PUPR will arrange and conduct stakeholder meeting to exchange opinion for the Coastal Facility Plan at selected four sections with relevant stakeholders, which will be conducted on January and February 2024 (refer to Attachment (b), p 72-74).
- PUPR will take necessary actions for the formulation of coastal protection project on the north coast of Java Island as loan project based on the prepared coastal facility plan.

Others

- GOI shall reflect the contents proposed in the Project (refer to Attachment (b), P 6-7) into RPJMN (2025 – 2029) to establish and develop the sustainable coastal management system to achieve the mid- and long-term coastal protection/conservation with harmonizing environment and utilization. This procedure shall be done by GOI, cooperating with related stakeholders taking into account the condition of coastal development.

(End of document)

Attachment:

- (a) Attendance List
- (b) Presentation Materials of 2nd JCC

Attachment a: Attendance List:

No	Name	Institutions/ Division	Remarks
PUPR – DG of Water Resources			
1	Leo Eliasta	Direktorat Sungai dan Pantai, PUPR	Offline
2	Anggun Etika P.	Direktorat Sungai dan Pantai, PUPR	Offline
3	Nimas Ayu	Direktorat Sungai dan Pantai, PUPR	Offline
4	Sudarto	Balai Teknik Pantai	Offline
5	Bayu	Balai Teknik Pantai	Offline
6	Sevi Inasih	Direktorat Sungai dan Pantai, PUPR	Offline
7	Paula Swastika	Direktorat Sungai dan Pantai, PUPR	Offline
8	Nadia Salsabila	Direktorat Sungai dan Pantai, PUPR	Offline
9	Jonathan Sebastian E. H.	Direktorat Sungai dan Pantai, PUPR	Offline
10	Ersty Nurul	Direktorat Sungai dan Pantai, PUPR	Offline
11	Abdul Hanif F.	Direktorat Sungai dan Pantai, PUPR	Offline
12	Mukhlis Arief Irvandi	Direktorat Sungai dan Pantai, PUPR	Offline
13	Firlana Hanifah	Direktorat Sungai dan Pantai, PUPR	Offline
14	Hatta Putra	Direktorat Sungai dan Pantai, PUPR	Online
15	Wahyu	Direktorat Sungai dan Pantai, PUPR	Online
16	Rafika S.D	Direktorat Sungai dan Pantai, PUPR	Offline
17	Asyifa Nur Hendina	Direktorat Sungai dan Pantai, PUPR	Offline
18	Farhan Putra Riyadi	Direktorat Sungai dan Pantai, PUPR	Offline
19	Anthony Harlly Sasono	Direktorat Sungai dan Pantai, PUPR	Online
20	Juan Talitha	Direktorat Sungai dan Pantai, PUPR	Offline
21	Silmi F. R	Direktorat Sungai dan Pantai, PUPR	Offline
22	Galih Wijaya	Direktorat Sungai dan Pantai, PUPR	Offline
23	Handayani Lestari	Direktorat Sistem dan Strategi Pengelolaan Sumber Daya Air, PUPR	Offline
24	Dery Uristy	Direktorat Sungai dan Pantai, PUPR	Offline
25	Tonigar Murizwa	Direktorat Sungai dan Pantai, PUPR	Online
26	Irham Adrie Hakiki	Balai Teknik Pantai	Offline
27	Ervan	BBWS Citarum	Online
28	Heri Suherlan	BBWS Citarum	Online
29	Tri Wijayanto	BBWS Cimanuk Cisanggarung	Online
30	Heni Krisyani	BBWS Pemali Juana	Online
31	Winda	BBWS Bengawan Solo	Online
32	Bangda	Kementerian Dalam Negeri	Online
33	Sani Satya	Bappeda Jawa Barat	
34	Nita Juwita P	Bappeda Jawa Tengah	
35	Dimas Baskoro	Direktorat Pencegahan Dampak Lingkungan Kebijakan Wilayah dan Sektor, KLHK	Online
36	Fina Ardarini	Kementerian Kelautan dan Perikanan	Offline
37	Giri Wilisandy	Kementerian Kelautan dan Perikanan	Offline
38	Mohammad Irfan Saleh	Direktorat Sumber Daya Air, BAPPENAS	Online
39	Ewin Sofian Winata	Direktorat Sumber Daya Air, BAPPENAS	Online
40	Siti Amira	Direktorat Sumber Daya Air, BAPPENAS	Offline
41	Aswin Al Farisi	Direktorat Sumber Daya Air, BAPPENAS	Offline
42	Heny Susilowati	ATR/BPN Wilayah I, Dit Bina Pengadaan dan Pencadangan Tanah	Offline
43	Kemal Syan	ATR/BPN Wilayah I, Dit Bina Pengadaan dan Pencadangan Tanah	Offline
JICA (Japan International Cooperation Agency)			
44	Ms. Kashihara	JICA Indonesian Office	Offline
45	Ms. Hastin Dian	JICA Indonesian Office	Offline
46	Mr. Yamamoto	JICA Expert	Offline
47	Ms. Dyas	JICA Expert	Offline
JICA Study Team			
48	Mr. Onaka	JICA Study Team	Offline
49	Mr. Ichikawa	JICA Study Team	Offline
50	Mr. Endo	JICA Study Team	Offline
51	Mr. Takagi	JICA Study Team	Online
52	Mr. Yonekura	JICA Study Team	Online

53	Mr. Mori	JICA Study Team	Offline
54	Mr. Takao	JICA Study Team	Offline
55	Mr. Higashiguchi	JICA Study Team	Offline
56	Mr. Miyagawa	JICA Study Team	Offline
57	Mr. Murakami	JICA Study Team	Offline
58	Mr. Azka	JICA Study Team	Offline
59	Ms. Shinta	JICA Study Team	Offline
60	Ms. Yohana	JICA Study Team	Offline



2nd Meeting of Joint Coordination Committee (JCC)

2024. 1.19

JICA Study Team

Contents of Presentation

1. Main Agenda of 2nd JCC
2. Overview of the Project
3. Selection of Three Priority Areas
4. Basic Policy for Coastal Management
5. Basic Coastal Management Plan for Selected 3 Areas
6. Coastal Facility Plan for Selected Sections
7. Technical Transfer & Capacity Development
8. Main Points to be Confirmed

2

1. Main Agenda of 2nd JCC

- 1) To confirm outputs in the Project until now
- 2) To confirm remaining issues and action take for PUPR, other agencies and JST by the end of the Project

3

2. Overview of the Project

4

Coastal Issues at the North Coast of Java Island

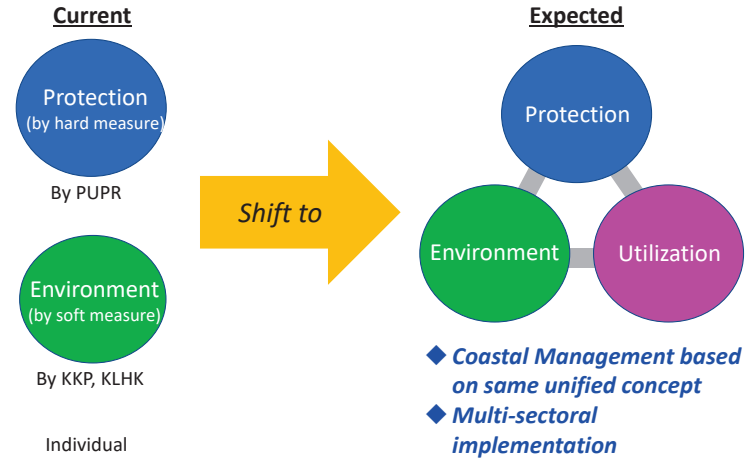
- ◆ Most of coastal area has been developed as the areas of infrastructural (port), residential, agricultural, fishery and also industrial area.
- ◆ Coastal disaster and degradation such as coastal erosion, tidal flooding and land subsidence, large-scale of topography change and sedimentation at river basin, were identified at north coast of Java Island.
- ◆ Comprehensive and integrated viewpoints on coastal management with harmonizing "Protection", "Environment" and "Utilization" are not considered sufficiently in Indonesian coastal management (most projects seems "localized" and "individual")
- ◆ Coastal protection/conservation measures have been implemented basically by each ministry individually based on each ministry's mandate.



It is important to realize the coastal management based on comprehensive & integrated coastal management plan with understanding of coastal process, mechanism and above 4 points of view.

5

Expected Goal for Coastal Management in Indonesia

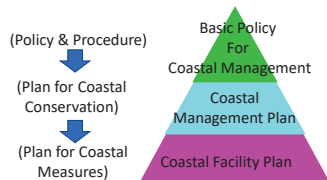


6

Objective of the Project

To prepare

1. Draft of **Basic Policy for Coastal Management**
2. Draft of **Basic Coastal Management Plan**
3. Plan for **Coastal Facility Plan** as Pre-F/S level at selected sections from 3 priority areas

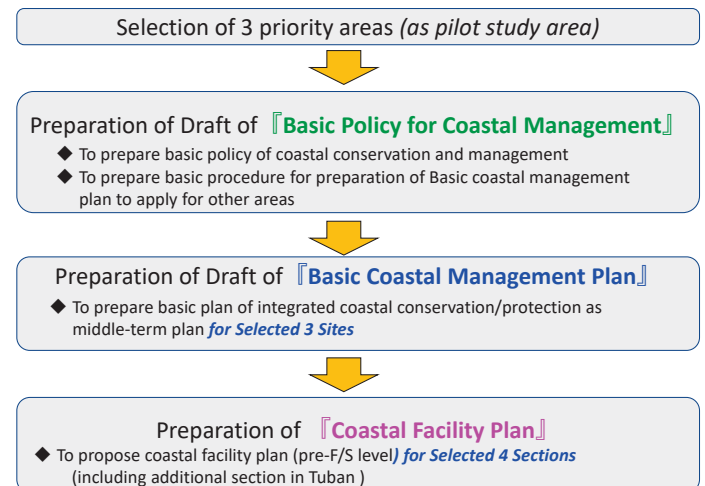


Important Pont is...

Prepared **Coastal Facility Plan** and **Basic Coastal Management Plan** shall be considered harmonization of "Coastal Protection", "Environment" and "Utilization"

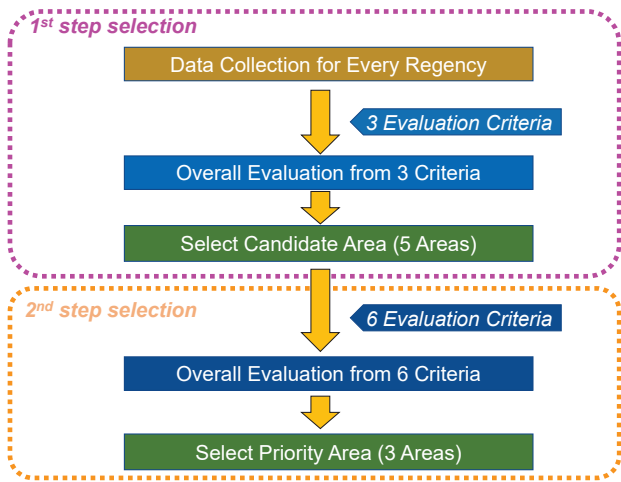
7

Procedure of this Study



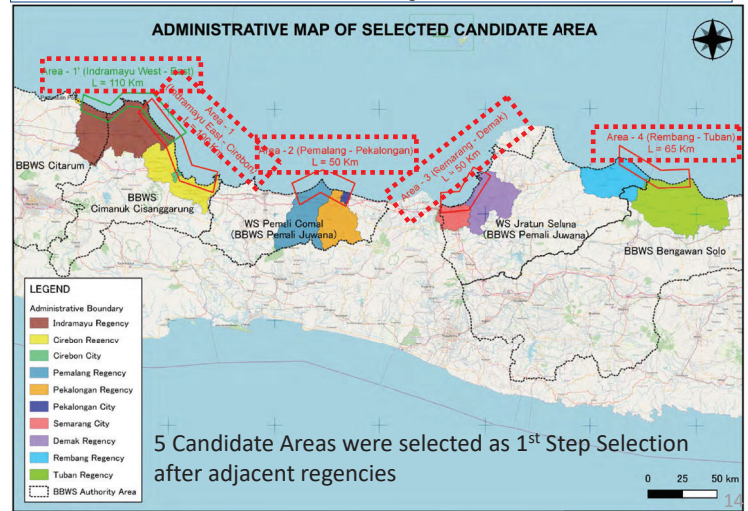
8

Procedure for Selection of 3 Priority Areas

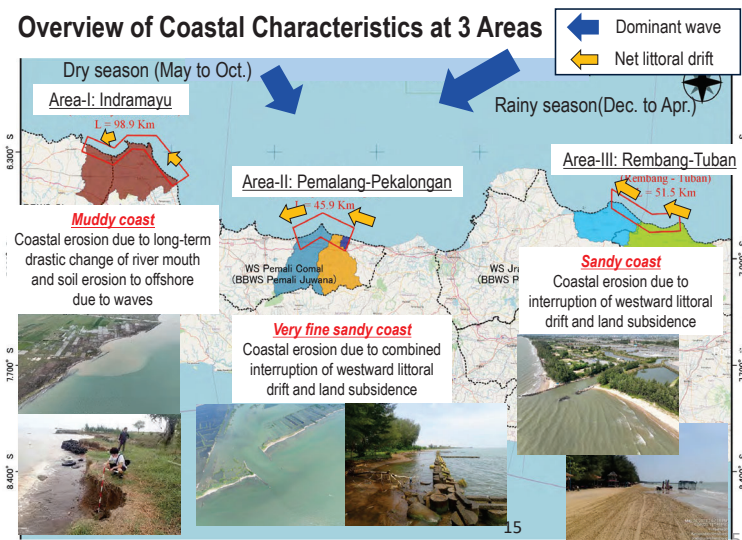


13

Result of 1st Step Selection



Overview of Coastal Characteristics at 3 Areas



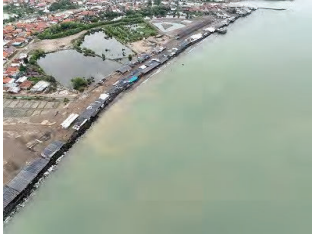
15

Area I: Indramayu (west) (2022.10.9)



16

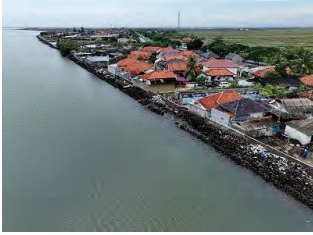
Area I: Indramayu (west) (by Drone, 2022.8.9)



Beach Condition at Domestic Tourism Area



Silt Diffusion due to Land Erosion



Protection Measure (by line) at Residential Area



Protection Measure (Mangrove Plantation) at Fish Pond

Area II: Pekalongan (2022.10.9)



On-going Protection Measures by Province



On-going Protection Measures by Province



Increased of Crown Height as Protection Measures by Province



Increased of Crown Height as Protection Measures by Province

Area II: Pekalongan (by Drone, 2022.10.9)



Coastal Use at Urban Area



Coastal Protection at Urban Area (Line Protection)

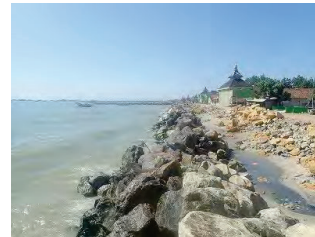


Coastal Protection at Urban Area (Line Protection)

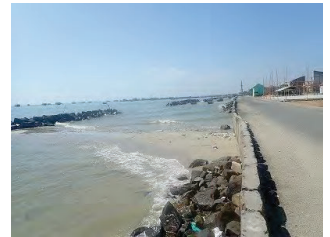


Coastal Protection at Urban Area (Line Protection)

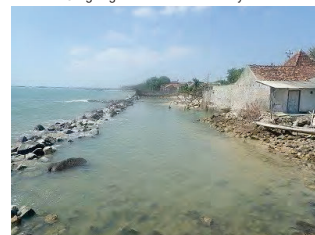
Area III: Rembang (2022.8.9)



On-going Protection Measure by BBWS



Offshore Breakwaters



Coastal Condition at Down-drift Side



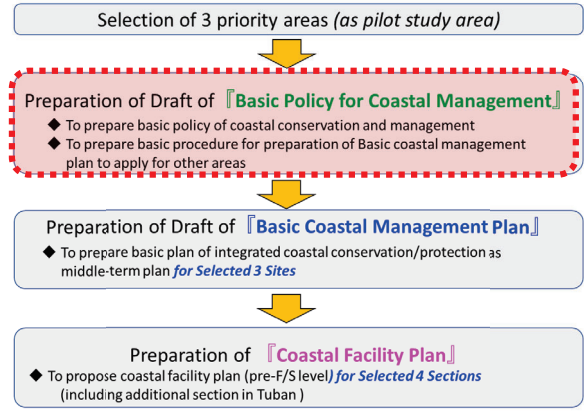
Coastal Condition at Down-drift Side

Area III: Rembang (by Drone, 2022.8.9)



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4. 『Basic Policy for Coastal Management』

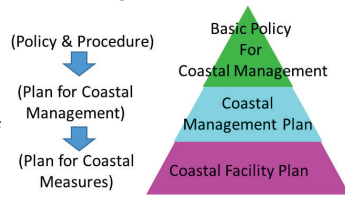


22

Objective & Position of 『Basic Policy for Coastal Management』

Objective

- ◆ To state clearly the basic policy on coastal management for planning of coastal management in Indonesia (especially for main islands)
- ◆ To define the basic procedure for preparation of Basic coastal management plan



Basic Policy is basis for coastal management **with unified concept to Multi-sectors** who are in charge of coastal management & implementation

Legalization is required to comply this basic policy

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Table of Contents of Basic Policy in Indonesia

I. Objective of “Basic Policy for Coastal Management”

II. Definition and Basic Role on “Basic Coastal Management Plan”

Clause 1 Basic Guidelines for Coastal Management

- 1 Basic philosophy of coastal management
- 2 Direction of coastal management
- 3 Direction of implementation of coastal facilities
 - 3.1 Direction on new implementation or improvement of coastal protection/conservation facilities
 - 3.2 Direction on maintenance or repair of coastal protection/conservation facilities
- 4 Other considerations on coastal management
 - 4.1 Promotion of initiatives from a broad and comprehensive perspective
 - 4.2 Promotion of cooperation with local communities and raising awareness of coastal conservation
 - 4.3 Promotion of research, studies and monitoring

Clause 2 Division of Area for Preparation of Basic Coastal Management Plan

Clause 3 Basic Items for Preparation of the Basic Coastal Management Plan

- 3.1 Basic items to be included into the Basic Coastal Management Plan
 - (a) Basic items concerning Coastal Management
 - (b) Basic items concerning implementation of Coastal Facilities
- 3.2 Important items to be considered into the Basic Coastal Management Plan
 - (a) Insurance of consistency with relevant development plans
 - (b) Cooperation and coordination with relevant administrative agencies
 - (c) Participation of residents and information disclosure
 - (d) Review of plan and revision properly

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Essence of Basic Policy for Coastal Management

I. Objective of “Basic Policy for Coastal Management”

- To provide the principles on coastal **management, development and conservation** toward achieving the realization of desirable future vision of the coast of Indonesia, **along with its continuous coastal development**

II. Definition and Basic Role on “Basic Coastal Management Plan”

- Defining the basic terms required for the Basic Coastal Management Plan
- Clarifying the relevant agencies responsible for establishing and enacting the Basic Coastal Management Plan

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Essence of Basic Policy for Coastal Management

Clause 1 Basic Guidelines for Coastal Management

Basic philosophy of coastal management

- **Achieving coastal protection and conservation harmonizing with coastal utilization and coastal environment**, and passing on the coast as national asset to the next generation **(Necessary to be determined by Indonesia)**

Direction of coastal management

- Ensuring appropriate protection levels against disasters
- Promoting conservation and creation of coastal environment that coexist with nature
- Promoting proper coastal utilization by public
- Ensuring appropriate maintenance and repair of coastal facilities **to maintain their functions**

Measures to achieve the direction of coastal management

- Promotion of development of safer coast
- Promotion of measures for the conservation of nature-rich coast, **and their creation as required**
- Promotion of measures for the beloved coast
- Promotion of implementation of planned and effective maintenance and repair of coastal facilities

Other considerations on coastal management

- Promotion of initiatives from a broad and comprehensive perspective
- Promotion of cooperation with local communities and raising awareness of coastal conservation
- Promotion of research, studies, and **monitoring**

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Essence of Basic Policy of Coastal Management

Clause 2

Division of Area for Preparation of Basic Coastal Management Plan

- **Five main Islands (Sulawesi, Kalimantan, Java, Papua, Sumatra) and two island-group (Maluku Islands and Nusa Tenggara)**

Clause 3

Basic Items for Preparation of the Basic Coastal Management Plan

- Current status of the coast and the direction of coastal conservation
- Items related to coastal protection
- Items related to the management, maintenance and conservation of the coastal environment
- Items related to proper public utilization of the coast
- Items related to new development or repair of coastal facilities
- Items concerning the maintenance or repair of coastal facilities
- Other important items to be considered in the Basic Coastal Management Plan

27

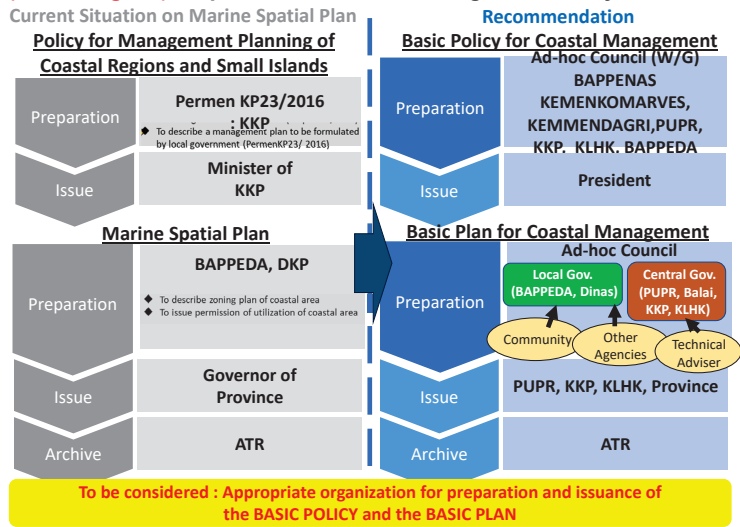
Required Action of Indonesian side for Finalization & Issuing of Basic Policy

- ◆ JICA Study Team has prepared the draft of “Basic Policy for Coastal Management” with discussions of Indonesian side. We will share the final draft.
- ◆ What to do next based on this idea is up to Indonesian opinion and action
- ◆ Further required actions are Finalization and Issuing of “Basic Policy for Coastal Management”, and preparation of coastal management plan (M/P) for other coasts not only for the north of Java coast but also for other main islands
- ◆ We recommend to conclude the authorization through further discussion in the Ad-hoc Council (like this W/G)

(Material for 3rd W/G)

28

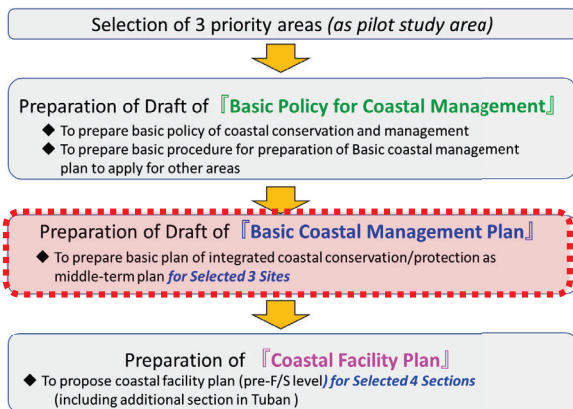
(Draft Image of) Preparation of Coastal Management Policy and Plan



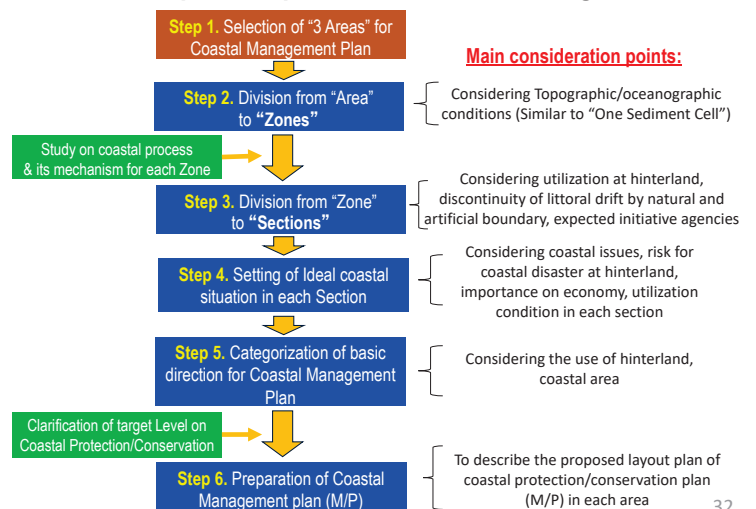
Legal Form of the Basic Policy for Coastal Management

	Legal Form	Option of Legal Form for the Basic Policy for Coastal Management
1	Law/ Undang-Undang (UU)	
2	Government Regulation in Lieu of Law/ Peraturan Pemerintah Pengganti Undang – Undang (Prp)	
3	Government Regulation / Peraturan Pemerintah (PP)	Option 1 : Develop new policy under existing law
4	Presidential Decree / Peraturan Presiden (Perpres)	Option 2 : Develop new policy under existing law Option 3 : Integrate the policy into existing policy “Perpres 37 / 2023 about National Water Resource Policy”
5	Ministerial Decree / Kaptusan Menteri Negara (Kepmen)	Option 4 : Develop New Policy by the name of related minister (PUPR, KKP and KLHK) like Japanese coastal management policy.
6	Ordinance / Peraturan Daerah (Perda)	

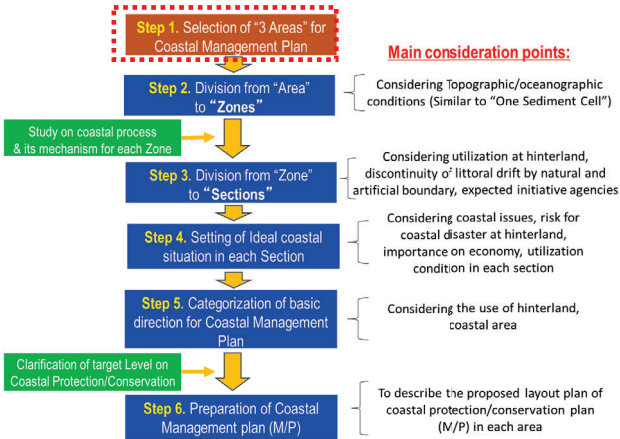
5. 『Basic Coastal Management Plan』



Procedure Step for Preparation of Coastal Management Plan

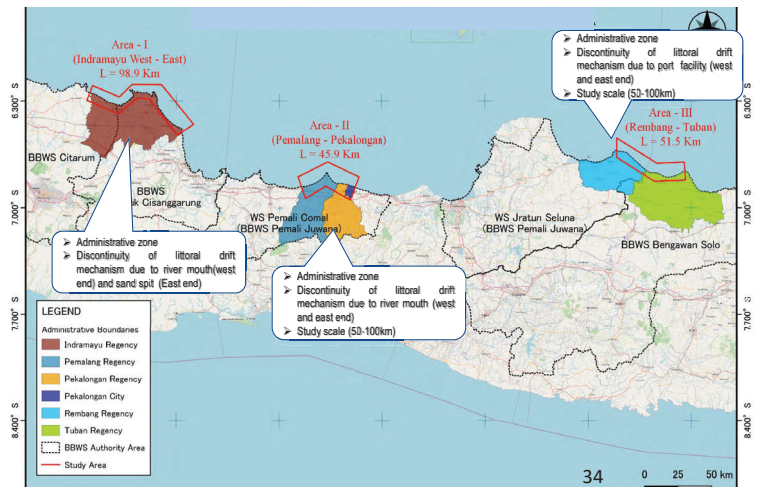


Step 1. Selection of "3 Areas" for Coastal Management Plan (just remained)

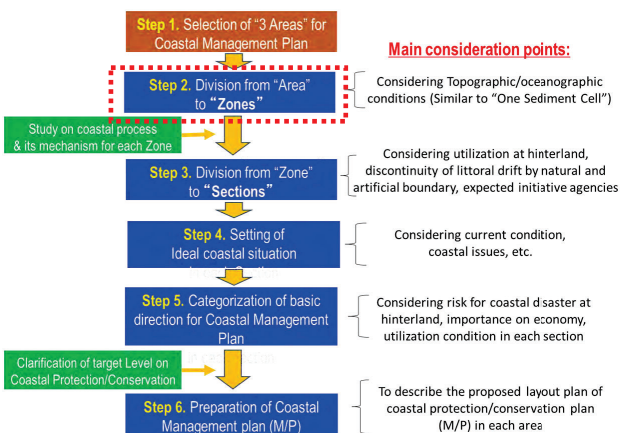


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Selection of "3 Areas" for Coastal Management Plan

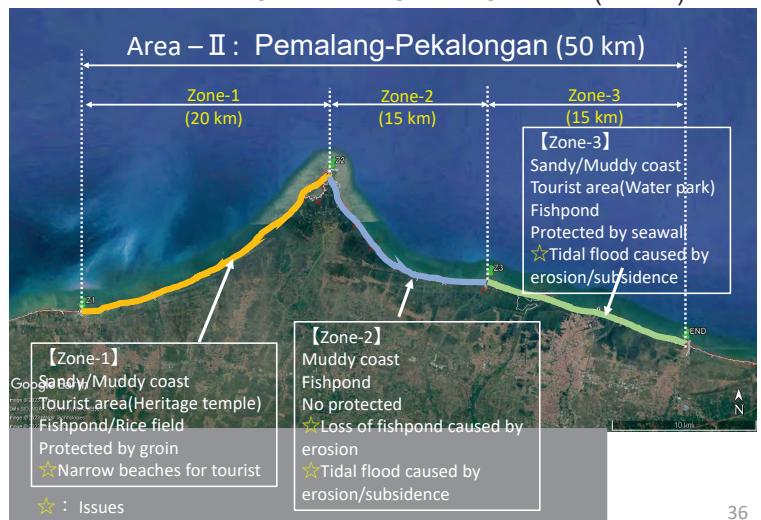


Step 2. Division from "Area" to "Zones" (just remained)



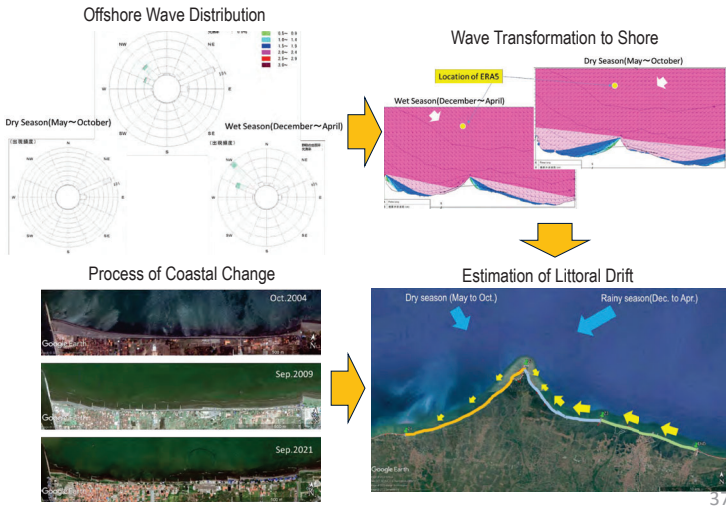
35

Zone Division and Overview of Coastal Condition (Area-II)

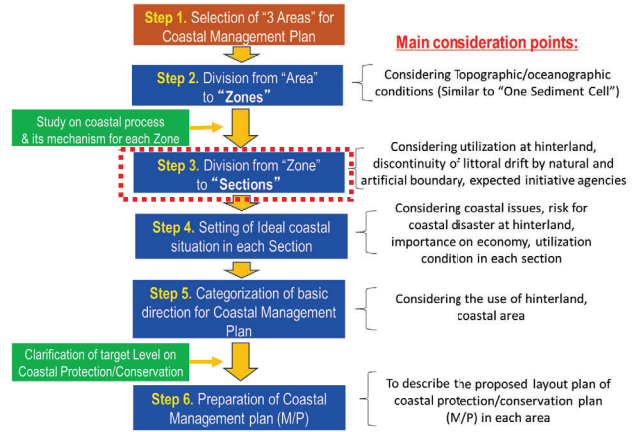


36

Overview of Coastal Mechanism (Area-II)



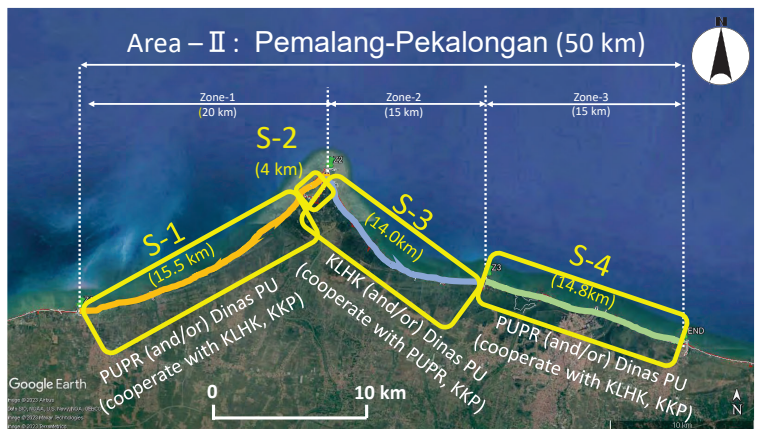
Step 3. Division from “Zone” to “Sections”



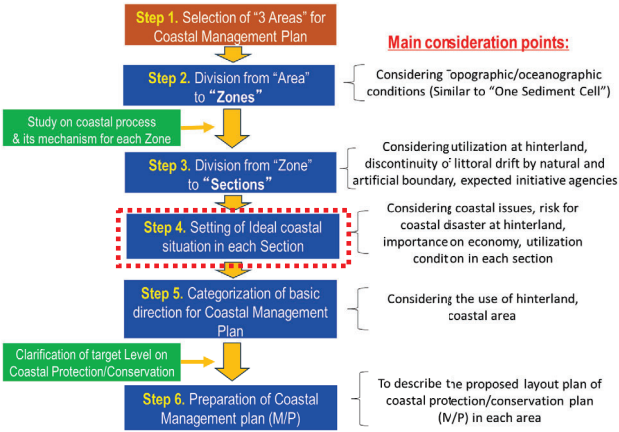
Idea for Initiative Agencies to prepare Coastal Management Plan

Type of land utilization at hinterland	Agencies who have to mainly consider management plan
Tourism Area (except mangrove eco-tourism)	PUPR, (DINAS PU)
Residential Area	
Agricultural Area (Farm)	
Fishery Port Area	KKP
Agricultural Area (Salt Farm, Fishpond)	
Natural Forest (Mangrove) Protection Area (include mangrove eco-tourism/ Mangrove restoration area in Mangrove Rehabilitation Program)	KLHK
Industrial and/or Commercial Port Area	Private, Pelindo, etc.

Section Division and Proposed Initiative Agencies to prepare Coastal Management Plan



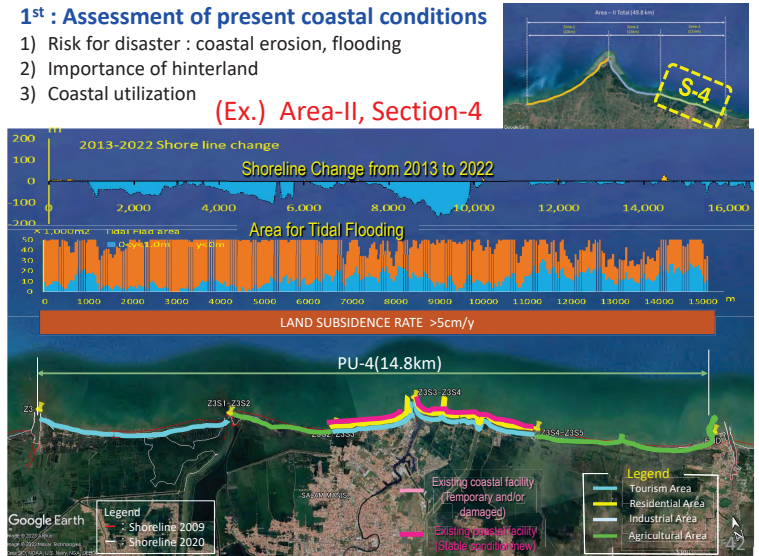
Step 4. Setting of Ideal Coastal Situation



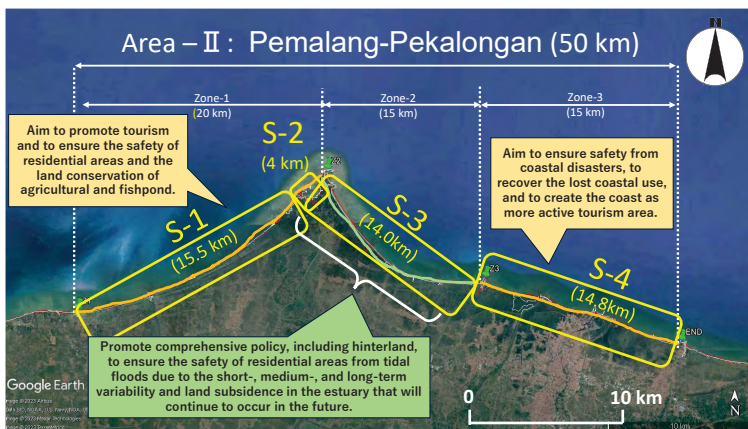
1st : Assessment of present coastal conditions

- 1) Risk for disaster : coastal erosion, flooding
- 2) Importance of hinterland
- 3) Coastal utilization

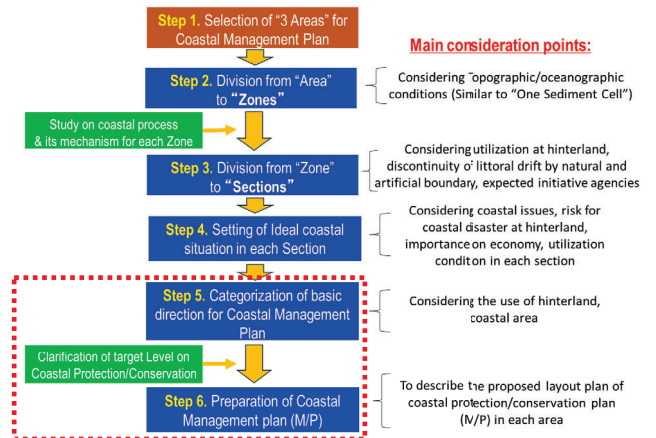
(Ex.) Area-II, Section-4



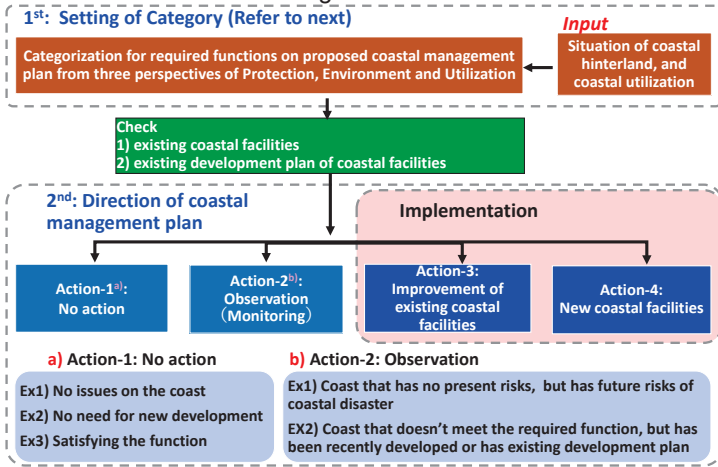
Ideal Coastal Situation (Area-II)



Step 5. Categorization of Basic Direction for Coastal Management Plan



Procedure for Categorization of Basic Direction for Coastal Management Plan



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1st : Setting Category for required functions on proposed coastal management plan

✓ Setting four (4) types of Categories to each coast

Category 1	Category 2	Category 3	Category 4
Necessity for "Protection"	Necessity for "Protection" and "Environment"	Necessity for "Protection" and "Utilization"	Necessity for "Protection", "Utilization" and "Environment"

✓ Examine cases where each function is required for each coast.

	Coasts where each function required	Examples
Protection	Coast with high risks of coastal disaster	(ex.) high risk of coastal erosion and/or coastal flooding
Environment	Coast with environmental protection area	-
	Coast with good ecosystem and landscape	(ex.) Coast that requires conservation of sandy beach, mangrove forest, coral reefs
Utilization	Coast with current demand of coastal utilization	(ex.) Coast that is used as local tourism area
	Coast with potential demand of coastal utilization	(ex.) Coast where future coastal demand is anticipated due to the use of the hinterland such as coastal areas of urban area

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1st : Setting Category for required functions on proposed coastal management plan

✓ Examples classified in each category

Category is set considering utilization condition of hinterland and coastal area

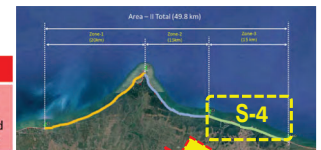
Category (Required function)	Examples
Category-1 (Protection)	(ex.) Residential area and agricultural area that doesn't necessarily require coastal utilization.
Category-2 (Protection, Environment)	(ex.) Protected area (by KKP, KLHK, local government, etc.)
Category-3 (Protection, Utilization)	(ex.) Residential area that requires coastal utilization, tourism area
Category-4 (Protection, Utilization, and Environment)	(ex.) High-tourism area, Eco-tourism area

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1st : Setting of Category

(Ex.) Area-II, Section-4

Category 1	Category 2	Category 3	Category 4
Necessity for "Protection"	Necessity for "Protection" and "Environment"	Necessity for "Protection" and "Utilization"	Necessity for "Protection", "Utilization" and "Environment"







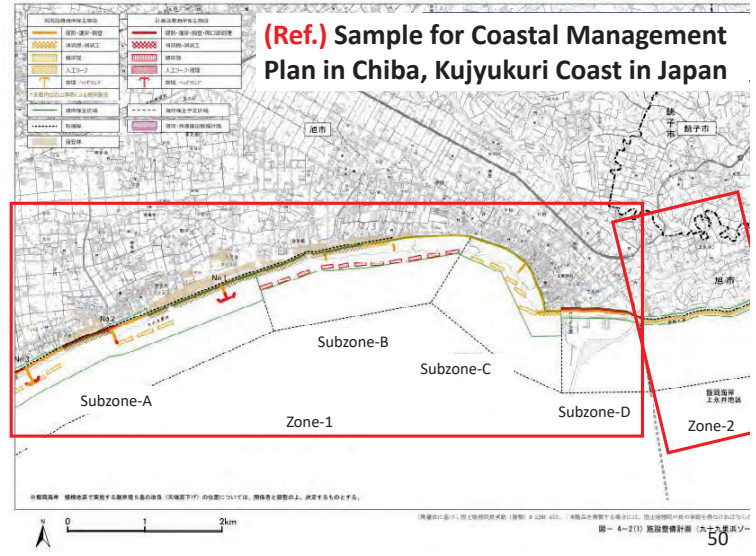
48

2nd : Direction of coastal management plan

Common measures for each Categories

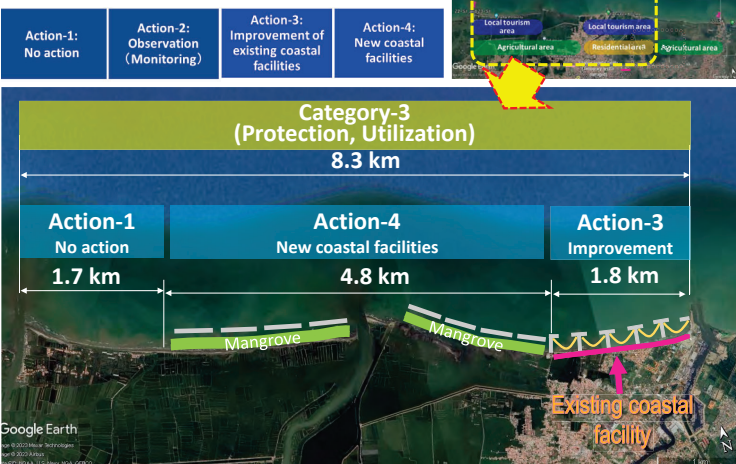
coastal measure	Categories for required functions			
	Cat.1 Protection	Cat.2 Protection Environment	Cat.3 Protection Utilization	Cat.4 Protection Utilization Environment
1 Hard (Structure) measure (Revetment, groin)				
2 Green measure (Mangrove plantation, Coral transplantation)				
3 Soft measure (Beach nourishment)				
4 Combination (hard, soft, green, gray measures)				

1. Hard (Structure)	2. Green measure	3. Soft measure	4. Combination
			



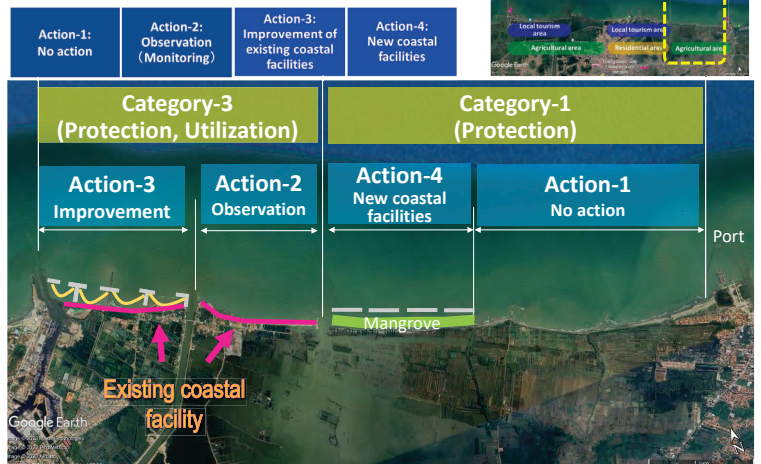
2nd : Direction of coastal management plan

(Ex.) Area-II, Section-4 (West side)

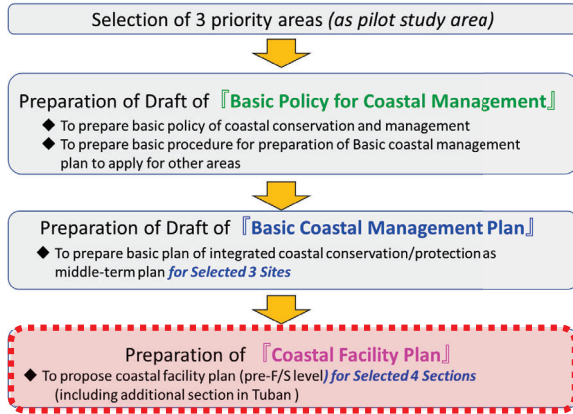


2nd : Direction of coastal management plan

(Ex.) Area-II, Section-4 (East side)

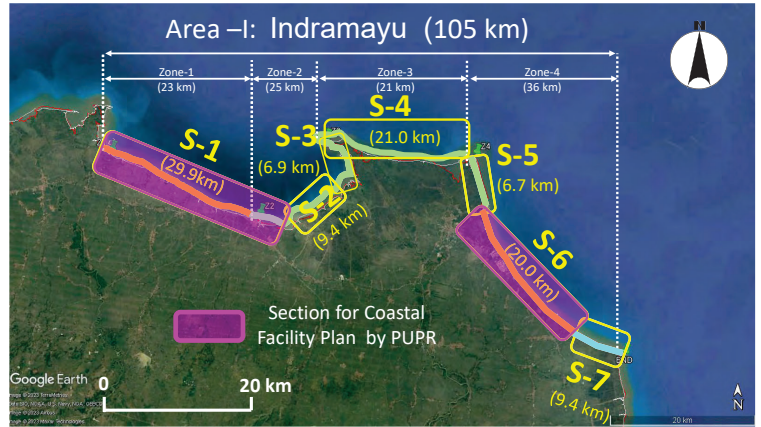


6. 『Coastal Facility Plan』



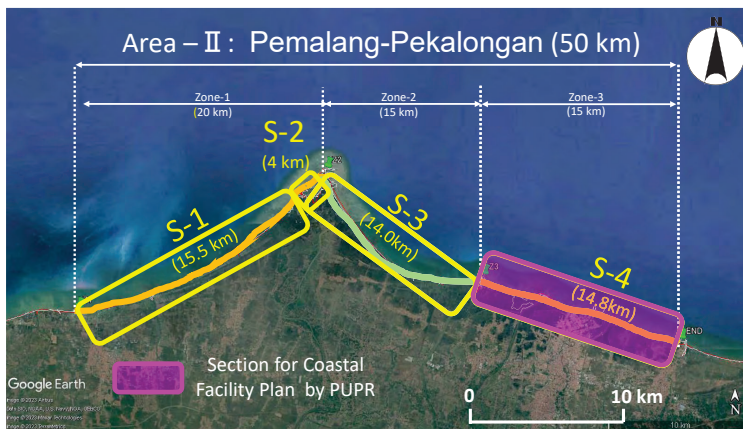
53

Sections for Coastal Facility Plan (Area-I)



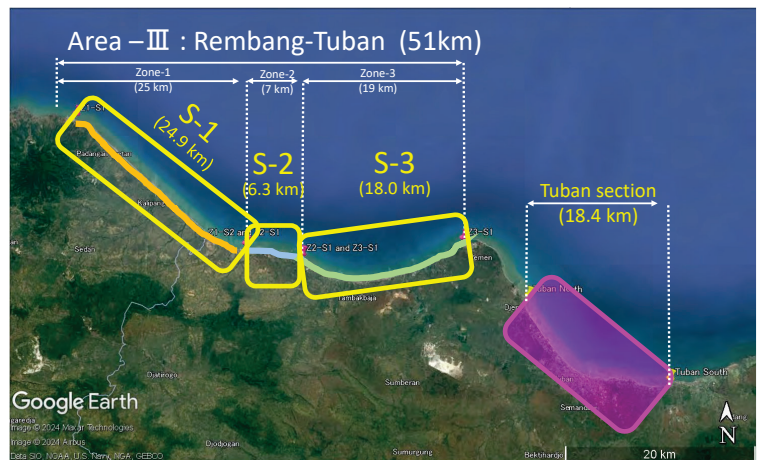
54

Sections for Coastal Facility Plan (Area-II)



55

Sections for Coastal Facility Plan (Additional Tuban Section)



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Facility Plan Example
Area-I, S-1a

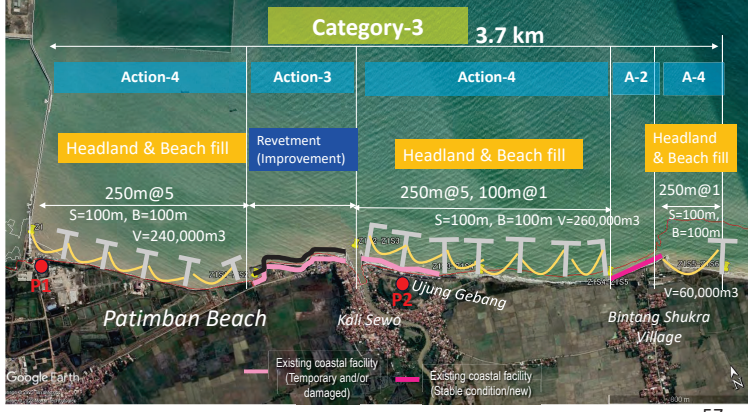


Image of Coastal Measure applying combined Gray & Green Measures (Area-I Section-1a)

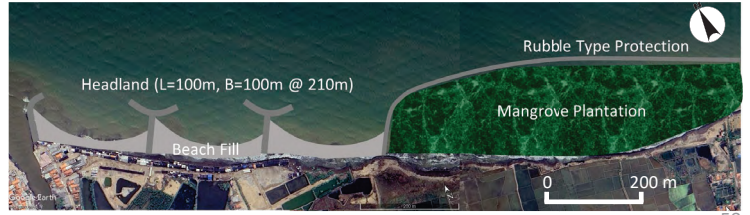
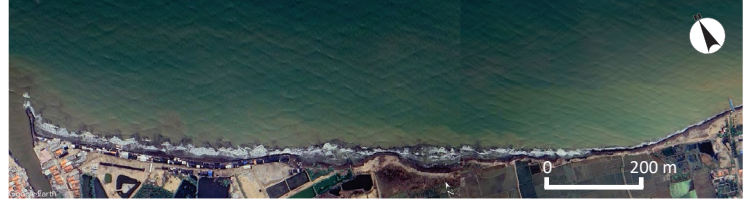


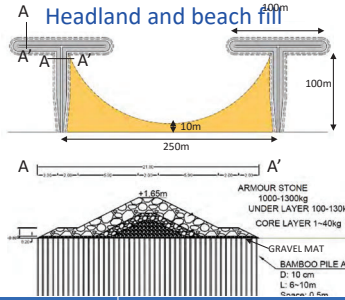
Image of Coastal Measure applying combined Gray & Green Measures (Area-I Section-1a)



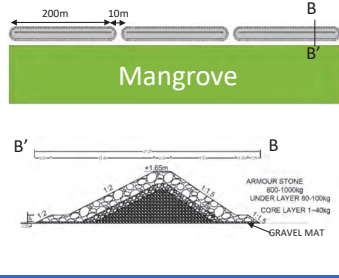
Image of Measures applying Amenity-oriented Revetment at Tuban



Design of layout and cross section



Breakwater for mangrove protection



Item	Headland	Breakwater for mangrove protection
Slope	Set as 1:2 considering stability of structure and utilization	Set as 1:2 offshore side considering stability Set as 1:1.5 onshore side considering economic efficiency
Crown height	Set as HWL + 1.0 m ※According to Japanese design standard HWL +1.0~1.5m considering subsidence How many meter are estimated for subsidence in North Java case ?	
Subsidence measures	Gravel mat, bamboo mat and bamboo pile is installed	Specific countermeasures is not installed considering economic efficiency.

Rough estimate on construction cost (still under checking)

Main Quantities for Facility Plan

* Very preliminary level

	Area-I S-1 Indramayu (West)	Area-I S-6 Indramayu (East)	Area-II Pekalongan	Tuban*	Total
Coastal length protected	10.7 km	7.3 km	8.4 km	16.8 km	45.2 km
Beach Nourishment	560,000 m ³	600,000 m ³	560,000 m ³	1,850,000 m ³	3,570,000 m ³
Headlands	11 Nos	15 Nos	11 Nos	22 Nos	59 Nos
	2,328 m	3,000 m	2,344 m	5,200 m	12,872 m
Breakwaters	37 Nos	-	26 Nos	-	63 Nos
	7,410 m	-	5,200 m	-	12,610 m
Mangrove Protection	156 ha	-	109 ha	-	265 ha

Rough estimate on construction cost (still under checking)

Summary of cost by Target Section in IDR

* Very preliminary level

Pay Item (category-level)	Area-I S-1 Indramayu (West)	Area-I S-6 Indramayu (East)	Area-II Pekalongan	Tuban*	Total
1 General and Preparatory Works	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	20,000,000,000
2 Health, Safety and Environmental Works	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	20,000,000,000
3 Beach Nourishment	152,320,000,000	163,200,000,000	113,680,000,000	334,850,000,000	764,050,000,000
4 Headland/ Groin Works	131,200,267,200	179,821,338,000	129,446,279,520	241,142,737,000	681,610,621,720
5 Mangrove Protection Works	283,690,271,000	1,035,000,000	146,044,680,000	-	430,769,951,000
Construction Cost (IDR)	577,210,538,200	354,056,338,000	399,170,959,520	585,992,737,000	1,916,430,572,720
Project Cost (IDR) (Estimated as 1.35 times* of the Construction Cost)					2,587,181,000,000*

* Price escalation: 15%, Consulting Service: 10%, Physical Contingency: 10%

*Equivalent to:

24,578,000,000 JPY or
162,992,000 USD

7. Technical Transfer & Capacity Development

1) Training for Bali Beach Conservation Project

- Joint Training on Coastal Conservation Projects between North Java and Maldives Projects by JICA -

◆ Objective

1. To see actual coastal conservation measures by applying beach nourishment in order to know the contribution of the coastal measures with harmonizing "Protection", "Utilization" and "Environment"
2. To enhance the understanding of issue on coastal maintenance and management for project beached by applying beach nourishment
3. To understand coastal issues in Indonesia and Maldives
4. To discuss and exchange opinion for above matters in each parties

◆ Training Period

- Sep. 5– 8, 2023 (4 days) in Bali

◆ Trainees

- 23 trainees (16 from Indonesia, PUPR, BBWS, KKP, KLHK, BAPPENAS)



2) JICA Knowledge Co-Creation Program on titled [Sustainable Coastal Protection Measures at Island Countries]

◆ Purpose

- To Learn coastal conservation (planning, implementation and maintenance) by case studies in Japan through site visit and classroom lecture
- Discussion & exchange opinion among government officials regarding coastal conservation.

◆ Training Period

- Nov. 22– Dec. 15 (about 3 weeks)

◆ Trainees

- 13 trainees (5 from Indonesia, PUPR (3), KKP(2))



Site Visit

Classroom Lecture

Closing ceremony

8. Main Point to be Confirmed

Main Points to be Confirmed in the JCC

1. Confirmation on Obtained Outputs (until Jan. 2024)

Output 1: Draft of Basic Policy for Coastal Management

- JST has already prepared and submitted the draft of Basic Policy for Coastal Management for both English and Indonesian versions and idea for legalization based on the discussions through the Working Group (hereinafter referred to as W/G)

Output 2: Draft of "Basic Coastal Management Plan"

- Three areas were selected as target area for developing the draft of basic coastal management plan, which are Area I: Indramayu (about 100 km coastal length), Area II: Pemalang - Pekalongan (about 46 km) and Area III: Rembang – Tuban (52 km) and agreed with JCC members in the 1st JCC.
- JST has prepared and presented the basic procedure for preparation of the Basic Coastal Management Plan, which is expected to be prepared by the Government of Indonesia (hereinafter referred to as "GOI") extensively, following this Projects.
- JST has prepared and presented the recommended Basic Coastal Management Plan for selected three areas, considering coastal physical characteristics, current condition and urgency, utilization of coastal area and hinterland, etc. as the case study.
- Also, the required structures and action for issuing of the Basic Coastal Management Plan has been discussed through W/G based on the basic idea prepared by JST.

Main Points to be Confirmed in the JCC

1. Confirmation on Obtained Outputs (until Jan. 2024)

Output 3: Coastal Facility Plan at Selected Sections

- Three sections (2 sections in Area I and 1 section in Area II) were selected as study area for preparation of coastal facility plan through the Close Group Discussions (CGD).
- Both parties (PUPR and JICA) were agreed to add one more section at neighboring coastal area in Area III with about 18 km, taking into account strong request from the PUPR and importance on protection at this coast (refer to Attachment).
- JST has prepared and presented the recommended Coastal Facility Plan for selected four sections and continued to discuss with PUPR about the contents of proposed measures as well as prioritization of each section, construction cost and formulation as loan project.

Output 4: Technical Transfer / Capacity Development

- Understanding of the idea and procedure for coastal management system for the members of W/G based on those in Japan has been enhanced through several opportunities of discussions in W/G and CGD.
- Understanding of coastal protection measures with harmonizing environment and utilization, and management issues afterward has been enhanced by the training program of coastal conservation project in Bali Island (BBCP1 & 2) and JICA Knowledge Co-Creation Program on Sustainable Coastal Protection Measures in Japan

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Main Points to be Confirmed in the JCC

1. Further Required Actions by end of the Project (June 2024)

Basic Policy for Coastal Management

- The W/G members in Indonesia shall continue to discuss for the finalization of contents of Basic Policy for Coastal Management and submission to the Perpres based on the proposed idea by JST. Finalized basic policy is expected to be submitted to Perpres by the end of 2025.
- JST will continue to support above actions as required by the end of the Project.

Basic Coastal Management Plan

- The W/G members in Indonesia shall review and provide their comments for the draft of basic coastal management plan at three sites recommended by the JST for finalization. The JST shall update/revise the draft of basic coastal management plan at three areas based on the comment from the W/G members by the End of the Project.
- The W/G members in Indonesia shall prepare the roadmap to roll up the preparation of Basic Coastal Management Plan to other main islands (as stated in the draft of Basic Policy for Coastal Management) in Indonesia.

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Main Points to be Confirmed in the JCC

1. Further Required Actions by end of the Project (June 2024)

Coastal Facility Plan at Selected Sections

- PUPR (including each BBWS in the target sites) shall provide further information regarding unit price of construction item for coastal facilities, procurement of construction materials such as sand, rock, etc. and review the draft of construction cost prepared by JST. JST shall continue to update the prepared coastal facility plan based on such information.
- As a part of technical transfer, PUPR will arrange and conduct stakeholder meeting to exchange opinion for the Coastal Facility Plan at selected three locations with relevant stakeholders, which will be conducted on January and February 2024 (refer to Attachment).
- PUPR will take necessary actions for the formulation of coastal protection project on the north coast of Java Island as loan project based on the prepared coastal facility plan.

Others

- GOI shall reflect the contents proposed in the Project (refer to Attachment) into RPJMN (2025 – 2029) to establish and develop the sustainable coastal management system to achieve the mid- and long-term coastal protection/conservation with harmonizing environment and utilization. This procedure shall be done by GOI, cooperating with related stakeholders taking into account the condition of coastal development.

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Schedule for Stakeholder Meeting for Area-1(Indramayu), Area-2(Pekalongan) and Additional Tuban Area

72

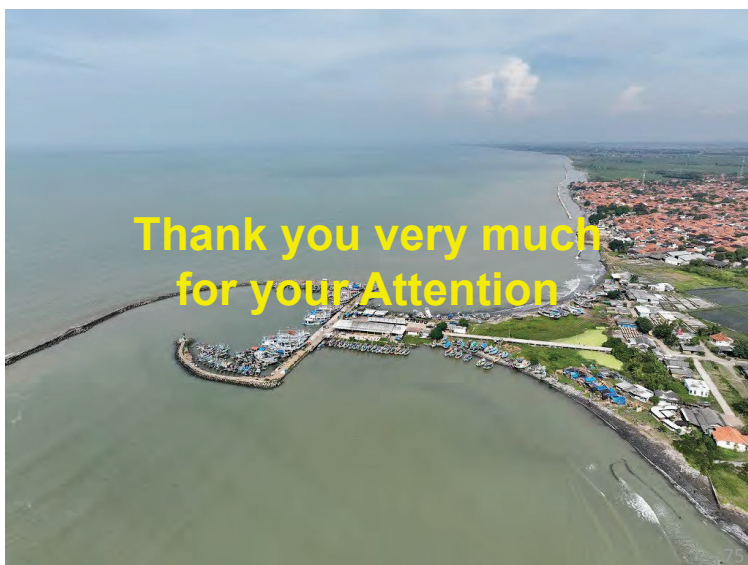
Policy for the 2nd SHM (Stakeholder Meeting)

Purpose	To explain and discuss the following to the local stakeholders: 1) the results of the 1 st SHM and FGD, 2) draft of the Coastal Facility Plan in priority areas, and 3) alternative plans (how the plan has been chosen among options).
SHM sites	Site 1: Cirebon @Area - I : Indramayu Site 2: Semarang @Area - II : Pemalang-Pekalongan Site 3: Tuban @ Additional area: Tuban
Participants	Site 1: Local governments of BBWS Cimanuk Cisanggarung Site 2: Local governments of BBWS Pemali Juana Site 3: Local Governments of BBWS Bengawan Solo
When	Site 1: January 31 (Wednesday) in Cirebon (plan for Indramayu) Site 2: February 1 (Thursday) at in Semarang (plan for Pekalongan) Site 3: February 2 (Friday) in Solo/Tuban
Host (Facilitator)	PUPR/BBWS

※FGD: Focus Group Discussion

Participants: Local Governments

Location	Local Government
Cirebon	BBWS Cimanuk Cisanggarung
Indramayu Regency	- Bappeda Indramayu Regency - DLHK Indramayu Regency - Dinas PUPR Indramayu Regency - Department of Marine and Fishery in Indramayu Regency
Semarang	BBWS Pemali Juana
Pekalongan City	- Bappeda Kota Pekalongan - DLHK Kota Pekalongan - Dinas PUPR Kota Pekalongan - Department of Marine and Fishery in Pekalongan City
Pemalang Regency	- Bappeda Pemalang Regency - DLHK Pemalang Regency - Dinas PUPR Pemalang Regency - Department of Marine and Fishery in Pemalang Regency



**MINUTES OF MEETING
ON
THE THIRD JOINT COORDINATING COMMITTEE MEETING
FOR
PROJECT FOR COASTAL DISASTER RISK REDUCTION PLAN STUDY
ON THE NORTH JAVA ISLAND
IN
THE REPUBLIC OF INDONESIA**

AGREED UPON BETWEEN

**AUTHORITIES CONCERNED IN INDONESIA
AND
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
AND
PROJECT TEAM OF JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA STUDY TEAM)**

Jakarta, June 11, 2024



Mr. Nozomu ONO
Senior Representative
JICA Indonesia Office
Japan International Cooperation Agency



Dr. Dwi Purwanto, S.T., M.T.
Director of River and Coasts, DWGR
Project Manager of the Project



Mr. Susumu ONAKA
Team Leader/Coastal Disaster Risk Reduction Plan
Study JICA Study Team

In response to the official request submitted by the Indonesian Government, the Record of Discussion (hereinafter referred to as "R/D") on PROJECT FOR COASTAL DISASTER RISK REDUCTION PLAN STUDY ON THE NORTH COAST OF JAVA ISLAND (hereinafter referred to as "the Project") was signed on March 31, 2022 between the Indonesian Side (Ministry of Public Works and Housing, hereinafter referred to as "PUPR") and Japan International Cooperation Agency (hereinafter referred to as "JICA") (collectively hereinafter referred to as "Both Parties"). Based on the R/D, the Project commenced on June 17, 2022. In accordance with the Implementation Schedule of the Project, the third Joint Coordinating Committee (hereinafter referred to as "3rdJCC") was held on June 11, 2024 and had a series of discussions for obtained outputs by the JICA Study Team (hereinafter referred to as "JST") until this period and further required actions after the Project. The meeting had presentation from JST on 1) Confirmation on Obtained Outputs through the Project and 2) Further Required Actions after the Project.

In the course of discussions, all the participants confirmed the main items on the 3rd JCC given in Appendix 1.

Appendix 1: Main Points Confirmed

Appendix 1

Main Points Confirmed

1. Confirmation on Obtained Outputs

Output 1: Draft of Basic Policy for Coastal Management

- JST has already prepared and submitted the draft of Basic Policy for Coastal Management for both English and Indonesian versions and idea for legalization based on the discussions through the Working Group (hereinafter referred to as W/G)

Output 2: Draft of “Basic Coastal Management Plan”

- Three areas were selected as target area for developing the draft of basic coastal management plan, which are Area I: Indramayu (about 100 km coastal length), Area II: Pematang - Pekalongan (about 46 km) and Area III: Rembang – Tuban (52 km) and agreed with JCC members in the 1st JCC.
- JST has prepared and presented the basic procedure for preparation of the Basic Coastal Management Plan, which is expected to be finalized by the Government of Indonesia (hereinafter referred to as “GOI”) extensively, following this Projects.
- JST has prepared and presented the recommended Basic Coastal Management Plan for selected three areas, considering coastal physical characteristics, current condition and urgency, utilization of coastal area and hinterland, etc. as the case study.
- Also, the required structures and action for issuing of the Basic Coastal Management Plan has been discussed through W/G based on the basic idea prepared by JST.

Output 3: Coastal Facility Plan at Selected Sections

- Three sections (2 sections in Area I and 1 section in Area II) were selected as study area for preparation of coastal facility plan through the Close Group Discussions (CGD).
- Both parties (PUPR and JICA) agreed to add one more section at neighboring coastal area in Area III, Tuban with about 18 km, taking into account strong request from the PUPR and importance on protection at this coast.
- JST has prepared and presented the recommended Coastal Facility Plan for selected four sections and discussed with PUPR about the contents of proposed measures as well as construction cost, economic analysis and formulation as loan project.

Output 4: Technical Transfer / Capacity Development

- Understanding of the idea and procedure for coastal management system for the members of W/G based on those in Japan has been enhanced through several opportunities of discussions in W/G and CGD.
- Understanding of coastal protection measures with harmonizing environment and utilization, and management issues afterward has been enhanced by the training program of coastal conservation project in Bali Island (BBCP1 & 2) and JICA Knowledge Co-Creation Program on Sustainable Coastal Protection Measures in Japan

Output (Additional): Preliminary Study at Sayung Area in Demak

- Preliminary Study at Sayung Area in Demak was conducted following the amended R/D (signed by both parties on 17 February 2023). The study result was presented as the part of final report.

2. Remaining Issues and Further Required Actions after the Project

Basic Policy for Coastal Management

- Indonesian side shall continue to discuss for finalization of the contents of “Basic Policy for Coastal Management” and its legislation with relevant agencies based on the proposed idea by JST. Indonesian side shall finalize the academic transcript (as draft zero) and action plan toward the legislation, and share them with JICA by September 2024.
- The JCC members of Indonesia agreed to take concrete action following the action plan for legislation that is expected to be effective on December 2026.

Basic Coastal Management Plan

- The JCC members of Indonesia shall continue to review and provide their comments for the draft of “Basic Coastal Management Plan” at three areas, which were recommended by the JST, for finalization. The comments shall be shared with JICA by September 2024 to refer to further coordination for formulation of loan project.
- Procedure for enactment of prepared basic plan shall be discussed with the JCC members and the timeline toward the enactment shall be prepared by September 2024. Basic Coastal Management Plan at the three selected priority areas are expected to be effective on December 2026.
- The JCC members of Indonesia agreed to prepare the roadmap to roll up the preparation of “Basic Coastal Management Plan” to other area of north of Java Island and other main islands as mandated in the draft of “Basic Policy for Coastal Management”

Coastal Facility Plan at Selected Sections

- PUPR agreed that the coastal protection projects is expected to start from 2026 based on the proposed “Coastal Facility Plan” with harmonizing protection, environment and utilization.
- PUPR agreed to take action to establish implementation structure for green- and gray- infrastructure measures, coordinating with relevant agencies, especially with KKP, KLHK and Provincial Governments.
- PUPR, BAPPENAS and JICA basically agreed to start coordination to formulate coastal protection project of north coast of Java Island as Japanese loan project.

Others

- GOI shall reflect the contents proposed in the Project into RPJMN (2025 – 2029) to establish and develop the sustainable coastal management system to achieve the mid- and long-term coastal protection/conservation with harmonizing environment and utilization.

(End of document)

Attachment:

- (a) Attendance List
- (b) Presentation Materials of 3rd JCC

Attachment (a): Attendance List:

No	Name	Institutions/ Division	Position	Remarks
BAPPENAS (MINISTRY of NATIONAL DEVELOPMENT PLANNING)				
1	Mohammad Irfan Saleh	Directorate of Water Resources, BAPPENAS	Director of Water Resources	Offline
2	Cintya MMS	Directorate of Water Resources, BAPPENAS	Staff	Offline
3	Siti Amira	Directorate of Water Resources, BAPPENAS	Staff	Offline
4	Kevin R.J Pantaow	Directorate of Water Resources, BAPPENAS	Staff	Offline
KLHK (MINISTRY of ENVIRONMENT and FORESTRY)				
5	Dimas Baskoro	Directorate of Regional and Sectoral Policy of Environmental Impact Prevention, KLHK	Staff	Online
KKP (MINISRTY of MARINE AFFAIRS and FISHERIES)				
6	Fina Ardarini	Ministry of Marine Affairs & Fisheries	Staff	Offline
7	Bagus A	Ministry of Marine Affairs & Fisheries	Staff	Offline
ATR / BPN REGION I (MINISTRY of AGRARIAN AFFAIRS and SPATIAL PLANNING)				
8	Jerry Deta P	ATR/BPN Region I, Ministry of Agrarian Affairs and Spatial Planning	Sub-Directorate	Offline
9	Lutfi Arianto	ATR/BPN Region I, Ministry of Agrarian Affairs and Spatial Planning	Staff	Offline
PUPR-DIRECTORATE GENERAL of WATER RESOURCES				
10	Ari Setyorini	Directorate of Water Resources Management System and Strategy, PUPR	Head of Foreign Loans and Grants Management Subdirector	Online
11	Handayani Lestari	Directorate of Water Resources Management System and Strategy, PUPR	Staff	Offline
12	Leo Eliasta	Directorate of Rivers and Coast, PUPR	Head of River and Coast Technical Planning Subdirector	Offline
13	Anggun Etika P.	Directorate of Rivers and Coast, PUPR	Staff	Offline
14	Nimas Ayu	Directorate of Rivers and Coast, PUPR	Staff	Online
15	Paula Swastika	Directorate of Rivers and Coast, PUPR	Staff	Offline
16	Nadia Salsabila	Directorate of Rivers and Coast, PUPR	Staff	online
17	Jonathan Sebastian E. H.	Directorate of Rivers and Coast, PUPR	Staff	online
18	Mukhlis Arief Irvandi	Directorate of Rivers and Coast, PUPR	Staff	Offline
19	Hatta Putra	Directorate of Rivers and Coast, PUPR	Staff	Online
20	Farhan Putra Riyadi	Directorate of Rivers and Coast, PUPR	Staff	Online
21	Anthony Harlly Sasono	Directorate of Rivers and Coast, PUPR	Staff	Online
22	Tonigar Murizwa	Directorate of Rivers and Coast, PUPR	Staff	Online

23	Sudarto	Directorate of Rivers and Coast, PUPR	Head of Coastal Engineering Agency	Offline
24	Irham Adrie Hakiki	Balai Teknik Pantai	Staff	Offline
25	Heri Suherlan	BBWS Citarum	Staff	Online
26	Adi Budi	BBWS Cimanuk Cisanggarung	Staff	Offline
27	Dwi Agus	BBWS Cimanuk Cisanggarung	Staff	Offline
28	Tri Wijayanto	BBWS Cimanuk Cisanggarung	Staff	Offline
29	Heni Krisyani	BBWS Pemali Juana	Staff	Online
30	L. Ardian	BBWS Pemali Juana	Staff	Offline
31	Winda	BBWS Bengawan Solo	Staff	Offline
32	Adiel Putra	BBWS Bengawan Solo	Staff	Offline
JICA (Japan International Cooperation Agency)				
33	Mr. Nozomu Ono	JICA Indonesian Office	Senior Representative	Offline
34	Ms. Kashihara	JICA Indonesia Office	Representative	Offline
35	Ms. Hastin Dian	JICA Indonesian Office	Program Officer	Offline
36	Mr. Hidenori Hashimoto	JICA HQ	Senior Deputy Director	Offline
37	Mr. Issei Hamana	JICA HQ	Officer	Offline
38	Mr. Eiji Otsuki	JICA HQ	Senior Advisor	Online
39	Mr. Keisuke Minami	JICA HQ	Officer	
40	Ms. Dyas Aryanti Karlina	JICA Expert	Technical Assistant on Integrated Water Resources Management	Offline
JICA STUDY TEAM				
41	Mr. Onaka	JICA Study Team	Team Leader	Offline
42	Mr. Ichikawa	JICA Study Team	Deputy Team Leader	Offline
43	Mr. Endo	JICA Study Team	Coastal Conservation-Development	Offline
44	Mr. Takagi	JICA Study Team	Flood Analysis	Offline
45	Mr. Yonekura	JICA Study Team	Integrated Coastal Zone Management (ICZM) River & Sediment Management	Online
46	Mr. Mori	JICA Study Team	Facility Design/Coast Estimate & Construction Planning	Offline
47	Mr. Takao	JICA Study Team	Facility Design/Coast Estimate & Construction Planning	Online
48	Mr. Higashiguchi	JICA Study Team	Organizational & Legal System/Social Practise Survey	Offline
49	Mr. Miyagawa	JICA Study Team	Marine & Coastal Survey	Offline
50	Mr. Murakami	JICA Study Team	Economy Effectiveness/Evaluation Analysis	Online
51	Mr. Azka	JICA Study Team	Local Engineer	Offline
52	Ms. Tasya Putri	JICA Study Team	Project Support	Offline
53	Ms. Yohana	JICA Study Team	Project Secretary	Offline



3rd (Final) Meeting of Joint Coordination Committee (JCC)

2024. 6.11

JICA Study Team

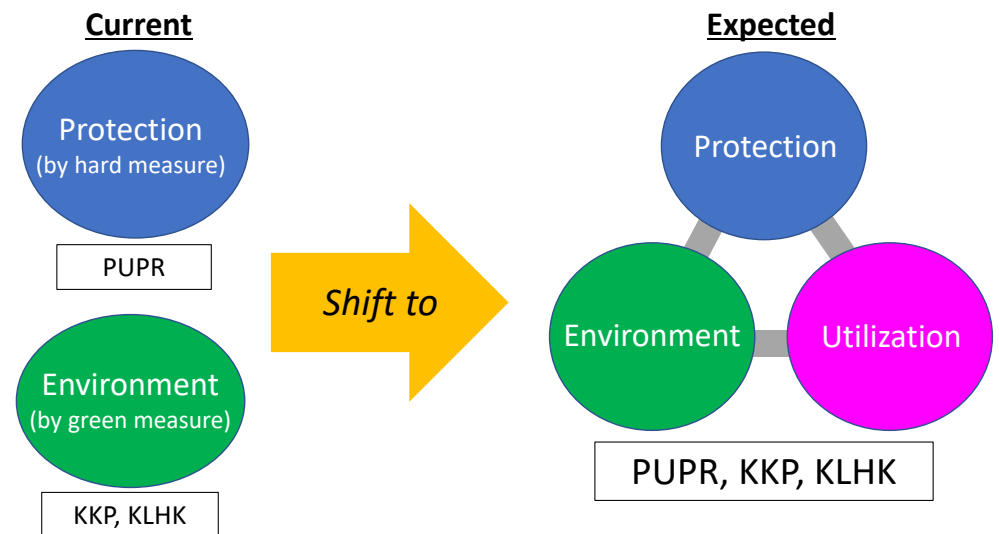
Contents

1. Overview of the Project
 - Obtained Output in the Project -
2. Selection of Three Priority Areas
3. Basic Policy for Coastal Management
4. Basic Coastal Management Plan for Selected 3 Areas
5. Coastal Facility Plan for Selected 4 Sections
6. Technical Transfer & Capacity Development
 - Summary of the Project -
7. Project Evaluation & Remaining Subjects
8. Recommended Roadmap
(for Implementation of Proposed Coastal Facility Plan)
9. Confirmation for Draft of Statements of MoM

2

1. Overview of the Project

Expected Goal for Coastal Management in Indonesia



Individually

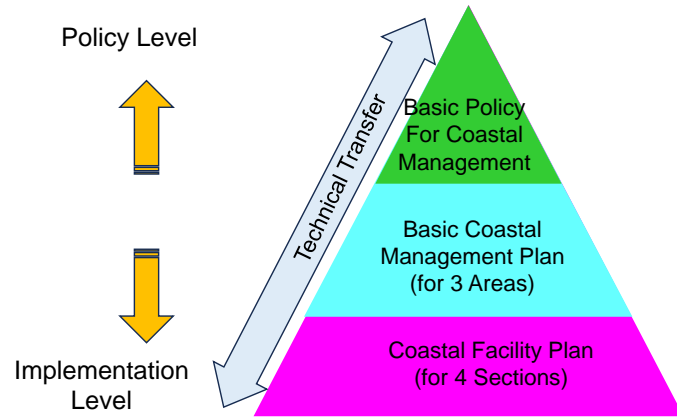
- ◆ *Coastal Management based on same unified policy & Plan*
- ◆ *Multi-sectoral implementation*

3

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Output Image of the Project

1. **(Draft) Basic Policy for Coastal Management**
2. **(Draft) Basic Coastal Management Plan** at 3 priority areas
3. **Coastal Facility Plan** as Pre-F/S level at 4 sections



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2. Selection of 3 Priority Areas

Selection of 3 priority areas (*as pilot study area*)

Preparation of Draft of **Basic Policy for Coastal Management**

- ◆ To prepare basic policy of coastal conservation and management
- ◆ To prepare basic procedure for preparation of Basic coastal management plan to apply for other areas

Preparation of Draft of **Basic Coastal Management Plan**

- ◆ To prepare basic plan of integrated coastal conservation/protection as middle-term plan *for Selected 3 Sites*

Preparation of **Coastal Facility Plan**

- ◆ To propose coastal facility plan (pre-F/S level) *for Selected 4 Sections* (including additional section in Tuban)

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Overview of Coastal Characteristics at 3 Areas



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3. Basic Policy for Coastal Management

Selection of 3 priority areas (*as pilot study area*)

Preparation of Draft of **Basic Policy for Coastal Management**

- ◆ To prepare basic policy of coastal conservation and management
- ◆ To prepare basic procedure for preparation of Basic coastal management plan to apply for other areas

Preparation of Draft of **Basic Coastal Management Plan**

- ◆ To prepare basic plan of integrated coastal conservation/protection as middle-term plan *for Selected 3 Sites*

Preparation of **Coastal Facility Plan**

- ◆ To propose coastal facility plan (pre-F/S level) *for Selected 4 Sections* (including additional section in Tuban)

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Table of Contents of Basic Policy in Indonesia

I. Objective of “Basic Policy for Coastal Management”

II. Definition and Basic Role on “Basic Coastal Management Plan”

Clause 1 Basic Guidelines for Coastal Management

- 1 Basic philosophy of coastal management
- 2 Direction of coastal management
- 3 Direction of implementation of coastal facilities
 - 3.1 Direction on new implementation or improvement of coastal protection/conservation facilities
 - 3.2 Direction on maintenance or repair of coastal protection/conservation facilities
- 4 Other considerations on coastal management
 - 4.1 Promotion of initiatives from a broad and comprehensive perspective
 - 4.2 Promotion of cooperation with local communities and raising awareness of coastal conservation
 - 4.3 Promotion of research, studies and monitoring

Clause 2 Division of Area for Preparation of Basic Coastal Management Plan

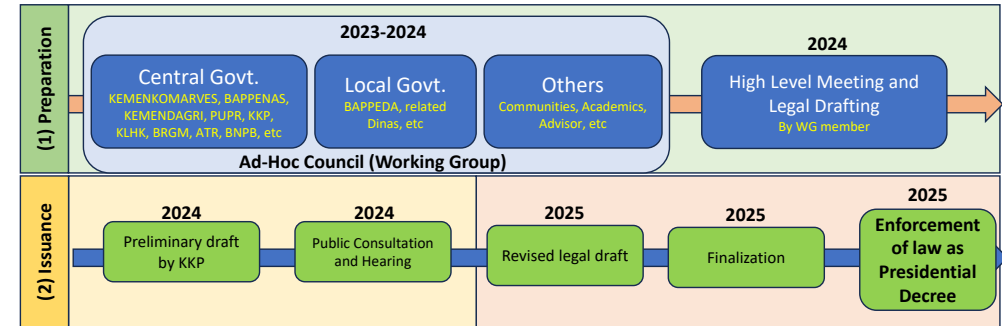
Clause 3 Basic Items for Preparation of the Basic Coastal Management Plan

- 3.1 Basic items to be included into the Basic Coastal Management Plan
 - (a) Basic items concerning Coastal Management
 - (b) Basic items concerning implementation of Coastal Facilities
- 3.2 Important items to be considered into the Basic Coastal Management Plan
 - (a) Insurance of consistency with relevant development plans
 - (b) Cooperation and coordination with relevant administrative agencies
 - (c) Participation of residents and information disclosure
 - (d) Review of plan and revision properly

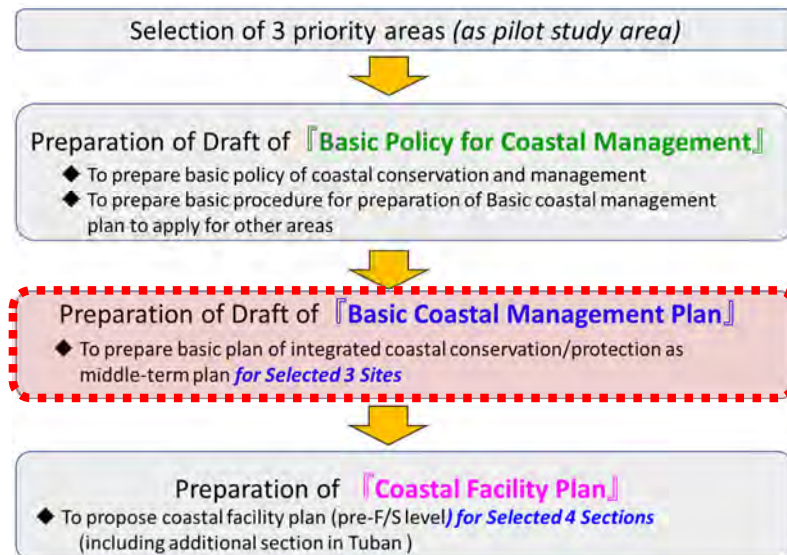
Draft of Roadmap for Legislation of Basic Policy

Following second JCC that was held on 19 January 2024, Government of Indonesia counterpart on this study conducted internal discussion regarding **Legal framework for Basic Policy of Coastal Management** at 6 June 2024, which was held by BAPPENAS. The conclusion of the discussion is as follows:

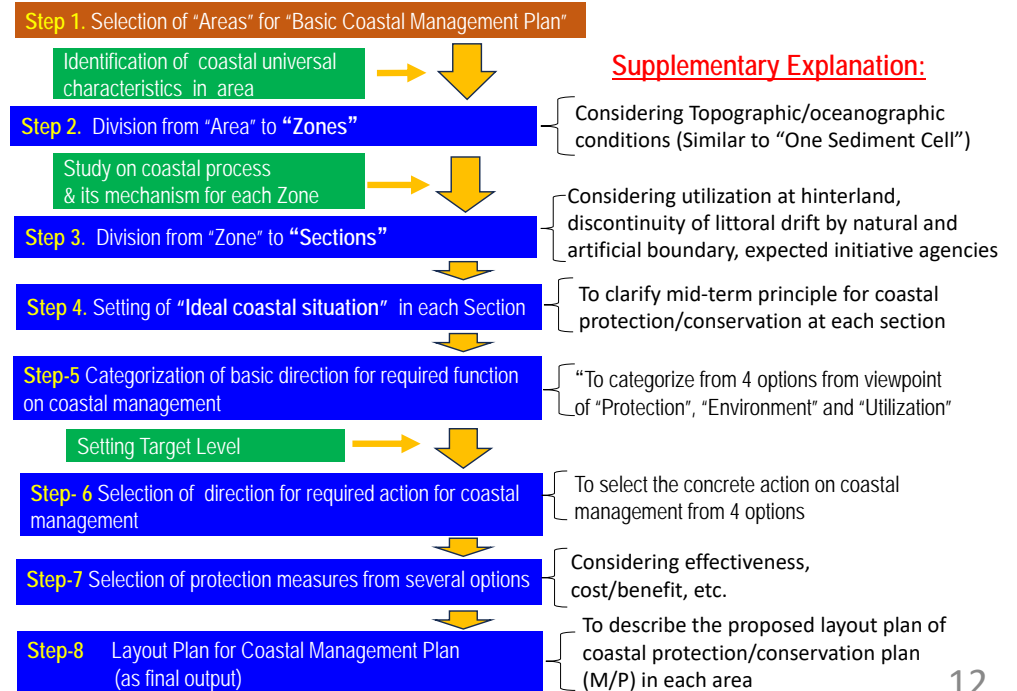
1. Basic Policy for Coastal Management are proposed to be legalized in form of **Presidential Decree** (ID: Peraturan Presiden), Presidential Instruction (ID: Instruksi Presiden), or equal
2. **Kementerian Kelautan dan Perikanan, KKP** (Ministry of Maritime Affairs and Fisheries), will lead its legislation process with help and support from other WG members. It is planned to **conduct high level meeting between each ministries** to formulate said legal draft



4. 『Basic Coastal Management Plan』



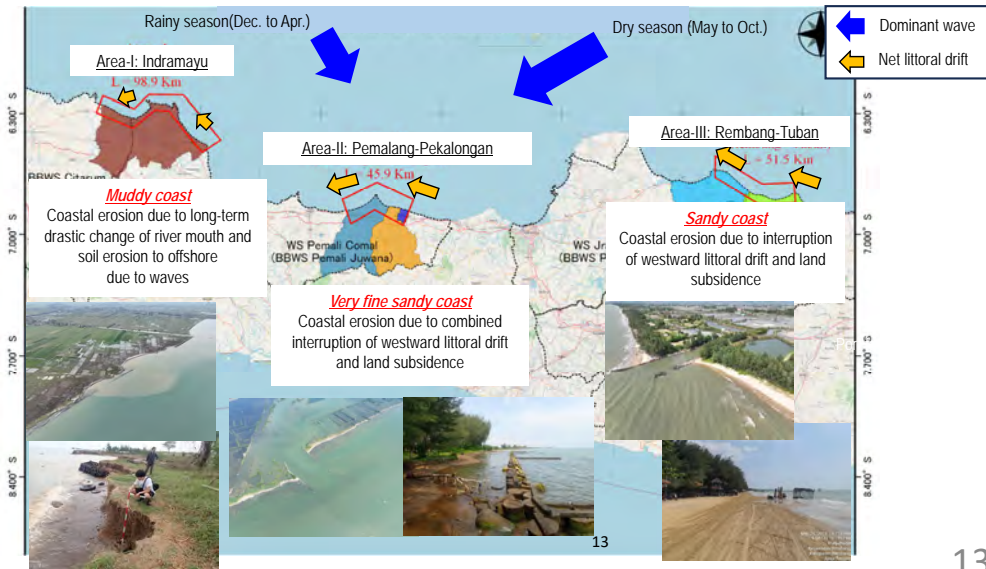
Proposed Procedure how to prepare “Basic Plan”



Step 1. Selection of "Areas" for "Basic Coastal Management Plan"

Considerations:

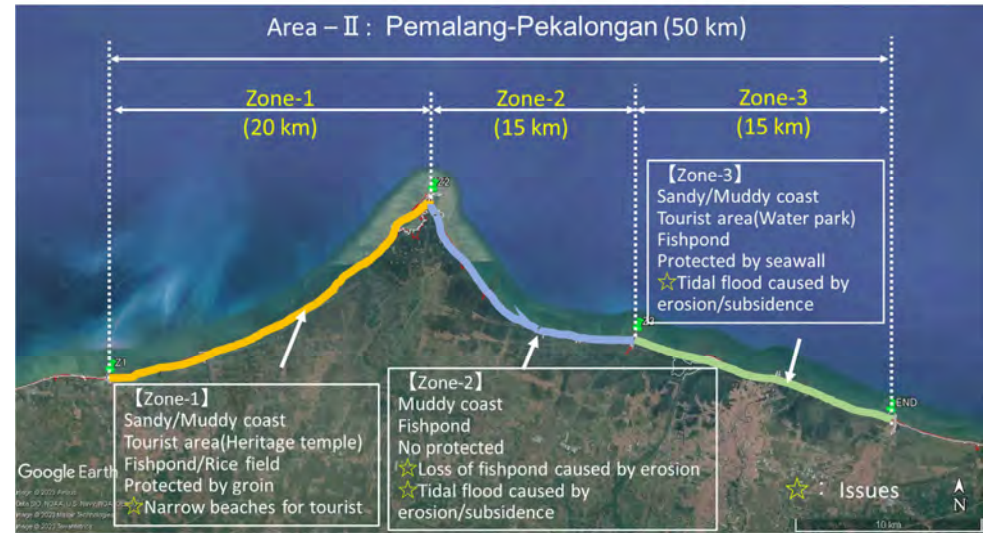
- 1) Boundary between administrative (Province, Regency, City, etc.)
- 2) Continuity of littoral drift,
- 3) Appropriate scale (50-100 km for one area)



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Step 2. Division from "Area" to "Zones"

"Area" is divided into "Zone," based on direction of shoreline angle to reflect the topographic/oceanographic conditions (Similar to "One Sediment Cell")

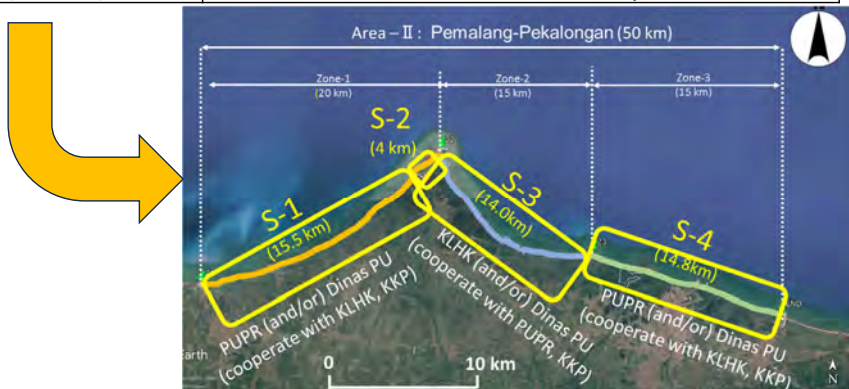


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Step 3. Division from "Zone" to "Sections"

"Zone" is divided into "Section" based on utilization at hinterland, discontinuity of littoral drift by natural and artificial boundary, to consider initiative agencies, and one segment for coastal management.

Agencies mainly tasked with management plan	Type of land utilization at hinterland
PUPR, (DINAS PU)	① Tourism area, ② Residential area, ③ Algaculture area (farm)
KKP	① Fishery port area, ② Agricultural area (salt farm, fishpond)
KLHK	① Natural forest protection area, ② Mangrove restoration area
Private, Pelindo, etc.	① Industrial and/or commercial port area

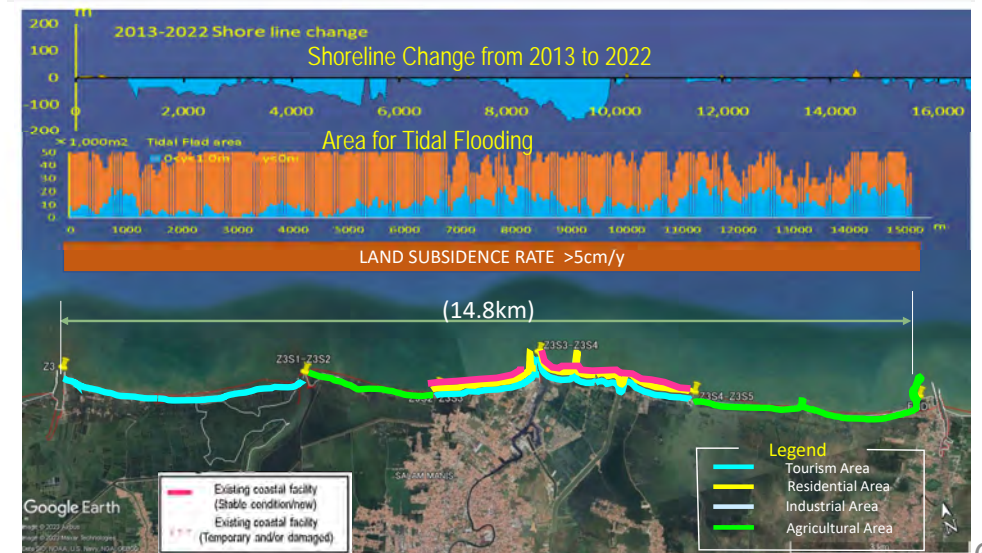


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Step 4. Setting of Ideal coastal situation in each Section

To clarify mid-term principle for coastal protection/conservation at each section, Ideal coastal situation for Section is determined, based on

- 1) coastal risk analysis,
- 2) hinterland utilization and coastal utilization,
- 3) existing coastal facilities.

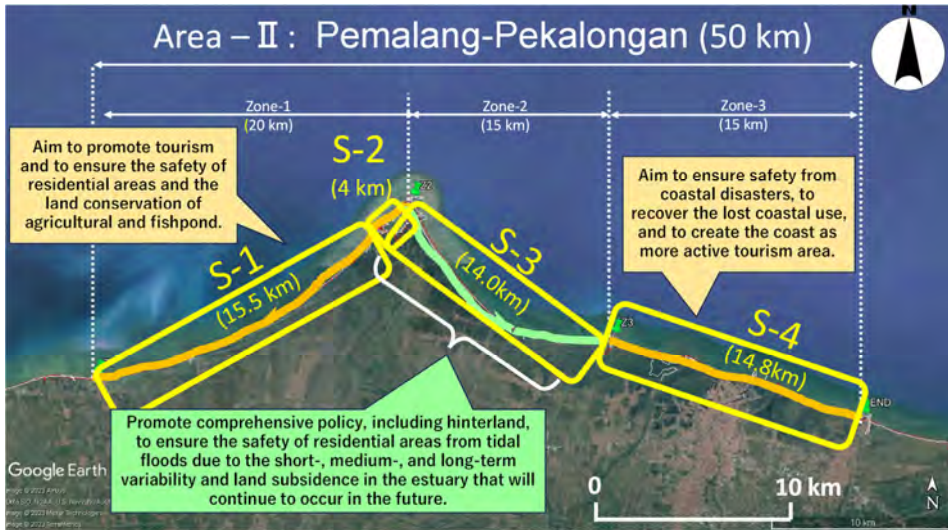


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Step 4. Setting of Ideal coastal situation in each Section

To clarify mid-term principle for coastal protection/conservation at each section, **Ideal coastal situation** for Section is determined, based on

- 1) coastal risk analysis,
- 2) hinterland utilization and coastal utilization,
- 3) existing coastal facilities.



Step5 - Step 7: Procedure for determining coastal measures.

Step-5: Categorization of basic direction for required function on coastal management

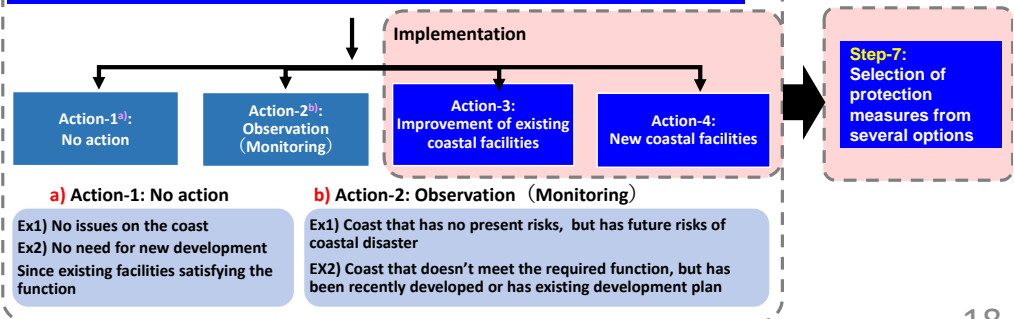
Categorization for required functions on each coast from three perspectives of Protection, Environment and Utilization ← **Input** Situation of coastal hinterland, and coastal utilization

Categorization of required functions

Category-1	Category-2	Category-3	Category-4
Protection	Protection + Environment	Protection + Utilization	Protection + Environment + Utilization

Input
1) existing coastal facilities
2) existing development plan of coastal facilities

Step-6: Selection of direction for required action for coastal management

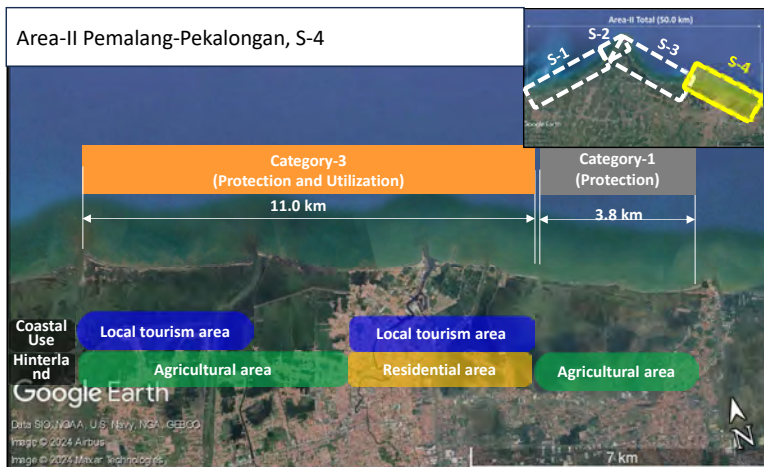
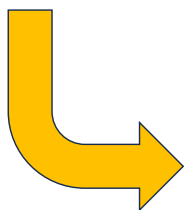


Step-5 Categorization of basic direction for required function on coastal management

To identify the **required function on coastal management** from viewpoint of “Protection”, “Environment” and “Utilization”, each coast is categorized into **four options**.

Categorization of required functions

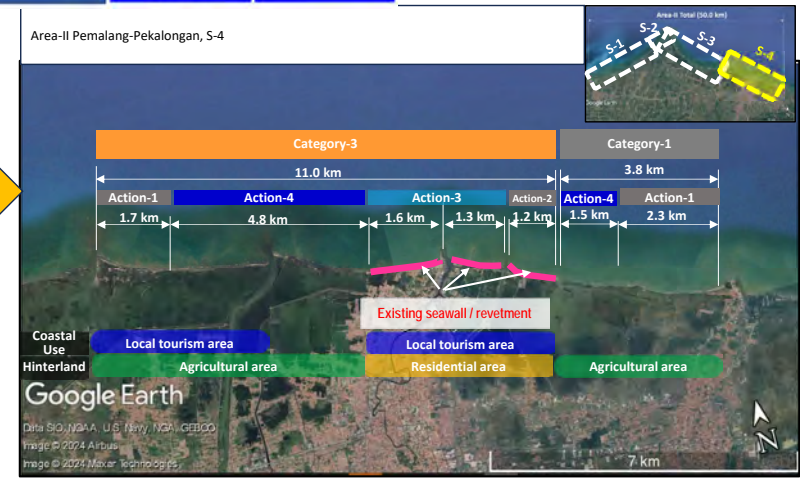
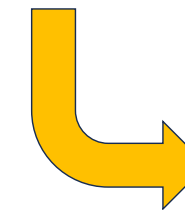
Category-1	Category-2	Category-3	Category-4
Protection	Protection + Environment	Protection + Utilization	Protection + Environment + Utilization



Step-6 Selection of direction for required action for coastal management

Considering **existing coastal facilities** and **existing development plan of coastal facilities**, the concrete action on coastal management are selected from **4 options**.

Action-1: No action	Action-2: Observation (Monitoring)	Action-3: Improvement of existing coastal facilities	Action-4: New coastal facilities
---------------------	------------------------------------	--	----------------------------------







Step-7 Selection of protection measures from several options

Protection measures were determined from several options based on
1) Function, 2) Effectiveness, 3) Cost/benefit, etc.

Function

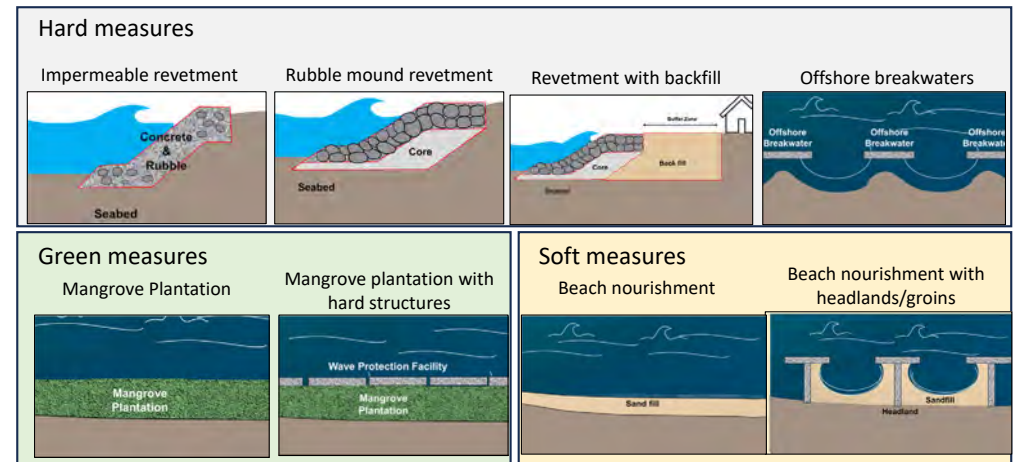
coastal measure	Cat.1 Protection	Cat.2 Protection Environment	Cat.3 Protection Utilization	Cat.4 Protection Utilization Environment
1 Hard (Structure) measure (Revetment, groin)	█			
2 Green measure (Mangrove plantation, Coral transplantation)	█			
3 Soft measure (Beach nourishment)			█	
4 Combination (hard, soft, green, gray measures)		█		

1. Hard measure	2. Green measure	3. Soft measure	4. Combination
			

Step-7 Selection of protection measures from several options

Protection measures were determined from several options based on
1) Function, 2) Effectiveness, 3) Cost/benefit, etc.

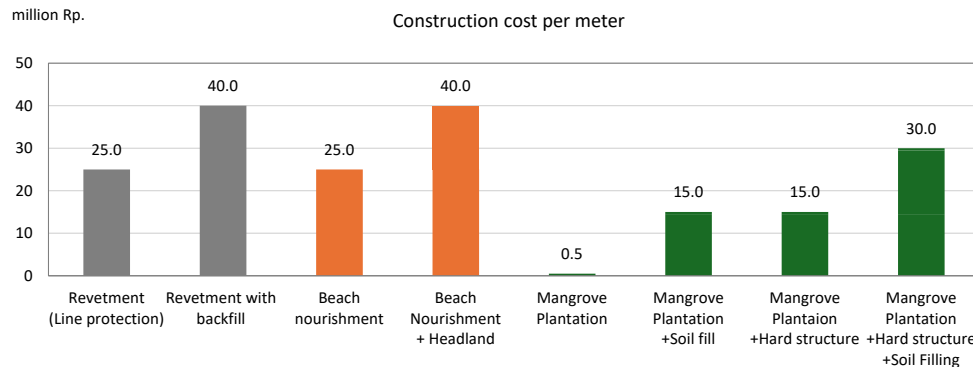
Effectiveness of each options



Step-7 Selection of protection measures from several options

Protection measures were determined from several options based on
1) Function, 2) Effectiveness, 3) Cost/benefit, etc.

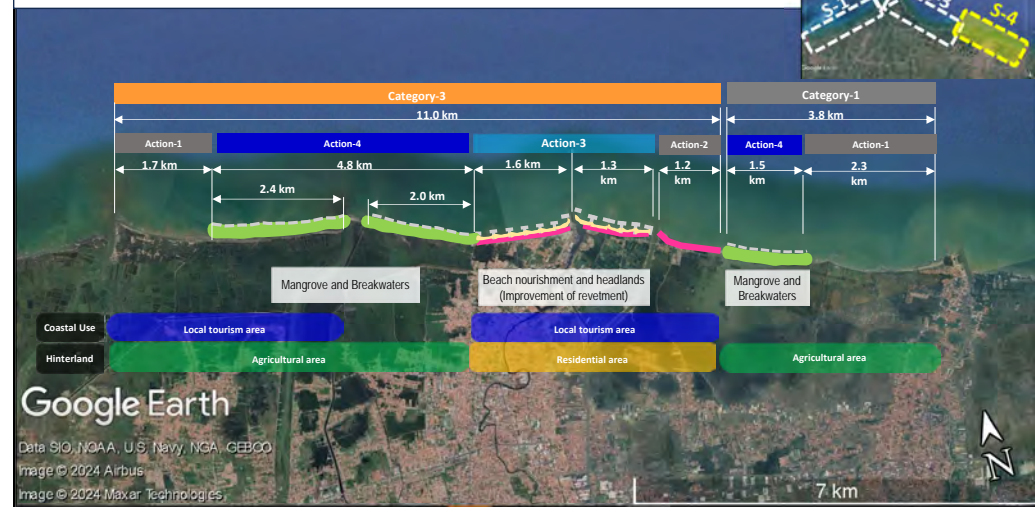
Cost



- Assumption:
- Revetment with backfill is revetment with Ave. 20 m of backfill
 - Beach nourishment assumes Ave. 30 m of beach width
 - Beach nourishment with headland/groin is the above + headland (250 m interval)
 - Mangrove plantation is assumed 150 m width.
 - Mangrove plantation + soil fill is the above + soil fill with 1 m thickness
 - Mangrove plantation + hard structure + soil fill is the above + rock breakwaters

Step-8 Layout Plan for Coastal Management

Area-II Pemalang-Pekalongan, S-4



Spatial Plan

Marine Spatial Plan: Fishing Port, Fisheries Area, Fishing Port, Mangrove, Tourism Zone, Fishing Port, Fisheries Area, General Port

Land Spatial Plan: Fisheries Area, Residential Area

Legend

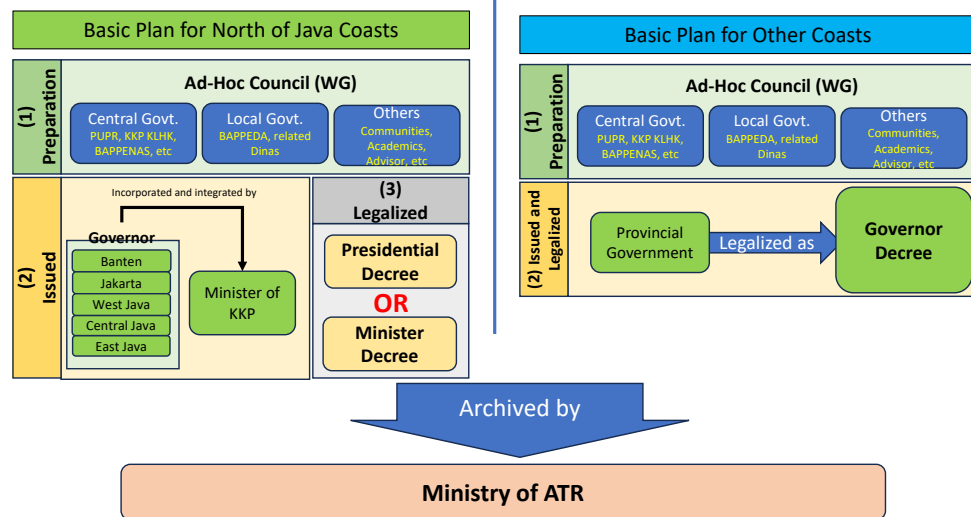
Category	Function
Category 1	Only "Protection" function is considered
Category 2	"Protection" and "Environment" functions are considered
Category 3	"Protection" and "Utilization" functions are considered
Category 4	"Protection", "Utilization", and "Environment" functions are considered

Action Legend:

- Action-1: No action
- Action-2: Observation (Monitoring)
- Action-3: Improvement of existing coastal facilities
- Action-4: New coastal facilities

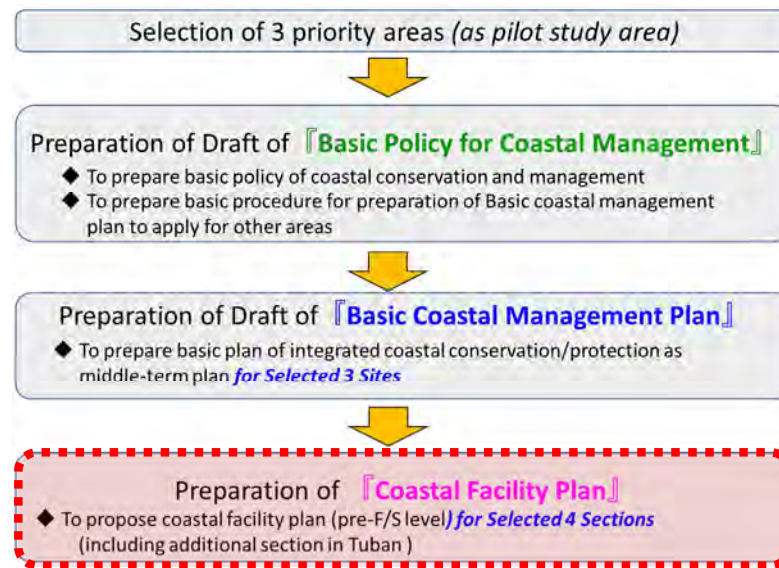
Idea for Enactment for Prepared Basic Plan

Considering the importance of north coast of Java Island on economic activities comparing to other area, the issuing for enactment of basic plan will be different as below (Idea from BAPPENAS)

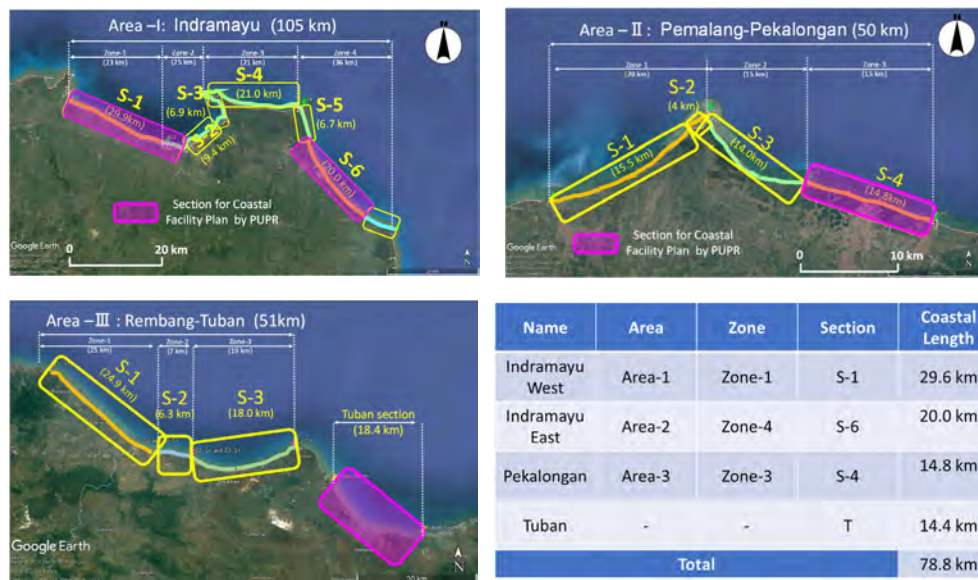


¹⁾ <https://maritim.go.id/detail/urgensi-land-subsidence-kemenko-marves-sinkronisasi-pokja-di-pantura> (accessed at 7 June 2024 13.20 GMT+7)
²⁾ Presidential Decree 15/2018 on Acceleration of Pollution and Damage Control to the Citarum River Watershed

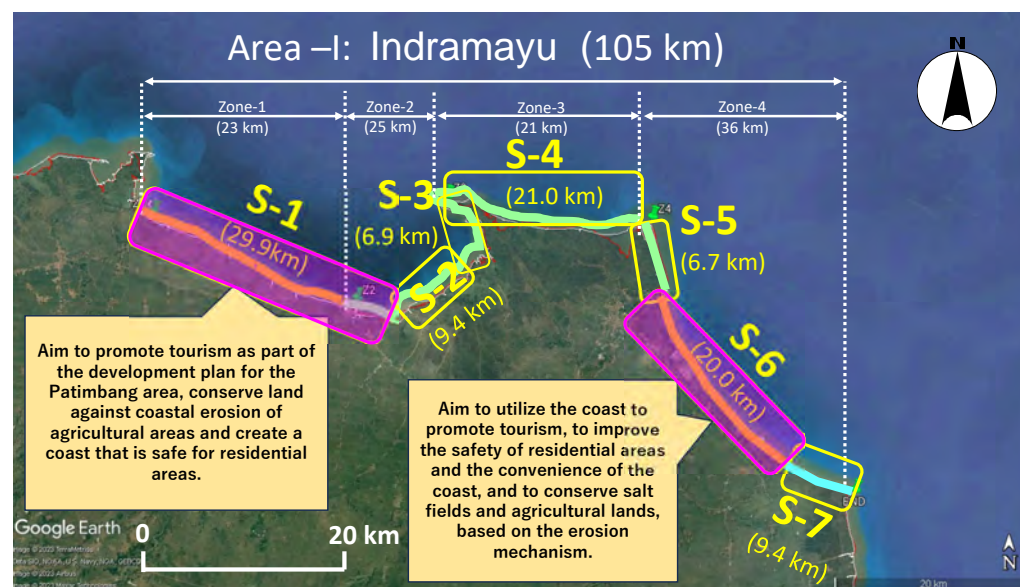
5. Coastal Facility Plan for Selected 4 Sections



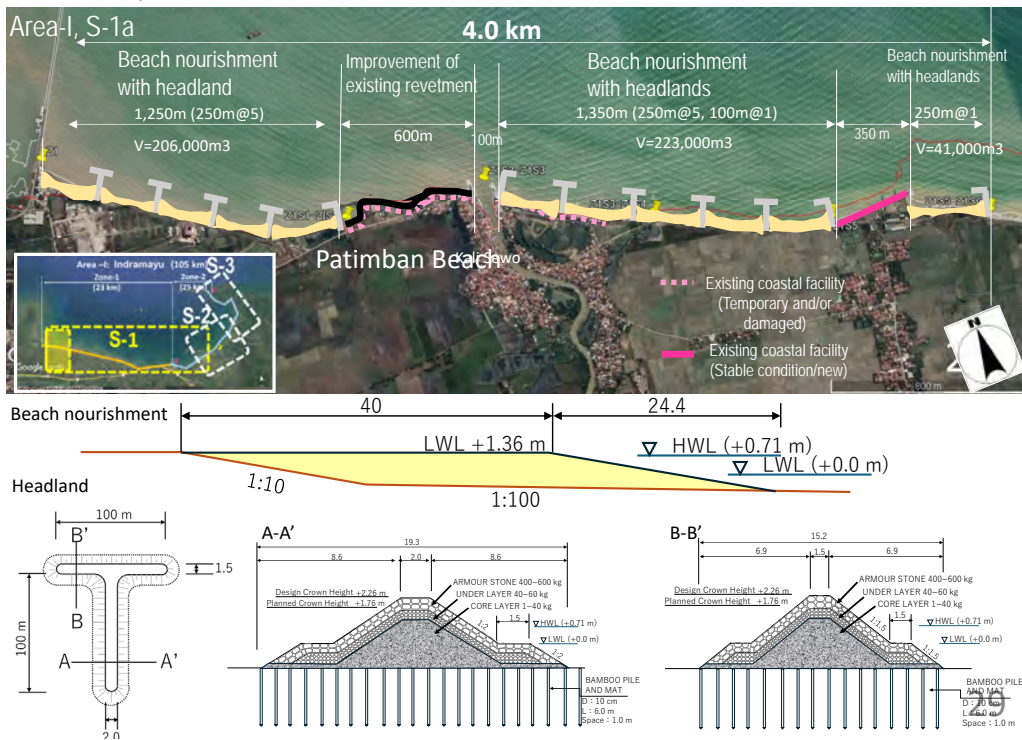
Four sections for target site of coastal facility plan by PUPR (Pink highlighted part)



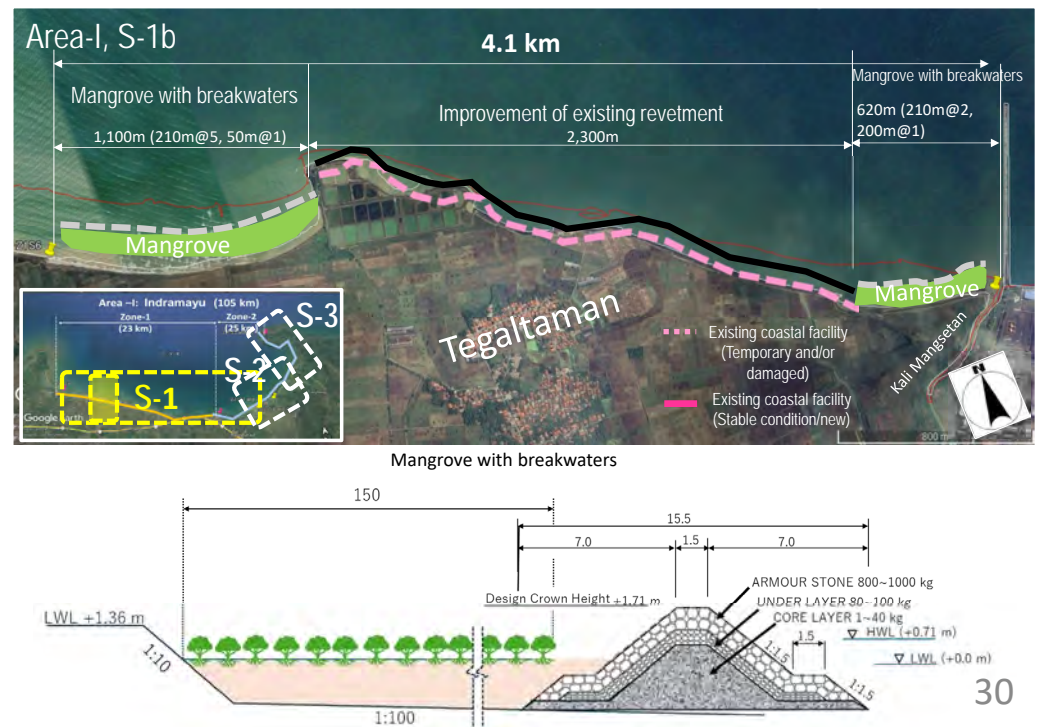
Ideal Coastal Situation (Area-I)



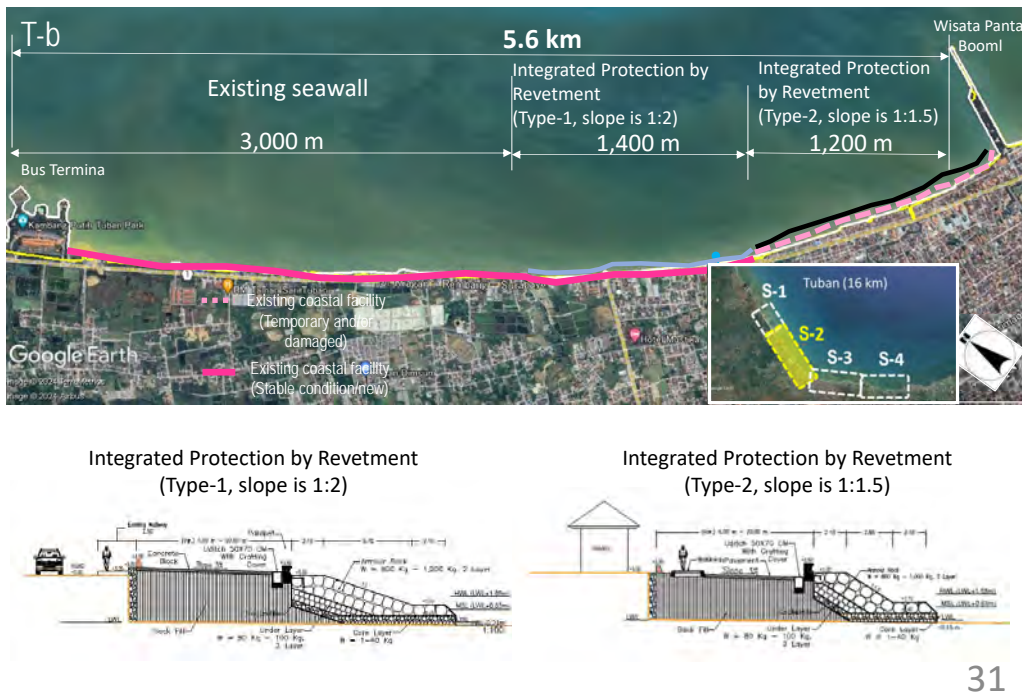
Case Example of Beach fill with Headland



Case Example of Mangrove with Breakwaters



Case Example of Revetment



Mangrove and breakwaters for mangrove protection



Beach nourishment with headlands



Integrated Protection by Revetment (Type-1 , Slope 1:2)



Integrated Protection by Revetment (Type-2 , Slope 1:1.5)



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Project Features in Quantity

	Indramayu West	Indramayu East	Pekalongan	Tuban	Total
● Coastal length to be protected					
Beach Nourishment	2.9 km	5.0 km	2.9 km	3.1 km	14.0 km
Mangrove with breakwaters	7.8 km	-	5.5 km	-	13.2 km
Integrated Protection by Revetment	-	-	-	11.3 km	11.3 km
Total	10.7 km	5.0 km	8.4 km	14.4 km	38.5 km
● Main quantities for facility plan					
Beach nourishment	289,866 m3	369,851 m3	438,531 m3	200,043 m3	1,298,219 m3
Headland/ groin	11 Nos	15 Nos	11 Nos	5 Nos	42 Nos
	2,200 m	3,500 m	2,100 m	500 m	8,300 m
Breakwater for mangrove	39 Nos	-	27 Nos	-	42 Nos
	7,430 m	-	5,190 m	-	12,620 m
Mangrove	117 ha	-	82 ha	-	199 ha
Soil fill for mangrove	1,167,000 m3	-	819,000 m3	-	1,986,000 m3

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Rough estimate on construction cost

Pay Item (category-level)	Indramayu West	Indramayu East	Pekalongan	Tuban	Total
1 General and Preparatory Works	5,000,000,000	3,000,000,000	5,000,000,000	5,000,000,000	18,000,000,000
2 Health, Safety and Environmental Works	5,000,000,000	3,000,000,000	5,000,000,000	5,000,000,000	18,000,000,000
3 Beach Nourishment	78,843,573,253	100,599,562,484	119,280,447,633	54,411,696,000	353,135,279,370
4 Headland/ Groin Works	42,652,251,200	56,406,026,480	54,833,528,000	5,841,318,000	159,733,123,680
5 Mangrove Protection and Plantation Works	228,175,646,000	0	175,215,411,000	0	403,391,057,000
6 Integrated Protection by Revetment	0	0	0	359,203,609,000	359,203,609,000
7 Initial Maintenance Work	3,757,678,067	1,369,819,751	3,424,394,075	740,900,000	9,292,791,893
Construction Cost (IDR)	363,429,148,520	164,375,408,714	362,753,780,709	430,197,523,000	1,320,755,860,943

*Unit price estimated refereeing to Indonesian standard and similar projects

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Rough estimate on Project cost

Item	Amount	Note
(1) Total Construction Cost	1,320,755,860,943 Rp	Sum of 4 sections
(2) Consultant fee for E/S	132,075,586,094 Rp	10% of (1)
(3) Consultant fee for S/C	15,000,000,000 Rp	Estimated from similar projects
(4) Physical Contingency	73,391,572,352 Rp	5 % of sum of (1),(2),(3)
(5) Price Escalation	262,007,913,296 Rp	17 % of sum of (1),(2),(3),(4)
(6) Project Cost	1,803,231,000,000 Rp*	Sum of all of the above

112 mil USD

*112,341,000 USD or
17,491,000,000 JPY

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Economic Analysis

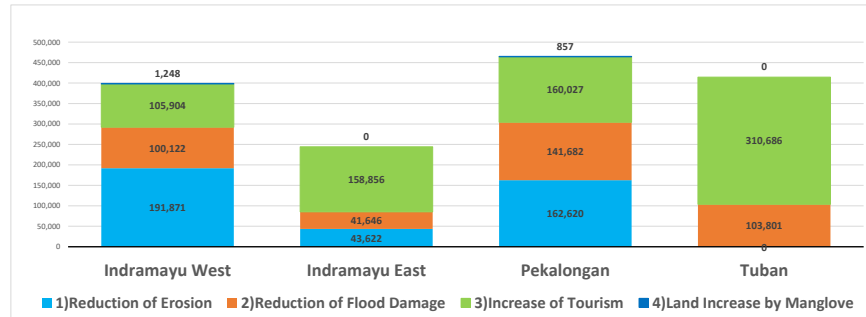
Cost: Project cost for coastal conservation

Benefit:

- ① Erosion prevention
- ② Inundation protection
- ③ Tourism enhancement
- ④ Land restoration by mangrove

No. of visitors: Estimated based on 1) present visitors and 2) length of beach area

Annual increase rate: Estimated as 4.9% based on tourism trend statistics



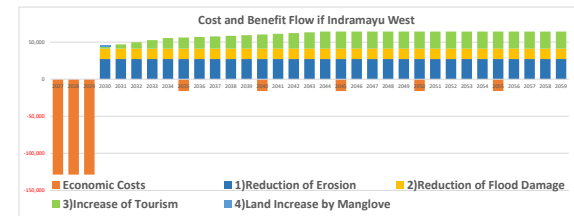
▲ Benefit in present value (mil Rp)

Results of Economic Analysis

Reference target values for Indicators

- EIRR (Economic Internal Rate of Return) $\geq 10\%$
- B/C (Cost Benefit Ratio) ≥ 1.0
- NPV (Net Present value) > 0

Section	EIRR	B/C	NPV (mil Rp.)
Indramayu West	11.9%	1.19	62,976
Indramayu East	15.1%	1.62	93,330
Pekalongan	13.7%	1.39	130,008
Tuban	10.7%	1.08	32,108
Total	12.7%	1.26	1,522,942



▲ Cost and benefit flow (Indramayu West)

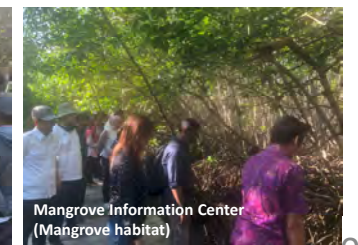
Other conditions:

- Base year: 2024
- Construction period: 3 years
- Evaluation period: 30 years after the implementation
- Discount rate: 10%

6. Technical Transfer & Capacity Development

1) Training for Bali Beach Conservation Project

- **Purpose**
 1. To see actual coastal conservation measures by applying beach nourishment
 2. To learn the importance of coastal management and maintenance
- **Training Period**: Sep. 5– 8, 2023 (4 days)
- **Trainees**: 23 trainees (16 from Indonesia, PUPR, BBWS, KKP, KLHK, BAPPENAS)



2) JICA Knowledge Co-Creation Program “Sustainable Coastal Protection Measures”

- **Purpose**
 1. To learn actual coastal conservation measures from not only successful cases but also unsuccessful case in Japan
 2. To learn the importance of integrated coastal zone management (ICZM)
- **Training Period** (2times): Nov.28 to Dec.15 (2022), Nov.27 to Dec.14 (2023)
- **Trainees:** 6 from Indonesia(2022), 5 from Indonesia(2023),



7. Project Evaluation & Remaining Subjects

1. Expected Goal, Output and the Project

(Refer to R/D 31 March 2022)

Expected Goal

Selected coastal area of the North Coast of Java Island is properly managed based on the draft **Basic Policy for Coastal Management** and the draft **Basic Coastal Management Plans** (Master Plans) considering harmonization of coastal **protection, environment, utilization and development**

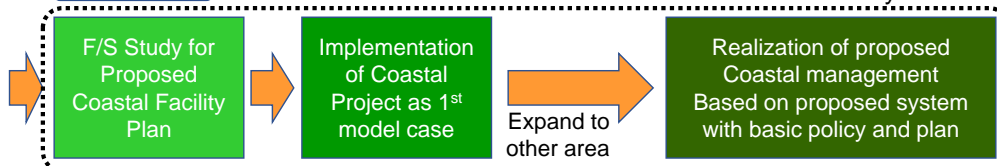
Output of the Project

Covered by this Project

1. Preparation of 「Draft of Basic Policy for Coastal Management」
2. Preparation of 「Draft of Basic Coastal Management Plan」 (3 Areas)
3. Preparation of 「Plan of Coastal Facility Plan」 (4 Sections as Pre-F/S Level)
4. Technology transfer to the relevant GOI staff through the project

Next Step

Performed by GOI



Summary of Evaluation for Project Outputs

Output	Achievement (in the Project)	Evaluation Index Outcome (after 3 years)
Draft of Basic Policy for Coastal Management	Draft of basic policy for English and Indonesian version was prepared and submitted	<ul style="list-style-type: none"> ● The proposed draft of Basic Policy, Basic Plan, and Coastal Facilities Plan are incorporated as part of the policies and plans for the implementation of coastal protection projects by PUPR ● Coastal protection projects (one or more) referring to the above three plans have been planned or implemented by PUPR
Draft of Basic Coastal Management Plan	Draft of basic plan for three areas (Indramayu, Pemalang-Pekalongan, Remban-Tuban) was prepared	
Coastal Facility Plan	Coastal facility plan for selected 4 sections (3 from above 2 areas, 1 from Tuban) was prepared as pre-F/S level	
Technical Transfer	<ul style="list-style-type: none"> ● Conducting WG & CGD ● JICA training in Okinawa 2023 ● Training in Bali Beach Project (BBCP1 &2) 2023 	

Action to Achieve Expected Goal

- ◆ To implement coastal protection and management based on the basic unified policy and mid-term M/P as proposed system
(currently, no system exists like this plan)
- ◆ To apply coastal protection measures from various options (green & gray, soft & hard) based on setting “Ideal coastal situation” at each coast, taking into account “Protection”, “Environment” and “Utilization”
(currently most of coastal measures are focus only “Protection”)
- ◆ To establish and realize implementation/management system in cooperation with related agencies for coastal protection.
(currently, protection by using hard-structure measures is PUPR, conservation by using green-infra is KKP, KLHK.
Also, coordination for coastal management seems insufficient for coastal problems)

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Confirmation of Remaining Subjects and Target Period

Item	Remaining Subjects	Expected Target Period
Basic Policy for Coastal Management	Finalization of contents	Sep. 2024
	Action taking for legislation	Dec. 2025
Basic Coastal Management Plan	Acceptance of procedure and proposed plan for 3 areas	Sep. 2024
	Issuing of enactment for prepared basic plan	Dec. 2025
	Expansion to prepare the basic plan to other areas	From Dec. 2024
Coastal Facility Plan	Concrete procedure and structure for implementation of combined green & gray infrastructures by multi-agencies	June 2025
Others (Project Formulation)	Project formulation as JICA Loan Project following current Blue Book	From now

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Required Study in F/S for Coastal Facility Plan

Coastal Facility	Remaining Subjects	Outline
Beach Nourishment	Sand borrow investigation at offshore seabed	For beach nourishment, the unit cost of sand must be reduced. Potential area at offshore will be Investigated.
	Permission procedure (especially KKPR of Spatial Plan) for above	Currently, it is no need to revise the spatial plan itself, but approval from the ATR is required (KKPR: Conformity of Space Utilization Activities). Based on the Bali Beach Conservation Project, it may take about one year for this approval. Considering AMDAL and Mining Permit afterward, it is recommended to proceed in advance.
Mangrove Plantation	Reviewing on appropriate site selection, protection effectiveness, implementation & maintenance method and organization, etc.	Although the above-mentioned studies are not conducted in this Pre-F/S level study, it is necessary to obtain some evidence and assurance for formulation of the project
	Discussion & study of implementation structures for combination with green- & gray-infrastructure with cooperation of related agencies	It is desirable to promote discussions on mechanisms and systems to promote active collaboration among related agencies, including the possibility of implementing the project with multiple agencies.
Hard Structures	Clarification on design for necessity of countermeasure for settlement due to construction of structures and land subsidence	Some areas and facilities may or may not have subsidence control measures. The effectiveness of such measures is also unclear. Since this will affect the project cost, it is desirable to collect and study further information in advance.

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8. Recommend Roadmap (for Implementation of Proposed Coastal Facility Plan)

3 Important Key-Words

Implementing under “unified basic policy & plan”

Combination of green & gray, soft & hard measures

Multi-sectoral implementation and management

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Recommended Roadmap for Implementation of Proposed Coastal Facility Plan

Item	2024		2025		2026		2027		2028		2029		2030		2031	
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1 Required Continuous Action by Indonesian Side																
Basic Policy for Coastal Management	Finalization of contents															
	Further discussion & coordination for legislation															
	Action taking for above															
	Issuing of legislation															
Basic Coastal Management Plan	Understanding & acceptance for procedure															
	Finalization & acceptance for 3 case-study areas															
	Further discussion & coordination for enforcement															
	Action taking for above															
Coastal Management Plan	Discussion for expansion at other areas															
	Discussion & coordination for implementation of combined green & gray infrastructures															
Project Formation	Discussion & coordination for formulation of Loan Project among relevant parties															
2 F/S Study on implementation of Coastal Facility Plan																
Basic Design (B/D) & Feasibility Study (F/S)																
Beach Nourishment	Investigation for sand borrow site															
	Proceeding of permission for above (KKPR)															
	Further study for adaptivity, effectivity, etc.															
Mangrove Plantation	Discussion & coordination for implementation structures (inc. collaboration with communities)															
	Further study for subsidence of structures															
Hard Structures	Further study for subsidence of structures															
Required process for concluding Loan Agreement																
3 Project Implementation																
1 Coastal Protection Combined with Green & Gray Infrastructures																
1) Implementation of pilot project																
2) Further implementation for other areas																
2 Beach Nourishment (with Groins & Headlands)																
1) Implementation of pilot project																
2) Further implementation for other areas																
3 Integrated Protection by Revetment (at Tuban)																
4 Technical Transfer & Capacity Development (as Soft Component)																
Support for Preparation of Basic Coastal Management Plan	Other areas for north of Java Island															
	Other primary Islands															
Support for Preparation of Coastal Facility Plan	Other areas for north of Java Island															
	Other primary Islands															



Basic Policy for Coastal Management

- Indonesian side shall continue to discuss for finalization of the contents of “Basic Policy for Coastal Management” and its legislation with relevant agencies based on the proposed idea by JST. Indonesian side shall finalize the academic transcript (draft zero) and action plan toward the legislation and share them with JICA by Sep. 2024
- The JCC members of Indonesia agreed to take concrete action following the action plan for legislation that is expected to be effective on Dec. 2026.

Basic Coastal Management Plan

- The JCC members of Indonesia shall continue to review and provide their comments for the draft of “Basic Coastal Management Plan” at three areas, which were recommended by the JST, for finalization. The comments shall be shared with JICA by Sep. 2024 to refer to further coordination for formulation of loan project.
- Procedure for enactment of prepared basic plan shall be discussed with the JCC members and the timeline toward the enactment shall be prepared by Sep. 2024. Basic Coastal Management Plan at the three selected priority areas are expected to be effective on Dec. 2026.
- The JCC members of Indonesia agreed to prepare the roadmap to roll up the preparation of “Basic Coastal Management Plan” to other area of north of Java Island and other main islands as mandated in the draft of “Basic Policy for Coastal Management”

Coastal Facility Plan at Selected Sections

- PUPR agreed to commence the coastal protection projects **expected to start** from 2026 based on the proposed “Coastal Facility Plan” with harmonizing protection, environment and utilization.
- PUPR agreed to take action to establish implementation structure for green- and gray- infrastructure measures, coordinating with relevant agencies, especially with KKP, KLHK and Provincial Governments.
- PUPR, BAPPENAS and JICA basically agreed to start coordination to formulate coastal protection project of north coast of Java Island as Japanese loan project.

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Others

- GOI shall reflect the contents that were proposed in the Project into the next RPJMN (2025 – 2029) to establish and develop the sustainable coastal management system with harmonizing protection, environment and utilization.

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