THE PREPARATORY SURVEY ON BALI BEACH CONSERVATION PROJECT-PHASE II IN THE REPUBLIC OF INDONESIA

FINAL REPORT [SIMPLE VERSION]

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ABBREVIATIONS

ASITA	:	Association of Indonesian Travel Agents
BWS-BP	:	Department of River Region Bali-Penida (Balai Wilavah Sungai
		Bali-Penida)
BAPPEDA	:	Regional Agency for Planning and Development (Badan Perencana
		Pembangunan Daerah)
BAPPENAS	:	National Agency for Planning and Development (Badan Perencana
	-	Pembangunan Nasional)
BBCP	•	Bali Beach Conservation Project
BBCU		Bali Beach Cleaning Un
BLH		Environment Agency (Badan Lingkungan Hidun)
BMCC	•	Bali Medical Clinic Centre
BPS	•	Statistic Centre Agency (Badan Pusat Statistik)
BTDC		Bali Tourism Development Center
CBR	•	Cost-Benefit Patio
CCAI	•	Coca-Cola Amatil Indonesia
CSP	•	Corporate Social Responsibility
CVM	•	Contingent Valuation Method
	·	Detailed Design
DCWP	•	Directorate Concernal of Water Resources
	•	Directorate General of Water Resources
Dinas PU	:	Department of Public works (Dinas Pekerjaan Umum)
DKP	:	Department of Sanitation and Landscaping (Dinas Kebersinan dan
		Pertamanan)
DPRD	:	Regional Parliament (Dewan Perwakilan Rakyat Daeran)
DPSPS	:	Sanur Development Accompany Fund
EIA	:	Environmental Impact Assessment
EIRR	:	Economic Internal Rate of Return
ESE	:	East South East
FIRR	:	Financial Internal Rate of Return
GDP	:	Gross Domestic Product
GOI	:	Government of Indonesia
GPS	:	Global Positioning System
GRDP	:	Gross Regional Domestic Products
GUS Foundation	:	Foundation which dedicated to improving Bali's environment (Yayasan
		Gelombang Udara Segar)
HWL	:	High Water Level
HHWL	:	Highest High Water Level
HHWS	:	Highest Astronomical Tide
HIS	:	Travel Agency in Japan
IMF	:	International Monetary Found
JICA	:	Japan International Cooperation Agency
JTB	:	Japan Travel Bureau
JTOA	:	Japan Tour Operator Association
JUMALI	:	Environment Control Unit
Loka Pantai /	:	Sub Experimental Station for Coastal Engineering
Loka Penerapan		
Teknologi Pantai		
LP2IPTEK	:	Laboratory Research and Development of Science and Technology
		(Laboratorium Pengetahuan dan Pengembangan Ilmu Pengetahuan dan
		Teknologi
LPM	:	Institution for Community Development (Lembaga Pemberdayaan
		Masyarakat)

LWL	: Low Water Level
M/M	: Minutes of Meeting
MNC TV	: Indonesian private television channel (Media Nusantara Citra Televisi)
MPW	: Regional Advisory Council (Majelis Pertimbangan Wilayah)
NGO	: Non-Governmental Organization
NPO	: Non Profit Organizations
NPV	: Net-Present Value
O&M	: Operations and Maintenance
OJT	: On the Job Training
OP	: Operations and Maintenance (Operasi dan Pemeliharaan)
PCR	: Project Completion Report
Pertamina	: Indonesian Oil Company (Perusahaan Pertambangan Minyak dan Gas
	Bumi Negara)
PHRI	: Association of Hotel and Restaurant Indonesian (Perhimpunan Hotel
	Restaurant Indonesia)
PISA	• Executor Network of Water Resources (Pelaksana Jaringan Sumber
	Air)
PLN	· Indonesian Electric Company (Perusahaan Listrik Nasional)
PMU	· Project Management Unit
PP	· Coast Guard (Penjaga Pantai)
PPK	· District Development Program (Program Pengembangan Kecamatan)
ррр	· Public Private Partnership
PR	· Public Relation
REPELITA	· Development Plans on the Five Years (Rencana Pembangunan Lima
	Tahun)
ROLE Foundation	· Rivers Oceans Lands Ecology Foundation
SATGAS	: Task Force (Satuan Tugas)
SCB	· Stakeholder Consensus Building
SCTV	· Indonesian private television channel (Surva Citra Televisi)
SDA	: Water Resources (Sumber Dava Air)
S	· South
SF	: South Fast
SHM	: Stakeholders Meeting
SSE	: South by South East
SSE	: South by South East
TKMPP	: Coordination Team for Beach Management (Tim Koordinasi
	Pengelolan dan Pemeliharaan Pantai)
TVRI	 Television Republic of Indonesian (Televisi Republik Indonesia)
INEP	: United Nations Environment Program
	: Implementing Unit Scheme (Unit Pelaksana Teknis)
VOA	· Visa on Arrival
W	· West
WG	· Working Groups
WMO	• World Meteorology Organization
WNW	West North West
WSW	· West South West
VDC	. WEST SOUTH WEST
113	. Sanu Development Foundation (Tayasan Pembangunan Sanur)

Summary

(1) Review of the Beach Monitoring and Maintenance System on Phase-1

- a) Current Condition at Phase-1: Beaches and its Problems
- Intended Purposes of Phase I: The Bali Beach Conservation Project (the Phase-1 Project) serves a multi-function on the contribution for conservation of different fields; that is the "Conservation of property (effect on property protection)", "Conservation of tourism (effect on the economy)", "Conservation of Balinese culture and society", and "Conservation of coastal environment"
- Achievements: It was proven that the Phase-1 Project has a great contribution for the development and maintenance of tourism in Bali Island. These were proven based on collected information, tourism statistics data, and back analysis of economical contribution using actual data for the change of occupation rate of hotels after the completion of the project.
- Problems Prevailed on Beach Maintenance: On the other hand, several problems have been exposed regarding beach maintenance, monitoring, and management in the post project stages of the Phase-1 Project at Sanur, Nusa Dua, and Kuta. The problems on beach maintenance and management in the Phase-1 Project are; 1) insufficient and ineffective actions adapted for the partial beach retreats, 2) coastal facilities, such as revetments, groins and offshore breakwaters, and public facilities such as walkway, gazebo, light stand, etc., were left unfixed, 3) beach trash such as washed-up seaweeds, plastics, cans, and bottles were left at public beach areas, 4) encroachment of buildings on recovered sandy beach, such as the illegal construction of facilities and changes of alignment of walkways done not only by stakeholders but also by the local governments, 5) detailed definition of illegal construction practices and procedures on permission to construct the buildings were not clear, not only in the Phase-1 beaches, but also in other beaches in Bali. The encroachment of facilities into the beach induces the deterioration of its environment, loss of foreshore area which leads to new beach erosion.
- Cause-1 (Lack of Engineering Skills and Experience): For the technical part on beach management including beach monitoring and evaluation, Balai Wilayah Sungai Bali Penida (BWS-BP) has been responsible for its post-project stage. The BWS-BP has also made a contract with the local consultant to carry out continuous beach monitoring based on the topographic survey. However, due to lack of experience and skill of BWS-BP for understanding the adaptive management system on beach nourishment, the effective and systematic monitoring, evaluation, and countermeasures of maintenance

works have not been doing well. The accumulated monitoring data have not been well maintained and the obtained data have not been used appropriately.

- Cause-2 (Unclear Division of Responsibilities Among Managing Bodies): According to a Minute of Discussion (MOD) which was agreed by the central and local governments after the completion of the Phase-1 Project, it was decided that the local governments of Bali Province, Badung Regency, and Denpasar City would take responsibility for the maintenance work of the beaches after handing over the project area from the central government to the local government. However until now, no action has been undertaken by the local governments so far. Until now, the maintenance work in the Phase-1 Project area has been undertaken by the central government (BWS-BP) as required. The present condition on the beach maintenance was caused by the following reasons; 1) Previous MOD was concluded among the common rank of each party and was not authorized by higher officials. As a result, the responsibilities of managing bodies were remained unclear and the agreement became useless eventually; and 2) Actual and definite maintenance and management works were not clear enough for each related party. Each party actually did not understand the required actions and works on beach maintenance and management.
- Cause-3 (Insufficient Participation of Stakeholders in Beach Maintenance and Management): There were no active involvements from stakeholders (communities, hotels, restaurants, marine sports shops, etc., in each area) in the maintenance and management work of the beach after the completion of the Phase-1 Project (except beach cleaning at their territory area). A basic understanding of the stakeholders was that the governments would take care of all beach maintenance and management works using government budget.
- Cause-4 (Lack of Understanding on the Importance of Maintaining Beach Environment among Stakeholders): Beach cleaning, which is one of the beach management items, has been mostly conducted by the stakeholders in Sanur, Nusa Dua, and Kuta. Although the specific area (the South Kuta area) has been well controlled by stakeholders in cooperation with the private sector or/and NGOs, rubbishes, seaweeds, driftwoods, etc., were left on the beach at some local areas. These conditions were causing the deterioration of the beach environment and utilization of tourism resources. This problem was thought to be caused by the lack of understanding on the importance of a comprehensive beach management and maintenance among each stakeholder.
- Cause-5 (Lack of Understanding on the Rule of Beach Use and Function of Walkway): Illegal construction of facilities such as public facilities, souvenir shops, etc., which were constructed by hotels, communities, and sometimes by the local government, were identified on the recovered sandy beaches at Sanur, Nusa Dua, and

Kuta, even though the beach area is designated as a public space by the government. Furthermore, the alignment of walkways was illegally moved to the ocean in some areas, even though walkways have an important function in identifying the boundary between private and public properties. This problem was mainly caused by insufficient public understanding for the rule of beach use and unclear definition of the walkway as the boundary between public and private properties at beach area.

- Cause-6 (Unclear Regulation at Foreshore Area as Buffer Zone and its Procedures): The construction of facilities at the beach areas is not allowed by the regulation of each regency to keep the beach as a buffer zone in coastal areas. New construction of facilities such as fences, seawalls, and other coastal protection facilities, in addition to the construction of hotels, villas, shops, and restaurants, are being built at foreshore public areas even though it was prohibited by government regulations. This problem was mainly caused by unclear regulations on beach riparian, restrictions, procedure for permission, and punishment.
- Particular Issue of Sand Outflow at Kuta: Topographic change and volume of sand remains of the beach were reanalyzed by using shoreline monitoring data which has continuously carried out since the Phase-1 Project stage. The remaining rate of nourished sand at Sanur and Nusa Dua still maintained approximately 90% of its sand in eight years since the completion of the project. However, partial beach retreats were also observed at some sections which were protected by groins (headlands) at both sides. Some maintenance works such as sand relocation from deposit area to retreat area, and small-scale additional re-filling of sand were required at some sections. At Kuta, serious sand outflow after the beach nourishment and the decline of grand level at toe part of constructed revetment were observed at the northern part of the Kuta coral reef area (nearby the third offshore breakwater BWN3). Further, the beach recession between the south end sand stopper and the first offshore breakwater (BWN1) was also observed. These problems at Kuta were mainly due to the difference of beach conservation method between original design and actual which was caused by the social problems at Kuta during the Phase-1 Project.

b) Measures Implemented for the Improvement of Beach Management and Maintenance

Activity-1 (Categorizing the Issues): In order to improve the current condition on beach maintenance and management, the beach maintenance and management were divided into five items, such as: 1) Monitoring and maintenance of beach fill area; 2) Maintenance of coastal facilities; 3) Maintenance of landscape and public facilities; 4) Beach cleaning; and 5) Beach utilization (Control of beach use). The necessary action and

the desirable responsibility for each maintenance and management item were examined by the JICA Study Team. The drafts of the beach management system and its action plan were also examined and presented in Chapter 5. This aims to achieve sustainable beach management based on the cooperation of public and private sectors.

- Activity-2 (Active Involvement of Local Governments and Stakeholders to be Promoted): Not only the central governments but also the local governments and related stakeholders, should take responsibilities of beach maintenance and management with their ownership. Based on the draft idea on beach maintenance and management examined by the JICA Study Team presented in Chapter 5, continuous and thorough discussions and consultations were conducted to the central and local governments through the working group meetings (WG1 to WG3) and to the related stakeholders through several individual and comprehensive stake holder's meeting, as shown in Chapter 4.
- Activity-3 (Establishment of Inter-organizational Committee): In order to achieve sustainable beach management activities among related parties, namely, the central and local governments, and representative stakeholders, the JICA Study Team proposed to establish a comprehensive coordination organization namely, "Coordination Team for Beach Management (TKMPP)" to discuss and make a decision for the required long-term beach maintenance and management for the Phase-1 Project beaches. The main objective of TKMPP is shown in Section 5.3 (2), Chapter 5.

The organizational structure, task sharing on beach maintenance and management, as well as the legalization process of this TKMPP were outlined based on several case studies which were examined by the JICA Study Team through the discussions in WG1 to WG3.

- Activity-4 (Transfer of Engineering Skills): In order to improve the technical skills on beach monitoring and maintenance, which is especially necessary for the staff of the central government (BWS-BP and other related technical sectors in water resources, ex. Loka Pantai) for controlling the sandy beach after the nourishment, capacity development through lectures from the JICA Study Team and technical advisers (Dr Uda and Dr Seino), were held during this study. The previous OM manual was also updated by employing the latest monitoring data. By using the newest monitoring data, a lecture on "adaptive management" for the project on beach nourishment was given. The transfer of knowledge for beach management to relative institutions was carried out through WG meetings and capacity building by lecture and OJT as described in Section 4.2 and 4.3, Chapter 4.
- Activity-5 (Promoting Participation of Stakeholders on Beach Management): In order to enhance the stakeholders' awareness on the importance of participating in beach maintenance and management, consultation and consensus building based on group discussions were conducted with the stakeholders at Sanur, Nusa Dua, and Kuta. The

stakeholder's meetings were held at each beach area to discuss the selected issue, such as: 1) small-scaled recovery of shoreline by stakeholder level through sand relocation from nearby accumulation area to retreat area in Sanur; 2) Beach cleaning issue of Kuta beaches; and 3) Prevention of illegal construction on the beach in Nusa Dua. Furthermore, a seminar was held on September 13, 2012 for the purpose to enhancing the awareness on the importance and necessity of sustainable beach management and maintenance, which was participated by both related stakeholders and governments. The methods and activities for stakeholder's meeting are described in Section 4.4, Chapter 4 in detail. The further discussion is necessary to achieve the involvement of stakeholders on beach maintenance trough individual discussion and TKMPP.

- Activity-6 (Promoting Participation of Private Business Firms): The possibility for cooperation of private sectors as CSR scheme on beach management or public relation (PR) was examined. Many private sectors are already participating in the management of the beaches. They are cleaning the beaches while some are already involved in minor transportation of sand, placing securities, and rising fund for beach management. Many private firms expressed positive opinions on cooperating with government sectors. As for public relation (PR), major Japanese tourist agencies agreed to support its PR activities. Further discussions including schedule and budget were required for new PR development with private firms. The approach and activities for promoting participation is described in Section 5.5, Chapter 5 in detail. It is necessary to discuss continuously about PR activities and establish new PR system for sustainable beach management among private companies during implementation of the Phase-2 Project because it takes for a long time to establish this system.
- Activity-7 (Catalyzing Public and Private Sectors): The action for beach maintenance and management in cooperation with the public and private sectors has just been proposed and started in Indonesia. The experience and skill of the public sectors in Indonesia for beach maintenance and management especially the adaptive management, which is required to the management to maintain the sandy beach, is still insufficient. In the Asian countries, only Japan has lessened and learned the beach maintenance and management trough both of excellent and inferior experiences. Thus, continuous support based on the experiences in Japan may be contributed to achieve the effective management system and to rise up technical skills which are necessary to proceed the suitable beach maintenance and management with the ownership of Indonesia.

c) Outcomes for the Study of Review of the Beach Monitoring and Maintenance System on Phase-1

- TKMPP to be Formulated: In the final working group meeting (WG3) held on July 20, 2012 it was concluded and agreed by the following top level management of the central and local governments to establish a "Coordination Team for Beach Management (TKMPP)" of which the function is to discuss and make decisions for necessary actions for beach maintenance and management for the Phase-1 Project beaches. The members of TKMPP will be authorized by governor of Bali Province in order to empower them to make a decision of countermeasures and implementations against beach management issues.
 - Mr. N. Donny Azdan (Director of Watering and Irrigation, BAPPENAS)
 - Mr. I Gusti Ngurah Raka (Head of BWS-BP)
 - Mr. Tjol. Pemayum (Head of Bappeda, province of Bali)
 - Mr. Wayan Suambara (Head of Bappeda, Badung Regency)
 - Mr. I Gusti Anindya Putra (Head of Bappeda, Denpasar City)

In this meeting, five management items as mentioned before were agreed. The central and local governments (provincial, regency and city) promised to clarify the task and responsibility for each management item. Furthermore, the government organizations have committed to take necessary actions for the establishment of TKMPP immediately.

- TKMPP to be Managed and Organized: The decree of the Governor of Bali to establish the beach management coordination team (No. 1.694/02-C/HK/2012) was issued on 19th October, 2012. According to this decree, BAPPEDA (Planning Department in Bali Provincial Government) is in charge to organize the TKMPP. The head of Public Works Services of Bali Province (Dinas PU of Bali Province) is the chairman for TKMPP in cooperation with BWS-BP. Regency governments (DINAS of Badung Regency and DINAS of Denpasar City) will also take action on the part of beach maintenance and management works as one of main players, including budget allocation. However, certain technical part such as monitoring, evaluation, planning, and design, will be handled by the central government (BWS-BP) which will give technical suggestions to the local governments. Details on the division of responsibilities and required actions shall be discussed and decisions will be made in the TKMPP.
- Stakeholders' Participation is Confirmed: Stakeholders for each beach fully understood the importance and necessity for beach maintenance and management. Stakeholders also understood the necessity for sharing the task of beach maintenance and management at their level. In the seminar, the representatives of each stakeholder including hotels and communities informed that they are ready to participate in the beach

maintenance works possibly at their level. To achieve this, they requested governments to take necessary action such as establishment of TKMPP and discussions, etc immediately.

(2) Feasibility Study of the Phase-2 Project

a) Condition at the Study Area

- Definition of the Study Area: The study area is divided into two coastal areas; the east coast and southeast coast. The study area in the east coast is defined in this study to extend from North Sanur (north end of the Phase-1 Project area at Sanur) up to Candidasa with approximately 30 km alongshore. The study area in the southwest coast is from North Kuta (north end of the Phase-1 Project Area at Kuta) up to Canggu with approximately 15 km alongshore.
- General Information at East Coast: In the east coast, there are more than ten beaches situated alongshore. Most of the beaches belong to the local tourism or residential area with volcanic sandy beaches. Serious beach erosion caused by the rapid decrease of sand inflow from rivers was identified at the area from the mouth of the Ayung River up to the mouth of the Unda River, with approximately 20 km alongshore. Padangbai and Candidasa, which is located 25 km and 30 km far from the south tourism area are international tourism areas with coral reef. Based on the previous technical reports and papers, beach erosion at Candidasa which has occurred since the 1980s due to tourism development was caused by large-scale coral mining.
- General Information at Southwest Coast: The southwest coast from North Kuta ~ Legian ~ Sminyak, which consists of sandy beaches with mixed corals and volcanic sand, is now the highest international beach resort area in Bali Island. A lot of foreign and domestic tourists visit there. Many kinds of beach and marine activities are performed such as sunbathing, walking, surfing, body boarding, and sightseeing as it is one of the best location to watch the sunset.

b) Selection of Three Candidate Sites

- Requirement: According to the Minute of Meeting between Indonesian Government and JICA, three candidate sites shall be selected in this study by employing an appropriate evaluation criteria and checking items. Further, it was required that the candidate beach shall contribute to further development of world tourism in Bali.
- Procedure for Selection: Two main criteria are firstly considered for the selection that are; a) contribution to tourism in Bali and b) beach condition that is degree of beach erosion and obstacle to beach activities. If the subject beaches fulfill above two criteria, the candidate sites are preliminary selected. Among the selected beaches, further three

checking points are considered, that are c) socio-environment, d) coastal environment, and e) realization of beach management. If these points are expected not to affect the negative impact to the preliminary selected beaches, these beaches finally become the candidate beaches for the Phase-2 Project.

Selected Sites: Based on two main criteria, Candidasa, North Kuta ~ Legian, and Seminyak were selected as the first priority of candidate beaches for the Phase-2 Project. As the result for the evaluation of three checkpoints, no obstacle was expected for selected candidate beaches. The selected two beaches at the south west coast, which is North Kuta ~ Legian and Seminyak belong to continuous stretched sandy beach. Thus, it was combined as one package. The candidate sites for the Phase-2 Project are summarized as shown below.

Package-1: Candidasa (East coast)

Package-2: North Kuta ~ Legian ~ Seminyak (Southwest Coast)

Necessity for Improvement at Kuta: Kuta is one of Phase-1 Project beaches. Beach nourishment with construction of three offshore breakwaters was undertaken from runway to the end of Kuta reef with 2.6km alongshore distance. Furthermore, beach nourishment without any kinds of coastal structures was undertaken from the north end of Kuta reef to the Alam Kul-kul Hotel with 1.6 km alongshore distance. However, as presented in Chapter 6, the significant sand outflow after undertaking the beach nourishment has been observed at the south reef area of Kuta. This was mainly due to the difference of beach conservation method between original design and actual which was caused by the social problems at Kuta during the Phase-1 Project as mentioned in (1), a) in Summary. Thus, it was recommended to conduct the improvement measures at Kuta to mitigate the further outflow of sand, even though Kuta belongs to the Phase-1 Project and it is out of the study area.

c) Beach Conservation Plan

- Validity on the Future Development Policy: The validity of the Phase-2 Project was examined based on the Indonesian development policy, contributions of the Phase-1 Project, and needs for the Phase-2 Project. From the Indonesian development policies such as the National Medium-Development Plan (RPJMN) in 2010-2014, Bali Province Medium-Development Plan in 2008-2013, Spatial Plan in Bali Province in 2009-2029, and Strategic Plan of Ministry of Public Works in 2010-2014, it was confirmed that the proposed beach conservation project has the same direction and follow the said policies.
- Validity Based on the Contribution of the Phase-1 Project: It was proved that the Phase-1 Project gave a great contribution not only to maintain and develop the tourism,

but also to enhance the welfare of residents to conserve the culture, religion, and their life. Similar contribution was expected for the Phase-2 Project.

Package-1: Candidasa

- Beach Erosion: The first selected area, in Candidasa is the most major tourism beach at the east coast area. On the other hand, the sandy beach has almost disappeared by beach erosion and the beach utilization, beach approaching and the landscaping as the tourism area has deteriorated by the existing vertical concrete seawalls, a lot of groins and offshore breakwaters. According to the long term shoreline change, the retreat of shoreline due to beach and land erosion was 20 m to 40 m in the east area, and 40 m to 60 m in the west area for 30 years. Even though the large-scale coral mining on the reef, which was carried out from 1969 to 1974, was the primary cause of beach erosion, uncontrolled construction of seawalls and groins caused further deterioration of the beach condition. The mechanism of littoral sand drift and cause of erosion are described in section 10.6, Chapter 10.
- Beach Conservation Plan: It was requested to recover the sandy beach as previous condition in order to maintain the beach utilization and landscaping as world tourism area. On the other hand, westward littoral drift due to oblique incident waves from the south to south-south-east direction exists at Candidasa. Thus, it was required to minimize the littoral sand movement by employing the groin system as the same method as that in Sanur and Nusa Dua in the Phase-1 Project. As the suitable beach conservation measures, sand nourishment with a combination of modification of the existing groins and seawalls was recommended. The detail of layout plan and design is described in Chapter 11.
- Consideration in the Design: The width of coral reef at Candidasa is narrower than that at Sanur and Nusa Dua. It is expected that the difficulty to maintain the sandy beach is as the same level as that for Sanur and Nusa Dua after the beach nourishment. To secure the maintenance of nourished sand as much as possible, the following considerations are recommended on planning beach conservation measures; 1) Sand nourishment is planned to recover the beach width not too much as the same level as that at Sanur and Nusa Dua, taking into account the original situation of the beach width at Candidasa (originally the beach width was not so wide). Basically, only recovering the foreshore part was considered, and recovering of the backshore was not expected, 2) Position of the modified revetment is planned to be set-back as much as possible. However, further consultation and consensus building is required to each hotel owner to finalize the alignment of revetment to obtain their agreements.
- Subject to Project Distance: There are two options for the project area. One is from the peninsula located at the east end of Candidasa (Tanjung Nti) to the temple (Pura

Dalem Samudra), 3 km alongshore (Case-1). Another is from the peninsula to Alilla Manggis Resort Hotel, 5 km alongshore in order to cover the whole problem area (Case-2). The extended area for Case-2 with 2km alongshore belongs to mostly private properties, and the foreshore area was altered by the owners to construct the private villas. Taking into account of this social condition as well as the economical efficiency based on economic analysis, Case-1 was recommended as the first phase of the Candidasa project. However, further discussion is required with the Indonesian government to determine the scope of the project.

Package-2: North Kuta ~ Legian ~ Seminyak

- Beach Erosion: Beach erosion at this area seems not so serious compared to that of the east coast. However, according to the long term shoreline change, the beach recession for 30 years was observed at 5 m to 15 m at Legian-Seminyak and 10 m to 20 m at north Semiyak. The beach space becomes too narrow during high tide and is causing the disturbance of beach activities. The mechanism of littoral sand drift and cause of erosion are described in section 10.7, Chapter 10.
- Beach Conservation Plan: The most advantage of this beach area is still the maintenance of the natural sandy beach and without any kind of artificial coastal protection facilities. This present beach condition and its utilization shall be maintained in the long term as the highest beach resort area in Bali. This is the purpose of the proposal on beach conservation project at this area. This area was expected as a "balanced area" on littoral sand movement based on the technical study. Taking into account the abovementioned beach condition and technical point of view, beach nourishment without any kind of coastal structures is recommended. The detail of layout plan and design is described in Chapter 11.
- Project Area and Design: The recommended area for beach nourishment is from the north end of beach nourishment which is carried out in the Phase-1 Project (Alam Kul-kul Hotel) up to Kudeta Restaurant at Semiyak, 2.9 km alongshore. The target width of the beach is 20 m to recover almost the same condition of the beach 30 years ago. The beach slope is assumed at 1:10 taking into account the current beach slope and assumed grain size for filling sand.

Package-3: Improvement at Kuta

- Issue after Completion of the Phase-1 Project: Kuta is one of the Phase-1 Project beaches where beach nourishment was undertaken from the runway at the south end up to Alam Kul-kul Hotel at the north end, with a 4.2 km alongshore distance. Based on the monitoring result, undesirable outflow of sand was observed at the south part of the nourishment area which is located at the Kuta reef area. According to the monitoring result, the total amount of sand loss during the last three years was estimated roughly at 80,000 m³ (20% from total quantity of nourishment). This quantity of sand loss was significantly higher than that in Sanur and Nusa Dua (10% for eight years)
- Cause of the Issue: The undesirable outflow of sand was mainly caused by the difference between the proposed design and the actual implemented layout due to social problems encountered during the Phase-1 Project. Originally, the beach nourishment with three headlands and one groin system were proposed in the detailed design in 1998. However, before commence of the implementation, strong objections on the construction of headland system was suddenly brought up by the communities and related NGO group. Due to this, the project was suspended for three years. After conducting the socialization for more than 100 times, the communities agreed to carry out the project to employ beach nourishment with three offshore breakwaters as well with their proposed crown height. Even though the effectiveness to maintain the nourished sand became low, the project side should agree on their conclusion in order to proceed with the implementation of the project.
- Improvement Plan: In order to reduce further outflow of nourished sand, it was recommended to improve the current beach condition at Kuta as Package-3, even though the proposed site is the Phase-1 Project area and is out of the study area. The recommended improved measures is to add the groin part at the onshore side of exiting offshore breakwaters; BWN1and BWN2, following the original design concept in the Phase-1 Project. In addition, based on the monitoring result after the beach nourishment, it was recommended to construct the new L-shape groin at the south part of the existing offshore breakwater (BWN3) in order to stop further beach recession surrounding this area.
- No Possibility of Further Social Problem: Local people and communities, who had strong objection in the Phase-1 Project, have already realized the insufficiency of the present structures to control the sand movement after identifying the different condition for maintaining nourished sand between Kuta and Sanur, Nusa Dua. Thus, it is expected that there will be no further social problems to undertake the recommended measures for improvement.

d) Implementation Plan

Package-1: Candidasa

- Mitigation Measures for Natural Environment: One of the attractive points of Candidasa for tourists is the transparency of seawater and the existence of coral habitat. This has to be fully taken into consideration for the planning and implementation of the project to maintain marine environmental conditions. Some of the existing corals which are attached at some parts of the surface will be affected by the removal of existing offshore breakwaters. To mitigate this, coral transplantation by utilizing a newly formed space at the head part of modified groins is proposed. In the implementation, turbidity should be minimized as much as possible during the excavation and filling of sand on the beach. Taking into account this point of view, the sand mining from the offshore area using trailer suction hopper dredger, which is the same method used in Phase-1 Project, is not recommended. The grab-dredger with attached special sealing type bucket to minimize the turbidity during sand mining is recommended. Furthermore, the double handling method for transport of mining sand, unloading on the land, land transportation and filling on the beach is recommended.
- Mitigation Measures for Social Environment Problem: During the sand filling work in Phase-1 Project, a serious discontentment was raised by the community nearby the sand borrow site because the sand is taken to benefit other communities on their sacrifice.. In order to avoid the same kind of problem, it is recommended to avoid transporting sand for outsiders' benefit: sand procurement should be done within the community.

Package-2: North Kuta ~ Legian ~ Seminyak

- Availability of Sand Borrow: Based on the results of the diving survey for the potential area for sand borrow pit, the fine grain size of sand, which is not suitable for stable sand nourishment, is predominant located offshore of the Legian Seminyak area. On the other hand, there is a potential area to obtain suitable sand at the offshore area of the Kuta coral reef. Thorough explanation on sand excavation plan and the impact is necessary to the Kuta community.
- Method for the Nourishment: Taking into account the economical and environmental considerations as well as present beach use, direct pumping method using trailer suction hopper dredger, which is the same method used in Phase-1 Project, is recommended.

e)

Package-3: Improvement at Kuta

➤ Use of Stocked Sand for Sand filling: Sand stockpile with 140,000 m³ of sand was prepared south of Sanur, mainly taking into account the future possibility for refilling of sand at Kuta during the Phase-1 Project after the change of conservation plan due to social problems. This stocked sand can be available for refilling of sand which is required in this improvement.

Schedule and Engineering Services

- Duration of Construction: The estimated construction period is 36 months for Package-1, 10 months for Package-2, and 16 months for Package-3.
- Road Map to Operate the Beach Maintenance and Management System: The establishment of beach maintenance and management system was proposed in this study and the expected road map was proposed in section 5.4, Chapter 5. However the establishment of beach maintenance and management system is the first trial in Indonesia, and it is necessary to lesson and learn through the actual operation work on beach maintenance and management. To support the beach maintenance and management works in the Phase-1 and future implemented Phase-2 Project Beaches, the soft component was proposed as the engineering services in the Phase-2 Project. Detail is described in section 12.3, Chapter 12
- Cost for Soft Component: The cost for soft component is estimated at US\$ 2.6 million.
- Engineering Services: The components of engineering services in the Phase-2 Project are; 1) Detailed Design, 2) Assistance in Bidding, 3) Construction Supervision and 4) Soft Component.

Chapter 1 Introduction

1.1 Background

More than 30% of the coastal area in Bali Island, Indonesia has been utilized as a tourist area and its beaches have been contributed to the country's tourism economic development. Beaches are utilized not only as resort area for foreign and domestic tourists, but also for local residents holding religious events and other common recreational activities. On the other hand, beach erosion problems have been serious due to tourism development since 1970. Several reasons were realized as causes of erosion such as; 1) sand mining from the river and river mouse to obtain the construction material, 2) coral mining on the coral reef flat to obtain the building material, and 3) uncontrolled construction of coastal facilities (seawall, groins, etc.) individually at foreshore area.

To recover the original natural coral sandy beaches, the Indonesian government decided to conduct a beach conservation project, namely, "Bali Beach Conservation Project (BBCP)" (hereafter referred to as "the Phase-1 Project") financed by the Japan Bank for International Cooperation (JBIC, presently the Japan International Cooperation Agency, JICA). Three seriously eroded beaches, namely, Sanur, Nusa Dua, and Kuta, with a total length of 18 km, and one sea cliff erosion area at Tanah Lot Temple were selected taking into consideration their tourism importance. The sand nourishment with supplementary coastal facilities in combination with groins, headlands, and offshore breakwaters were employed to recover the coral sandy beaches at the said three beaches except Tanah Lot. This project was first implemented in Tanah Lot in July 2000, while those for other beaches commenced subsequently. The project was finally completed in December 2008 with Kuta as the final package.

The recovered sandy beaches highly contributed to the maintenance of the tourism industry in Bali. On the other hand, several problems on beach maintenance and management were exposed after the completion of the project. Consequently, unsatisfactory beach conditions, which are related to beach maintenance and management system, were observed at several areas. Based on these conditions, it has been strongly required to establish sustainable beach maintenance and management system to the Phase-1 Project beaches for both public (government) and private (stakeholders) sectors.

The international beach resort area is concentrated at the south part of Bali Island, which has adverse influence on tourism considering the constant increase of tourists. To relieve the concentration at the said area, a new resort site shall be developed as part of the tourism area extending towards the east and west coastal area. On the other hand, beach erosion problem has expanded to almost all the coast areas in Bali Island. Based on these conditions and since the completion of the Phase-1 Project, a similar beach conservation project has been requested by the Indonesian government, particularly by the local government in Bali.

1.2 Objectives of the Study

This study will proceed on the basis of "The Minutes of Meeting for the Preparatory Survey on Bali Beach Conservation Project (Phase-2)" agreed by the Ministry of Public Works (PU), the National Development Planning Agency (BAPPENAS) and JICA on May 20, 2011. The objectives of the preparatory survey are as follows:

Component 1 (Review of the monitoring and maintenance system of the Phase-1 Project)

To review and study the sustainable monitoring and maintenance system for the beaches of the Phase-1 Project involving related stakeholders, to achieve a sustainable and appropriate beach maintenance after the project.

Component 2 (Feasibility study for the project)

To review and study the feasibility of the next beach conservation project (as the Phase-2 Project) considering selection of a candidate beach, scale of project, and feasibility for sustainable beach maintenance based on the study result for component 1

1.3 Study Area

The study areas covered in this preparatory survey work are shown in Figure 1.3.1.

➢ For component 1:

Sanur, Nusa Dua, and Kuta (nourishment of beaches in the Phase-1 Project)

➢ For component 2:

East coast area (from north Sanur to Candidasa with approximately 30 km alongshore) West coast area (from north Kuta to Canggu with approximately 15 km alongshore)



Figure 1.3.1 Location of the Phase-1 Project and Phase-2 Study Area

(Source: JICA Study Team)

1.4 Scope of Work

The scope of work for each component is as follows:

(1) Review of the Beach Monitoring and Maintenance System of Previous Phase-1 Project

- [1-1] Review the current situation of coastal management
- [1-2] Review the problems and countermeasures on beach conservation
- [1-3] Support consensus building among stakeholders concerned on coastal management
- [1-4] Support the implementation of coastal maintenance and management

(2) Feasibility Study for the Project (as Phase-2 Project)

- [2-1] Data collection and analysis
 - [2-1-1] Review existing reports
 - [2-1-2] Natural condition of the survey area
 - [2-1-3] Social-economic condition of the survey area
 - [2-1-4] Review of the external condition outside the study area
- [2-2] Review the current situation on coastal management
- [2-3] Review the problems and countermeasures on beach conservation
- [2-4] Selection of three candidate sites
- [2-5] Field survey and analysis
 - [2-5-1] Coastal survey
 - [2-5-2] Beach erosion survey
 - [2-5-3] Survey of existing facilities related to coastal conservation
- [2-6] Formulation of urgent coastal conservation plan
 - [2-6-1] Setup the objective for the project
 - [2-6-2] Consideration and recommendation of suitable project scope to meet the balance between economic activity and coastal erosion
 - [2-6-3] Clarification on the causes of erosion
 - [2-6-4] Selection of proper countermeasures against coastal erosion
 - [2-6-5] Design the basic layout, coastal conservation facilities, and other related facilities
 - [2-6-6] Estimation of feasible project cost

- [2-6-7] Consideration of appropriate project implementation schedule and construction plan
- [2-6-8] Consideration of effective structure for project implementation
- [2-6-9] Analysis on the financial condition of the executing agency, and consideration of the financial plan
- [2-6-10] Consideration of appropriate contract packages
- [2-6-11] Consideration of project effectiveness including economic cost and benefit, e.g., EIRR and FIRR (if possible)
- [2-6-12] Consideration of appropriate "Operation and Effective Indicators"
- [2-6-13] Consideration of effective structure for the project operation and maintenance
- [2-6-14] Environmental and social considerations
- [2-7] Support for consensus building among stakeholders concerned on coastal management
- [2-8] Support for the implementation of coastal maintenance and management

The overview of this study and its schedule is shown in Figure 1.4.1.

1.5 Outline of Previous Phase-1 Project

(1) **Project Outline**

The Bali Beach Conservation Project (the Phase-1 Project) consists of four packages, namely, Sanur (Package-1), Nusa Dua (Package-2), Tanah Lot (Package-3), and Kuta (Package-4). Among these, Sanur, Nusa Dua, and Kuta are facing serious beach erosion problems on coral sandy beaches. On the other hand, Tanah Lot has cliff erosion problems.

The Bali project sites are highly populated with tourists. Hence, the project is expected to contribute in maintaining and further developing the tourism sites in Bali as a world famous beach resort. To achieve this, it is required to consider not only the protection point of view, but also beach utilization, landscaping, and beach environment as a tourist area. Beach nourishment was the only measure to fulfill these requirements, and was undertaken to recover the coral sandy beach at Sanur, Nusa Dua, and Kuta.

Design principles for these three beaches are intended to form a static stable condition of the beaches after its nourishment, in order to minimize future maintenance for sandy beach, which is done through frequent sand refilling. To obtain such stable condition, the beach nourishment was executed together with supplementary coastal facilities such as groins, headlands, and offshore breakwaters to prevent littoral sand movement. The project information and outline of beach conservation measures for each site are shown in Table 1.5.1, and Figures 1.5.1(1) and (2).





(Source: JICA Study Team)

GENERAL		
- Project Name	:	Bali Beach Conservation Project
- Executive Agency	:	Directorate General of Water Resources, Ministry of Public Works
- Location of Site	:	Sanur, Nusa Dua, Kuta and Tanah Lot - Bali Island, Indonesia
- Construction Period	:	July 2000 - December 2008 (For All packages)
Package I (Sanur Beach)		
- Construction Period	:	November 2001 - October 2004
- Length of Project Area	:	4,910 m (Original Area) + 2050 m (Additional Area)
- Beach Fill	:	301,200 m3
- Demolition of Existing Structures	:	10,800 m3
- Breakwater	:	BWN-1 (1 nos)
- New Groins	:	GN-1, 2, 3 and 4 (4 nos in Original Area), GA-1 and GA-2 (2 nos in Additional Area)
- Modification of Existing Groins	:	G-3, G-4, G-7, G-16, G-32, G-38, G-39 (7 nos in Original Area)
- Extension of Existing Outlets	:	6 Nr
- Walkway	•	5.830 m
- Landscaping	•	
Package II (Nusa Dua Beach w	ith	Ouarry Development)
- Construction Period	:	August 2001 - October 2004
- Length of Project Area	•	2.900 m (Original Area) + $3500 m$ (Additional Area)
- Beach Fill	•	342,600 m3
- Supply of Rock for Package I	•	74 800 m3
- Demolition of Existing Structures	•	16 600 m3
- Y - Groin UG-1	•	UG-1 (1 nos)
		GN-1 and 2 (2 nos in Original Area)
- New Groins	:	GA1. 2. 3 and 4 (4 nos in Additional Area)
- Modification of Existing Groins		$G_{0} = 1.4.5 \oplus 10$ and $12.77 \text{ nos in Original Area}$
- Revetment	•	50, n, -, -, -, -, -,
- Walkway	•	3 280 m
- Landscaping	•	Limp Sum
Package III (Tanah Lot)	•	
- Construction Period	•	July 2000 - February 2003
- Submerged Breakwater	•	1 nos (182m Length 70m Width)
Number of Tetrapod	•	2.700 nos (16-T Tetrapod), 4.400nos (6.3-T Tetrapod)
- Removal of Existing Tetrapod		1 500 nos
- Artificial Rock	•	3 287 m2
- Removal of Existing Sand	•	707 m3
Landscaping	•	Lump Sum
Package IV (Kuta Beach)	•	a F a an
- Construction Period		June 2006 - December 2008
- Length of Project Area	:	Approx 7.000 m (4.200m for Beach Nourishment Area)
- Demolition	;	9.200 m3
- Revetment	:	1,230 m
- Offshore Breakwater	:	BWN1(L 155m), 2(L 125m) and 3 (L 100m) (3 nos)
- Beachfill	:	519,000 m3
- Reef Flat Restoration	:	Group-A (Approx. 10,000 m2), Group-MD (Approx. 7,000 m2)
- Coral Transplantation	:	110,000 nos of Fragment at Group A (10,000m2)
- Walkway	:	3,400 m
- Permanent Stockpile Volume	:	140,000 m3
- Drainase	:	350 m
- Parking Area	:	3,300 m2
- Public Facilities	:	Lump Sum
- Landscaping Works	:	Lump Sum
Total Project Cost		Approx 9,600 Million Yen (675 Billion Rp.)

 Table 1.5.1
 Project Information for Previous Phase-1 Project

(Source: Project Completion Report -Technical Edition-)



(2) Package-2 (Nusa Dua)



(Source: Data for BBCP Phase-1 arranged by the JICA Study Team)



(4) Package-4 (Kuta)

Figure 1.5.1 Outline of Previous Phase-1 Project (2/2)

(Source: Data for BBCP Phase-1 arranged by the JICA Study Team)
(2) Problems

As shown in the latter chapter, the project has significantly contributed to tourism. The number of visitors who stayed or visited the project beaches have significantly increased compared without the project.

On the other hand, the nourished beach is always subjected to natural hydraulic impact such as waves and current. Beach nourishment is noted as a kind of "soft structure", with sand fill constantly moving (or sometimes flow out) due to wave and current, despite the existence of supplementary coastal facilities. Thus, beach maintenance and management based on an "adaptive management system" shown in Figure 1.5.2 is strongly recommended.



Figure 1.5.2 Coastal Management Based on "Adaptive Management System"

(Source: JICA Study Team)

After the completion of the Phase-1 Project, the issue for beach maintenance and management system was discussed. The sharing of responsibilities on beach maintenance and management were also discussed between the central and local governments. However, beach maintenance and management has not been doing well, and unsatisfactory beach conditions due to insufficient maintenance and management have been observed at several areas in the Phase-1. Such conditions include partial beach retreat, damaged coastal facilities, inefficient cleaning of beaches, and uncontrolled beach use, especially illegal construction activities along the beach.

These problems will cause the deterioration of beach conditions for the Phase-1 beaches and might have negative effects on tourism development.

1.6 Understanding the Current Condition

Current Condition of Beach Maintenance and Management of Phase-1 Beaches

(1) **Problems of the Governments in charge of Coastal Management**

a) Insufficient skills and experience on beach maintenance and management

The beach monitoring and maintenance after the Phase-1 Project has been carried out basically by the Department of River Region Bali-Penida (Balai Wilayah Sungai Bali-Penida, hereinafter referred to as "BWS-BP"). According to the information from BWS-BP, three technical staff and other four administrative staff are in charge of beach maintenance works including other beaches in Bali Island. Some of the beach maintenance projects were conducted by BWS-BP for the part of Sanur and Nusa Dua beaches, as countermeasures against partial beach retreat problems after the completion of the Phase-1 Project. However, the effective and useful monitoring, and undertaking of countermeasures did not seem to be carried out successfully. This was caused by insufficient capacity of beach management system (monitoring \rightarrow evaluation \rightarrow planning \rightarrow execution) based on "Adaptive Management System", which was required to the beach nourishment project as shown in Figure 1.5.2. b) Unclear issues on sharing of responsibilities on beach maintenance and management between central and local governments.

According to the agreement between the central and local governments during the Phase-1 Project in the workshop, the beach maintenance work will be handed over by the central government (PU) to the local government (Bali province and regency). However, there was no activity by the local government in terms of beach maintenance and management.

(2) **Problems of the Stakeholders**

a) Insufficient involvement on beach maintenance and management

The cleaning of the beach, which is one of the periodic maintenance items, has been carried out continuously at most in the project beach areas by hotels and each community within their

territory. A clean beach condition could be maintained at these areas. On the other hand, there exist some unsatisfactory cleaning conditions at some areas. Seaweeds and rubbishes have accumulated on the beach, which causes deterioration of beach's landscape and coastal environment.

b) Illegal construction on recovered sandy beach

Recovered sandy beach area is under the territory of the government. The boundary between the private and beach areas under the government territory was defined by a newly constructed



Photo 1.6.1 Illegal Construction on Recovered Sandy Beach Area

(Source: Nippon Koei)

walkway. However, some illegal facilities were constructed by hotel owners and communities after the completion of the Phase-1 Project. The narrowness of foreshore area and deterioration of beach's landscape were observed at some areas.

(3) **Problems of End Users and Private Sectors**

The beach conservation project can directly contribute to the tourists and residents who visited the project beaches. Furthermore, the project beach area can be utilized for holding some events and other businesses. From this point of view, the contribution and participation of end users (tourists and residents) and private sectors are desired through sharing some responsibilities on beach maintenance works. However, most visitors (including both Indonesian and foreign tourists) did not realize the execution of the Phase-1 Project, and misunderstood that the condition of the Phase-1 beaches were maintained without further effort. Due to this, people's awareness in participating in beach maintenance was regarded low.

Understanding the Phase-2 Study Area

(1) Development of Infrastructure at East Coast and Expansion of Resort Area at West Coast

Several famous beach resorts in Bali are concentrated at the south coast area. The proliferation of beach resorts has caused some socio-environmental problems such as chronic traffic jams, improper waste disposals, etc. To solve this, the Government of Bali has developed the east and west coast area in order to disperse and expand the tourism area. The new development of infrastructures and tourist sites have been executed at the east coast area. These include construction of new toll road from north Sanur to Padangbai, new development

of tourist area at Lebih, pening of new cruiser port at Tanah Ampo, etc. The high grade villas, hotels, and restaurants are being developed at the south west coast area from north Seminak to Canggu.

(2) Proposed Area for Coastal Protection and Beach Conservation Measures by the Government of Indonesia (GOI)

Figure 1.6.1 shows the location map of the beaches, where coastal protection and beach conservation measures are required. This location map was made by GOI based on site investigation, to check the current beach condition after the completion of the Phase-1 Project. More than 20 eroded beaches were selected as beaches requiring coastal protection and beach conservation measures.

Among these, ten beaches are included in the study area for Phase-2.



Figure 1.6.1 Candidate Beaches for Coastal Protection/Beach Conservation Proposed by GOI

(Source: BWS-BP arranged by the JICA Study Team)

Lessons Learned from the Phase-1 Project

(1) Importance of Concensus Building to the Communities

As the Phase-1 Project was the first large-scale beach conservation project employing the method of beach nourishment, several social problems were exposed as follows:

- Strong objection from the Kuta community for employing groin system (This was caused by the negative image of this type of structure based on their previous experience).
- Strong objection from the neighborhood community for dredging sand from offshore area (This was basically due to jealousy for using dredged sand to other beaches as part of beach conservation project).
- Hard negotiation with private owners of land properties and hotels regarding the identification of walkway alignment, which will serve as the boundary between the beach area (under the control of the government) and their property.

One of the uniqueness of Bali society is the strong power of the community. The area of the Phase-1 Project was widely spread with several different communities. Hence, individual consensus building for each community was required to obtain the final acceptance for the project. To proceed with the consensus building smoothly, it was learned from the Phase-1 Project that frequent face to face explanation and discussion with each community to gain mutual trust is very important.

(2) Necessity of Understanding the Difference between "Beach Conservation" and "Coastal Protection"

There were many coastal protection projects in Indonesia. These include construction of coastal facilities such as seawalls, revetments, groins, and offshore breakwaters to protect the land side, taking into consideration only the functional point of view. Basically, there was no consideration on utilization, landscaping, and coastal environment, strongly required which are for beach conservation in the tourist area. The most important consideration for beach conservation is how to maintain the beach taking into account not



Previous (Sanur)



Beach Conservation considering utilization and landscaping (same position)

Photo 1.6.2 Beach Conservation (Sanur)

(Source: Nippon Koei)

only the functional point of view, but also utilization, landscaping, and coastal environment as a tourist area. Beach nourishment is the most common method for fulfilling the multi-purpose beach conservation measures. On the other hand, outflow of sand is anticipated and frequent maintenance work to re-fill the sand is commonly required. In order to reduce the outflow of sand and minimize maintenance cost, construction of coastal facilities such as groins, headlands, breakwaters, and revetments are sometimes excessive. Consequently, this leads to the deterioration of beach utilization, natural landscaping, and coastal environment, which are strongly required especially for the tourist beaches. Thus, it is very important to consider the balance between "functional and economical point of view" and "utilization, landscaping, and coastal environment" as beach conservation measures, especially at tourist beaches.

REVIEW OF THE BEACH MANAGEMENT SYSTEM ON PHASE-I

Chapter 2 Review of the Current Situation on Beach Management

2.1 Overview of the Current Situation on Beach Management

The following three items were studied in order to have a grasp of the current situation on beach management for Phase-1.

	Current situation on beach monitoring and maintenance	[2.2]
\triangleright	Current situation on beach management system	[2.3]
\triangleright	Current situation on beach management policy	[2.4]

As a result of the studies conducted, most of the beaches are in good condition and received a lot of benefits after the project completion. However, various issues such as technical management, financial condition, organizational operation, demarcation of responsibility, legislative preparations, etc., were pointed out. These comprise the following five principal issues from the viewpoint of beach management;

- 1) Uncontrolled partial retreat of beaches (Refer to Section 2.3 (1))
- 2) Uncontrolled damage of coastal protection facilities (Refer to Section 2.3 (1))
- 3) Uncontrolled damage of public facilities (Refer to Section 2.3(1))
- 4) Lack of cleaning activities especially in public areas (Refer to Section 2.3(2))
- 5) Uncontrolled construction of illegal buildings and structures and relocation of walkway without permission (Refer to Section 2.4 (2))

According to the study and analysis of beach management issues, the above issues from items 1) to 3) have common obstructive factors, as follows;

- Lack of awareness on the importance of continuous monitoring and maintenance among government institutions and stakeholders related to beach management;
- Unclear demarcation of responsibilities among government institutions; and
- Lack of technical skill for evaluation of monitoring results, analysis of data, planning of countermeasures.

The obstructive factors for above item 4) on lack of cleaning activities pointed out the following issues;

- Lack of awareness against the importance of beach cleaning especially at the stakeholders level; and
- Lack of involvement of the project's direct and indirect beneficiaries on beach management.

The obstructive factors for above item 5) on uncontrolled beach utilization pointed out the following issues;

• Unclear representation of walkway along the beach as boundary between the public and private;

- Insufficient daily monitoring and control against illegal buildings in the beach nourishment area; and
- Unclear permit approval system by governments against construction in the coastal zone.

For the establishment of an appropriate beach management, the whole community members consisting of government institutions and stakeholders related to beach management should understand all important points/issues, and most importantly share countermeasures against these issues through the cooperation and initiatives of the public and private sectors. The contents of this chapter are described in Figure 2.1.1.



Figure 2.1.1 Process Flow on the Review of the Beach Management Current Situation

(Source: JICA Study Team)

2.2 Current Situation on Beach Monitoring and Maintenance

(1) Technical Skill for Monitoring and Data Archive System

The monitoring activities were handed by the international consultant and contractor to BWS-BP since 2009 after project completion. The past records of beach monitoring and maintenance activities from 2007 to 2011 are summarized in Appendices 2.2.1 to 2.2.3.

According to the information, beach monitoring has been carried out continuously at least twice a year and its quality also has been kept in good condition until 2008. The monitoring activity was not carried out in Sanur last 2010 and the monitoring area was narrowed in Nusa Dua in 2009 and 2010. At the same time, the quality of beach monitoring had changed for the worse from 2009 to 2010. It is difficult to use some monitoring data for quantitative analysis and evaluation to understand the change of shoreline and quantity of sand lost. It is thought that possible causes of unstable condition are the 1) lack of benchmark on site (lost of bench mark) and 2) lack of quality control by BWS-BP for results monitoring. Also, the quality of archiving monitoring data was not good. Recent monitoring data as well as series of old monitoring data were not archived properly by BWS-BP. This makes the evaluation of beach monitoring data incomplete since some of data were lost.

- The current situation of beach monitoring becomes worse as capability of technical skill for monitoring has declined since the completion of the project. The objective of monitoring surveys and how to analyze/evaluate and conclude the required maintenance activity based on "Adaptive Management Concept" are not well understood by BWS-BP.
- Archiving of monitoring data by BWS-BP is also one of the problems. Data of long monitoring period is very important and useful to be able to evaluate and know the actual beach phenomena and shoreline movement.

(2) Technical Skill for Planning on Beach Maintenance

The principal maintenance works in Sanur, Nusa Dua, and Kuta beaches after project completion are summarized as follows:

(Sanur)

- Construction of groins (G37 and G5) and supplementary sand nourishment in 2006;
- Repair of revetment on the south side of G16 in 2008 and 2010; and
- Construction of retaining wall and repair of walkway on the north side of GA2 in 2011.

(Nusa Dua)

- Repair of walkway around GA8 and G0 in 2008;
- Construction of groins (GN5 and GN6) and supplementary sand nourishment in Tanjung Benoa area in 2010; and
- Construction of groin (GN4) and supplementary sand nourishment in Tanjung Benoa area in 2011.

(Kuta)

- Replacing stones to reinforce revetment in front of Kartika Plaza Hotel in 2010.

According to inventory survey and result of shoreline data, construction of groins in the Sanur area has an effect on controlling beach erosion. However, beach erosion has not reduced even though three additional groins which serve as countermeasures were constructed in the north of Nusa Dua. It is observed that the technical skills required for the evaluation of monitoring data and planning on beach maintenance are not enough.

(3) Capability of Beach Monitoring and Maintenance by Government Institutions Related to Beach Management

In order to understand the capability of beach monitoring and maintenance by government institutions related to beach management, past records and budget for beach monitoring and maintenance activities at Phase 1 area are summarized in Table 2.2.1. The government institutions consist of the following five institutions:

- ▶ BWS-BP for Sanur, Nusa Dua, and Kuta Beaches;
- Dinas PU of Bali Province for Sanur, Nusa Dua, and Kuta Beaches;
- Environmental Agency of Bali Province for Sanur, Nusa Dua, and Kuta Beaches;
- > Dinas PU of Denpasar City for Sanur Beach; and
- > Dinas PU of Badung Regency for Nusa Dua and Kuta Beaches.

Government institutions except for BWS-BP and Environmental Agency of Bali Province did not allocate a budget for monitoring activities for Phase-1 Project. Both budget of BWS-BP and Environmental Agency have increased gradually and their budget for 2011 were Rp.380,000,000 and Rp.50,000,000, respectively. The principal monitoring activities of BWS-BP and Environmental Agency were 1) beach profile survey and 2) monitoring of seawater, coral reef, sea grass, and mangrove based on EIA, respectively.

Government institutions except for BWS-BP have never allocated budget for maintenance activities. The fiscal budget scale of BWS-BP is between Rp.8,000,000 and Rp.6,470,000,000 since 2007. BWS-BP allocated a maximum budget in 2007, and this consists of construction of groins and additional sand nourishment from sand stockpile in Sanur as countermeasure against partial retreat of the beach. In the 2010 and 2011 budget, comparatively, more budget was also allocated for the construction of groins and additional sand nourishment in the north of Nusa Dua (Tanjung Benoa Area) such as Rp.4,460,000,000 and Rp.3,330,000,000, respectively.

The detailed information on beach monitoring and activities and budget for government institutions are shown as follows.

Appendix 2.2.1 describes the contents of beach monitoring and maintenance for Phase-1 as follows;

- Specific item and frequency of beach monitoring;
- Item and number of own equipment for beach monitoring;
- Method of beach monitoring;
- Engineer and staff for beach monitoring;
- > Past records of maintenance activities; and
- > Possession situation of equipment, heavy machinery for maintenance work.

Appendices 2.2.2 and 2.2.3 describe the beach monitoring and maintenance activities and budget for the whole area excluding Phase-1 as follows;

- Past records of beach monitoring activities;
- Past records of beach maintenance activities;
- Past records of beach conservation project;
- Budget for beach monitoring in the last five years;
- Budget for beach maintenance in the last five years;
- Budget for beach conservation project in the last five years; and
- Budget for relative division and department for beach management in the last five years.

According to Appendix 2.2.1, the capability of beach monitoring and maintenance for government institutions is summarized as follows:

• BWS-BP and Bali Province have total station, water pass, GPS, eco sounder, current meter, etc., for monitoring activities. On the other hand, Denpasar City and Badung Regency have only camera, measuring tape, and GPS. It is likely that they cannot carry out beach monitoring except visual inspection;

- They have some engineers and staffs for beach monitoring and maintenance. However, there are no coastal engineers and experts in all government institutions to evaluate the monitoring data and to plan countermeasures against partial retreat of the beach; and
- BWS-BP and Dinas PU of Bali Province have implemented maintenance work not only at Phase-1 area but also in other beaches in Bali. The principal maintenance work by Dinas PU of Bali Province is the construction of revetment to protect land against beach erosion. BWS-BP, Denpasar City and Badung Regency have dump trucks and/or trucks for maintenance.

According to Appendix 2.2.3, the capability of beach monitoring and maintenance from the viewpoint of budget scale is summarized as follows:

• BWS-BP has been allocating budget for maintaining a proper balance among monitoring, maintenance activities, and beach conservation project (new project) in the whole Bali. On the other hand, Dinas PU of Bali Province has not prepared a budget for monitoring activities, and fiscal budget for maintenance activities and beach conservation project has been unstable. The annual budget scale in the last five years for BWS-BP were :

	Monitoring activities	: Rp.91,000,000 to Rp.250,000,000
≻	Maintenance activities	: Rp.8,000,000 to Rp.6,470,000,000
≻	Beach conservation project	: Rp.1,500,000,000 to Rp.52,457,200,000

• According to the budget for the past five years of related division and department in government institutions, the fiscal budget scale for government institutions is shown as follows. The budget of related division and department differed substantially among them, where BWS-BP and Bali Province made relatively bigger budget and Denpasar City and Badung Regency made markedly less budget.

(Department of Public Works)

- ► BWS-BP : Rp.35,704,064,000 to Rp.124,964,224,000
 - Dinas PU of Bali Province : Rp.119,614,238,100 to Rp.193,445,315,174
- Dinas PU of Denpasar City : Rp.47,017,000,000 to Rp.60,080,000,000
- Dinas PU of Badung Regency : Rp.35,278,000,000 to Rp.93,811,000,000

(Related division/unit for beach O&M)

- PPK O&M & PPK River and Coastal II (BWS-BP) : Rp.5,960,000,000 to Rp.55,787,600,000
- Section of Water Resources Engineering (Bali Province) : Rp. 8,599,007,000 to Rp. 54,834,827,200
- Sub-unit of Water Resources Engineering (Denpasar City) : Rp.4,712,000,000 to Rp.7,688,000,000
- Irrigation Sub-unit (Badung Regency)
 : Rp.1,428,000,000 to Rp.7,481,000,000

		•	Construct is	a thirtices which relate to bood	* monocomot	、 、
tegory	Item	Balai Wilayah Sungai Bali - Penida (RWS-RD)	Dinas PU of Bali Province	Environmental Agency of Bali Drovince	Dinas PU of Denpasar city	Dinas PU of Badung Regency
S	Object beaches	Sanur, Nusa dua and Kuta Beach	Sanur, Nusa dua and Kuta Beach	Sanur, Nusa dua and Kuta Beach	Sanur Beach	Nusa dua and Kuta Beach
		- Beach profile survey twice a vear	- There is no funding allocation	- Monitoring of Seawater Quality	- No Activity for Beach Monitoring.	- No Activity for Beach Monitoring.
		(June & Septem); - Analysis of shoreline change and	from the Local Budged (APBD) for	for several spot area (Sanur, Musa Dua and Kuta)		
	Activities for monitoring of	sand lost; -	- Surveillance of the beach	- Monitoring and Controlling the		
səi	beaches	Recommendation several	utilization performed by City	Implementation of EIA;		
tivit:		counterm easure.	Planning Agency with coordination	- Monitoring Coral Reef, Seagrass		
)6 ac			DY FUDIIC WOIN OF DAIL FLOVINCE	ariu marigrove as indicator or environmental condition.		
ouene		- The maintenance works were carried out for damaged structures	- No activity for beach	- Plantation of Mangrove at Mertasari (Sanir) and Coral Reef	- No Activity for Beach Maintenance	- No Activity for Beach Maintenance
ətri		such as walkway walkroad on the	-Dinus PLL of Bali Province has	at Serandan and South Sanur		
em		aroin and public facilities.	Operation and Maintenance Unit.	at octanigan ana ocam oana Area.		
pu		- Additional beach filling was carried	but they conducted for irrigation			
e 61		out at some retreated area from	sector only.			
nin		permanent sand stockpile.				
otin	Activities for maintenance	- Beach conservation structures				
ow	of beaches	such as groin and revetment was				
чэ		constructed in order to reduce the				
eə		shoreline change and the sand lost				
B		based on the long term beach				
		monitoring and requirement from				
		local people at South Sanur area				
		(GN5 and G37) and North Nusa				
		Dua area (GN4, GN5 and GN6).				
	Budget for 2011	Rp 380.000.000,-		Rp. 50.000.000,-		
	monitoring of 2010) Rp 250.000.000,-		Rp. 42.000.000,-		
) Rp 206.000.000,-		Rp. 25.000.000,-		
ţ		3 Rp 91.000.000,-				
əbp	1431 J years 2007	-		Rp. 15.000.000,-		
one	Buideof for 2011	Rp 3.330.000.000,-				
1		0 Rp 4.460.000.000,-				
	heaches in the 2009	PRp 8.000.000,-				
	last 5 vears 2008	3 Rp 96.000.000,-				
	2007	Rp 6.470.000.000,-				
					(Sour	ce: JICA Study Team)

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(4) Usage of Sand Stock for Maintenance of Phase-1 Beaches

In the Phase-1 Project, the sand stockpile was constructed at south Sanur (Mertasari Area), and 140,000m3 of sand was stocked taking into account future re-filling of sand as the maintenance of the Phase-1 Beaches for ten years. Main portion of the sand stock was expected to be used for the sand re-filling at Kuta Beach based on the predicted quantity of sand outflow.

Until now, only roughly 21,000m3 of sand was utilized by BWS-BP for the sand re-filling between Groin No GA8 and GA3, and GA3 and GA2 at North of Nusa Dua together with the construction of additional groins in order to mitigate the beach retreat which was observed after completion of the project (refer to Fig. 1.5.1 (2)). However as the beach monitoring after this measure was not conducted, the effectiveness for the measures was not clear.

There was no determined plan for the usage of sand stock based on the evaluation result of beach monitoring, and still 120,000m3 of sand was remaining, even though almost ten years has already passed since completion of the nourishment at Sanur and Nusa Dua.

The reason why the stock sand was not used effectively is;

- 1) The beach change and the condition of beach retreat doesn't be well evaluated by BWS-BP based on the result of beach monitoring
- 2) The ownership and usage of sand stockpile and stocked sand was not clear to the governments (local governments) and stakeholders. Due to this, even if some parties or hotels has a problem on the beach retreat in front of their property, and they want to consider some rehabilitations to recover the sandy beach, there is no chance to consider the usage of stock sand with cooperation of BWS-BP.



Figure 2.2.1 Sand Stockpile at South Sanur

(Source: Nippon Koei)

2.3 Current Situation on Beach Management System

(1) Current Situation on Management of Nourished Beach and Facilities

Some coastal and public facilities have been damaged after completion of the project due to progression of partial retreat of beach, wave overtopping, various human activities, etc. In order to reduce partial retreat of beach, some maintenance and construction works have been implemented by BWS-BP as shown in the lower column of Appendices 2.2.1 to 2.2.3. However, these works have not reached the inclusive maintenance because only a small portion of countermeasures were done. Based on the inventory survey, the situation and location of the partial retreat of beach, damage of coastal facilities, and public facilities in Sanur, Nusa Dua, and Kuta beaches are summarized in Table 2.3.1. Serious beach erosion has been occurring in the following areas; southern part of Sanur, northern part of Nusa Dua, and in front of Kartika Plaza Hotel in Kuta. Some parts of the revetment were damaged due to progressing beach erosion and scouring due to waves. Regarding public facilities, some pavement parts of the walkroad on the groin were damaged due to beach erosion.

Location Situation of partial retreat of beach and damage to coastal and public facilit							
Sanur Beach							
G3–G4	- Da	amage a part of the walkroad in G3					
G4–G5	- Da	amage a part of the walkroad in G4					
G7–GN4	- Pa	artial retreat of beach in the north of G	SN4				
G38–G39	- Da	amage a part of the walkroad in G38					
G39–GA2	- Pa	artial retreat of beach in the north of G	6A2				
	- Da	amage of walkway in the north side of	GA2				
GA1–GA3	- Da	amage of sandbags					
	- Da	amage a part of the walkroad in GA1					
Nusa Dua Beach							
GA1-GA2	- Da	amage a part of the walkroad in GA2					
GA8–G0	- Se	rious partial retreat of beach in the n	orth of G0				
	- Da	amage a part of the walkway					
G4-G5	- Da	amage a part of the walkroad in G4					
G5-GN1	- Da	amage a part of the walkroad in G5					
	- Da	amage a part of the walkway					
GN1-G9	- Da	Damage a part of the walkroad in GN1					
G9–G10	- Da	mage a part of the walkroad in G10	and G9				
G10–UG1	- Da	amage a part of the walkroad in G10					
UG1–GN2	- Da	amage a part of the walkroad in GN2	and UG1				
GN2-G12	- Da	amage a part of the walkroad in G12	and GN2				
Kuta Beach							
German	- All	 All street lights along the walkway were already broken 					
Beach–Restaurant Pantai							
Restaurant Pantai–BWN2	- All	street lights along the walkway were	already broken				
BWN2–BWN3	- Se	rious beach erosion at the whole are	a				
	- A	part of the revetment has already bee	en broken				
BWN3 to north	- Se	rious beach erosion in front of Kartik	a Plaza Hotel				
	- A	part of the revetment has already bee	en broken				
Remarks:							
Partial retreat or beach eros	sion	Damage to coastal facilities	Damage to public facilities				

Fable 2.3. [*]	1 List	of Partial	Retreat	of Beach	and	Damages	to F	acilities
Table 2.5.	LISU	or r ar tiar	Retreat	or beach	anu	Damages	U	acintics

(Source: JICA Study Team)

Final Report (Simple Version)



Photo 2.3.1 Partial Retreat of Beaches

(Source: JICA Study Team)



Photo 2.3.2 Damages to Coastal Facilities

(Source: JICA Study Team)



Photo 2.3.3 Damages to Public Facilities

(Source: JICA Study Team)

(2) Current Situation on Beach Cleaning Control

Improper disposal of trashes is one of the major problems faced by Phase-1 beaches. Continuous cleanup is necessary to keep the beach clean since trashes are not only coming from the land but also from the ocean continuously. In most cases, the beach surroundings in front of a hotel is properly kept clean by hotel employees; on the other hand, public areas and fisherman's quarters located just next to the hotel are covered with trashes. The trashes degrade the area's tourism value which also affects the hotel business. In addition, some parts of the walkway are covered with sand where stakeholders neglect to clean.



Plastic wastes are scattered along Nusa Dua Beach Coastline



Dump site located in the public area of Kuta Beach



Walkway almost covered by the sand (Nusa Dua)



Beach cleaning was intermitted in some parts of Sanur Beach

Photo 2.3.4 Current Situation on Beach Cleaning

(Source: JICA Study Team)

The current situation on beach cleaning is summarized in Tables 2.3.2 to 2.3.4. Denpasar City and Badung Regency had reached a settlement between public and private beaches that beach cleaning will be implemented in cooperation with stakeholders. DKP of Denpasar City has been conducting beach cleaning activities in Sanur and Padang Galak areas. Denpasar City has formed three groups with one shift conducted in Sanur area. Denpasar City has already coordinated with Sanur community, e.g., Sanur Kauh Village, Sanur Kaja Village, Sanur Village, and Yayasan Pembangunan Sanur (YPS). There are two kinds of cleaning works, as follows;

- Routine condition: This activity is handled by 30 staffs from Denpasar City everyday with one shift from 6:00 to 11:00; and
- Incidental condition: This activity will be carried out if lots of rubbish and seaweeds are accumulated on the beach especially during rainy season, which occur from November to April. The number of laborers and equipment are determined based on the discussion with responsible community.

DKP of Badung Regency has been conducting cleaning activities in Kuta and Nusa Dua areas. For Kuta area, DKP carries out cleaning activity by shift system; however, for Nusa Dua area, DKP has never conducted cleaning activities. DKP just supervise the cleaning activities of the residents of Tanjung Benoa Village and Benoa Village only. All beach cleaning at this area are done by the communities or hotels.

The immaculate condition of the tourist beach located in front of the hotels and restaurants in the project area is voluntarily kept well. Hotels generally conduct good cleaning practices for beaches in front of them. Hotel associations collaborate in general with local governments. For instance, a member hotel of the Kuta Hotel Association contributes Rp.400,000 monthly to a traditional village.

In public beaches, there is a successful case of beach cleaning activity that was implemented by the corporate social responsibility (CSR), sellers, traditional village, and Badung Regency, etc., on a systematic basis. Since 2008, the Coca-Cola Amatil Indonesia (CCAI) and Quiksilver Indonesia (Quicksilver), a company that deals with surfing equipment and clothing have been providing funds for beach cleaning activities in Kuta, Legian, Seminyak, Jimbaran, and Kedonganan as a framework of corporate social responsibility. The beach cleaning activity of CCAI is named as the Bali Beach Cleaning Up (BBCU) program. This is one of the five major CSR programs of CCAI. The CCAI management direction sees a balance between business and society especially creating a positive impact to the environment, and therefore, regards CSR as an important way of giving back to the society and the environment.

However, cleaning activities have not been implemented sufficiently in most public areas of Sanur, Nusa Dua, and Kuta except in the north of Kuta and Legan area. The unoccupied lands in between hotel properties especially in Nusa Dua are not kept clean due to unclear responsibilities.

Location	Condition of the Beach		Category of
			the Beach
South of GA3	Rubbish and seaweeds in the south side of the groin (G3)	Low	Public
A3–GA1	Rubbish and seaweeds in the south side of the groin (GA1)	Low	Public
GA1–GA2	Rubbish and seaweeds in the whole area	Low	Public
GA2–G39	Rubbish and seaweeds in the north side of the groin (GA2)	Low	Public
G39–G38	Good condition in front of the hotel	High	Private/Hotel
	Rubbish and seaweeds in the north side of the groin (G39)	Low	Public
G38–GN5	Good condition in front of the hotel	Low	Private/hotel
	Seaweeds in the whole area. But hotel carry out beach cleaning by themselves every morning	Middle	Public/Private
GN5–G37	Rubbish and seaweeds in the whole area, dirt around local café	Low	Public
G37–G32	Rubbish and seaweeds between groins	Low	Public
G32–G16	Rubbish and dirt at the fisherman's quarter, local village, local restaurant	Low	Public
	Good condition in front of the hotel	High	Private/Hotel
South G16	Rubbish and dirt at the fisherman's quarter, local village, local restaurant	Low	Public
G16–GN4	Good condition in between groins	High	Private/Hotel
N4–G7	Good condition in between groins	High	Private/Hotel
G7–GN3	Good condition in between groins	High	Private/Hotel
GN3–GN2	Little rubbish and seaweed in public areas	Middle	Private
GN1–GN2	Good condition in front of hotel and restaurant	High	Private/Hotel
GN1–G5	Little rubbish and seaweeds in public areas	Middle	Private/Public
G5–G4	Good condition in front of the hotel and restaurant	High	Private/Hotel
	Rubbish and seaweeds in the north of GN1	Low	Public
G4–G3	Rubbish and seaweeds in between groins	Low	Public
	Rubbish and seaweeds in between groins	Low	Public

 Table 2.3.2 Summary of Beach Cleaning Condition in Sanur Beach

(Source: JICA Study Team)

Location	Condition of the Beach		Category of
			the Beach
Nusa Kecil-G12	Good condition in front of the hotel	High	Private/Hotel
G12–GN2	Rubbish and seaweed in the whole area	Low	Empty
GN2–UG1	Good condition in front of the hotel	High	Private/Hotel
UG1–G10	Good condition in front of the hotel	High	Private/Hotel
G10–G9	Rubbish and seaweeds in the north side of the groin (G10) :public area	Low	Public
	Good condition in front of the hotel	High	Private/Hotel
G9–GN1	Rubbish and seaweed in the whole area	Low	Empty
GN1–G5	Rubbish and seaweed : public area	Low	Public
	Good condition in front of the hotel	High	Private/Hotel
G5–G4	Good condition in front of the hotel	High	Private/Hotel
G4–G1	Rubbish and seaweed : public area	Low	Public
G1–G0	Rubbish and seaweed : public area	Low	Empty
G0–GA8	Rubbish and seaweed : public area	Low	Public
	Good condition in front of the hotel	High	Private/Hotel
GN8–G.TB	Cleaning by private sector	High	Private/Hotel
G.TB–GN4	Good condition in between groins	High	Private/Hotel
GN4–GA3	Rubbish and seaweeds in public areas	Low	Public
	Good condition in front of the hotel and restaurant	High	Private/Hotel
GA3–GN6	Rubbish and seaweed in public areas	Low	Public
	Good condition in front of the hotel and restaurant	High	Private/Hotel
GN6–GN5	Good condition in front of the hotel	High	Private/Hotel
GN5–GA2	Good condition in front of the hotel	High	Private/Hotel
GA2–Novotel	Good condition in front of the hotel	High	Private/Hotel
Novotel–GA1	Rubbish and seaweed in public areas	Low	Public

Table	233	Summary	of Reach	Cleaning	Condition	in Nusa	Dua R	each
Table	2.3.3	Summary	of Deach	Cleaning	Contaition	III INUSa	i Dua D	each

Table 2.3.4 Summary	of Beach	Cleaning	Condition	in Kuta I	Beach
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Location	Condition of the Beach		Category of the Beach
Sand Stopper– Pemelisan	Rubbish and seaweeds in the whole area	Low	Public
Pemelisan–BWN1	Good condition in front of the hotel	High	Private/Hotel
BWN1–Holiday Inn Hotel	Good condition in front of the hotel	High	Private/Hotel
German Beach– Restaurant Pantai	Rubbish and seaweeds in the whole area	Low	Public
Restaurant	Rubbish and seaweeds around huts	Low	Public
Pantai– BWN2	Good condition in front of the hotel	High	Private/Hotel
BWN2-BWN3	Good condition in front of the hotel	High	Private/Hotel
Graveyard–Hotel Alam Kul-kul	Good cleaning condition maintained by each stakeholder which has activity on the beach, coordinated by SATGAS KUTA	High	Public

(Source: JICA Study Team)

(3) Current Situation on Beach Management with End Users Matter

The end users can be generally referred to as the people who use the beaches for recreational and socio-cultural activities. Those are therefore mostly tourists and local residents in particular and, in a broader sense, tourism business and local communities.

One of the beach management issues most salient and relevant to those end users is a beach cleaning. Yet this particular issue in the realm of those users cannot be well analyzed in effective and sustainable manner without dealing with broader issues over environment/sanitation and education/awareness. It is because of the proposition that a

clean and attractive beach can truly be maintained only if people's behaviors become environmentally sound and friendly.

A negative manifestation of the proposition is actually observed in Kuta. Abandoned wastes have been one of the biggest environment problems in Bali and complaints about wastes by Kuta beach surfers become louder and more frequent. It is said that 70% of Kuta beach garbage are organic and 30% non-organic (mostly plastics and cans). A quantity of the garbage from Java increases especially during a rainy reason through November to March and in April with a strong wind.

Thus, in this chapter, some situations over three subjects related to the proposition from the end user perspective are described; (1) beach cleaning, (2) environmental activities, and (3) educational and awareness-raising activities. In the description of beach cleaning, not only through the business and local communities but also a private sector is there a remarkable situation worth noting.

- a) Beach Cleaning
 - i) Business Community

The community mainly represented by hotels, restaurants and shops keep good cleaning practices for its own beaches. Their collective associations are said to be generally collaborative with local governments. For instance, the Kuta Executive Club (Hotel Association) contributes a monthly Rp.400,000 for a beach management and other amounts to the Seminyak traditional village office. The head of the Association is the General Manager of the Puri Saron Hotel and enjoys other executive functions in other tourism institutions. The Association is composed of 24 four- and five-star hotels (totaling to 3.000 rooms) stretching from Kuta, Legian, and to Seminyak. Although he does not know much about the BBCP, he appreciates its Phase I execution and has a full confidence in JICA projects. He is well aware of erosions at Seminyak beach since the 1990s. Although he has made a request for some actions against the erosions to the local governments, he knows that they have little budget to deal with. Over the past few years, particularly in 2011, he is anxious about a strong tendency of high tide reaching properties of restaurants and hotels. His hotel has been active in corporate social responsibility (CSR) activities by donating materials of household goods such as towels and blankets.

ii) Local Community

A local community in general is keenly aware of the issue of beach cleaning and takes actions in its own mandate. Local leaders at Sanur Beach, for instance, are very much concerned with the issue. Compared to other two beaches in the Project, as the Sanur community is characterized with its strong presence of local culture and society, traditional and voluntary beach management groups exist. A consciousness of beach cleaning among fishermen (200-250 fishermen in Sanur, about 1,000 in Nusa Dua, and about 200 in Kuta) are said to be generally low but this should be altered because there is a tendency for them to become involved in a marine tourism industry. Yet public beaches are usually not as clean as private beaches taken care of the business community.

Local leaders are also said to be active. One of the local community leaders in Sanur is a native businessman, NGO activist and a specialist of environmental/costal management. Over the years, he has witnessed an everlasting growth of the tourism infrastructure with influx of immigrant workers from Java and with environmental degradation in which coconuts trees and other plants have been cut. He has a positive observation on the BBCP with a few technical comments in Sanur and expects the Project to be modified and to be continued as the concerned government offices lack of financing new projects to mitigate beach erosions. In addition to a routine beach cleanings, he also organizes a beach clean-up every three months with hotels, schools, fishermen, shops, etc., and a water clean-up every six months.

iii) Private Sector

In the Project sites, there is one salient beach cleaning activity sponsored by private companies within a framework of corporate social responsibility (CSR).

Two companies stand out in their CSR accomplishments in Bali beach cleanings, the Coca-Cola Amatil Indonesia (CCAI) and the Quiksilver Indonesia (the Austrian brand surfer equipment and clothing company). Since 2008, they have been supporting a Bali Beach Clean Up (BBCU) program along a beach extending 9.7km long over five beaches, Seminyak, Legian, Kuta, Kedonganan and Jimbaran. With a help of local NGOs such as the ROLE Foundation, they employ 74 daily cleaning staff from local communities. A field coordinator is stationed in each beach and makes a daily monitoring record on cleaning activities and equipment conditions.

The both companies maintain a 50/50 financial sharing with no-time-limit commitment. Major supports include donations of equipment such as 4 tractors, 3 garbage trucks, 4 garbage trailers and 300 garbage bins, and employment of the 74 cleaning crew staff. Monthly crew remuneration is said to be Rp.1,000,000 per person.

There is no other companies engaged in a beach cleaning activity in such a constant way, but there are some companies engaged on an ad hoc basis, naming a few, Suferguard surfing equipment company and Tiara Dewata department store. The Tiara Dewata, established in 1985 in Bali, is the oldest and biggest local supermarket/department store with approximately 2,000 staff. Since 2000, on the its anniversary of 25 March, over 200 staff have been engaged in beach cleanings and coastal planting activities at Kadoganan and Martasari Beaches in collaboration with the forest department and the military cooperation of Denpasar city.

There is little doubt either that there are some potential companies who would be able to follow the examples of the CCAI and the Quiksilver. The Bali Tourism Board is said to be one of the important information warehouses on such companies engaged in CSR.

According to a coordinator of Quiksilver, in January 2012, the Bali Province Government and the owner of Pullman Hotel donated two loaders and a few trucks for beach cleaning activities. This can be regarded as a little but good example of an embodiment of a Public Private Partnership (PPP).

b) Environmental Activities

During field studies, remarkable activities on environmental issues were being conducted by NGOs. One of the activities was done by the Nusa Dua Reef Foundation in October 2011. They celebrated a kick-off ceremony for a coral recovery project in Nusa Dua with invitation of its sponsor, the Eximbank who made a donation of Rp.100 million. They installed the first a half-ton concrete ball structure at the bottom of the sea about four meters deep which allows coral seeds to start growing. They plan to install other 15 structures along the beach.

The ROLE Foundation is focusing on education of the disadvantaged women in coastal communities in Bali. Their focus lies in an idea that education for those women on environmental issues raises their consciousness and then it can be passed on to the next generations. Some of their coastal community-based projects are as follows: (1) Public

sanitary management within a surfing sports industry in Uluwatu with two local NGOs. (2) Solid waste collection and recycling management in Sawangan (around the Nikko Hotel area, the south of Nusa Dua) in collaboration with the Rotary Club Nusa Dua. (3) Beach cleaning project initiated by Rotary Club Canggu by installing a structure of floating bins at the mouth of rivers to prevent plastic from drifting to the sea in Canggu. Since 2011, they have been also collaborating with private companies, the CCAI and the Quiksilver, on their CSR beach cleaning activities in providing weekly and monthly trainings for cleaning personnel.

Since 2011, the Nusa Dua Reef Foundation has been forming the Bali Marine Conservation Community (BMCC) with a view to formulating Marine Protected Areas (MPA) in Bali and thus supports local governments for consolidating marine protection regulations and practices. The provincial decree in 2009 shows only rough conservation areas without details in water area. Regency is now conducting a detailed study asking technical advice from NGOs like the BMCC. The NGOs MPA studies are necessary at district level and make complement to a zoning at the province level. Almost all districts do not agree the provincial zoning. Under some autonomy laws, a district can be more powerful than a province. A BMCC first book on marine conservation in Bali that is still in an editing process can become one of the important educational materials on coastal environment. The MPA formulates a mapping with a core zone utilized for only research and education, a sustainable fishing zone, a marine tourism zone, a civic farming zone, a sacred zone for temple, etc. The Foundation has been forming a larger working group through stakeholder meetings about MPA planning in Nusa Dua. They have already agreed in principle and started defining a zoning that is to be presented to the Badung Regency in 2012. The BMCC's work on MPA is technically appreciated and can play a role as a strong advocate to a business community in their direction of tourism promotion and to the government authorities as well in their consolidating regulations on marine environment.

Lastly it should be noted that a contribution to environmental issues also comes from a private sector. The CCAI and the Quiksilver have provided a local community with a donation for constructing an incubation center of sea-turtle in Kuta.

c) Educational and Awareness-Raising Activities

It is encouraging that, even in a few-month-period of field studies, the following concrete activities could be observed. Small but impressive examples in five different entities are presented.

i) Government

Since 1995, the Denpasar City Tourism Office has been conducting the Extension Program (extra-curriculum education) to senior-high schools in Denpasar between April and August every year. There are 51 high schools (8 public and 43 private) in Denpasar. Every year, the Program is offered to about 18 schools where 70 students per school become beneficiaries. In the Program, some visiting-specialists in tourism give the students lectures in order to enhance understanding and awareness of eco-tourism in Bali focusing seven issues, i.e., safety, discipline, cleanness, coolness, beauty, hospitality and image.

ii) School

In Sanur, there are 11 elementary schools composed of ten public schools and one private school that is an international school. An elementary school has six grades starting from seven years old. It is said that approximately 10% of the school-age-children go to schools in Denpasar city and the rest goes to schools in Sanur. Every Saturday, Balinese

elementary schools conduct extra curricula activities on a subject of Self-Development. On top of the subject, the elementary schools in Sanur conduct environmental education.

Especially, in 2006, the Sanur Elementary School No. 12 with about 400 pupils became the first pilot school to be reinforced in environmental education with some practical elements incorporated such as waste management learning and recycling production activities. Its technical cooperation has been provided by NGO called the PPLH Sanur. The pilot project has been duplicated to nine other public schools. The Sanur Development Foundation (YPS) then adopted the project within its Blue and Green Program. Now the spirit of the project has turned into a "school life style" as the schoolmaster of Elementary School No. 12 assures its sustainability/continuity of environmental education. The School has obtained some prizes in nation-wide environmental education contests/competitions and has been always encouraging pupils to participate in environmental events outside of school.

In Sanur, there are two junior high schools, one is managed by the YPS and the other is public. The school has three grade (7, 8 and 9 grade) starting with age 13. As for the senior high schools (with three grades), there are two public schools in Sanur. The YPS-managed Wisata Junior High School has recently been awarded the first prize in nation-wide environmental education contests/competitions. The school is well equipped with environmentally-friendly equipment such as separated garbage cans by type, signs/bulletin-boards on waste management, a classified garbage disposal site with composted fertilizers ready to use and an exhibition room of handicraft work made by students from recycled materials. One of the impressive works done by a teacher is his experiment over four years at home over processing inflammable oil from the plastic garbage materials. He has developed a simple machine with four colleagues for a small business, but it has not reached at application stage in industry yet.

Hearings from those Sanur schools indicated that schools located near Nusa Dua and Kuta beaches should be engaged in environmental education and activities.



Photo 2.3.5 Wisata Junior High School

(Source: JICA Study Team)

iii) NGO

A NGO called the Reef Check Foundation has an experience to outreach schools in Sanur areas for environmental education and beach cleaning awareness. The Foundation envisages and expands the same activities again in Sanur, Nusa Dua, Kuta and Lovia in the North. In 2012, they aim at doubling the school members and concentrates on teacher education. They maintain that the quality of water in Sanur cannot be regarded as good because of its location of river-mouth and drainage facilities. In 2008-09, with a funding from the Coca-Cola Amatil Indonesia (CCAI), the Foundation made a stakeholder mapping analysis in a solid-waste management in Sanur. Yet the Foundation has not received a further funding in implementation of garbage cleaning activities. They have established a good relationship with the Sanur Development Foundation (YPS) who is a key actor to organize various stakeholders in beach cleaning activities at local level.

The ROLE Foundation, working closely with coastal communities and targeting at women's empowerment, manages a 1.5 hectare Eco-Learning Park in Sawangan, Nusa Dua. The Park is equipped with 22 education stations for income-generating trainings and environment awareness education such as Marine Education Center. The Park is well connected to their waste management project in the Sawangan area. They are engaged in coastal solid waste cleanups and one of their partners, Rotary Club, is said to be an organization who has a potential capacity to work with for coastal environmental issues.

iv) Private Sector

For the Coca Cola Amatil (CCAI), year 2012 is the year of revision and sustainability, thus although the Bali Beach Clean Up program expansion is not expected, more involvement in public relations in media and in governments is to be made. In this sense, one of the most important events for them was the second Bali Clean and Green Weekend Festival on 7 and 8 of July 2012 where local government authorities got together in an effort to reactivating its Bali Clean and Green Program. For that weekend, the CCAI organized environmental awareness campaigns. This event can be characterized as a multi-stakeholder networking with a view to raising awareness on beach environmental issues. These events are put on publicity though local media. Their tractor garage also plays a role of materials exhibitions and education information for publicity.



Photo 2.3.6 Bali Clean and Green Weekend Festival (Source: JICA Study Team)

v) Volunteer

A clean-up volunteer activity under the Bali Japan Club is one of the most remarkable examples to show how much the ordinary public can do in the cause of environmental issues. The Clean Up Bali volunteer group has been formed since January 2008. With nearly 40 members in increasing participation of Balinese children and the youth, the group has been engaged in various waste/garbage treatment/management activities. Some activities include researches on recycle waste treatment situation in Sanur, environmental education exhibitions in various events/festivals, production of environment education goods/materials, twice-a-year Sanur beach cleanings and environmental study/eco-cleaning tours in Bali.

The current major concentration is a waste management and environmental education at elementary school level employing Japanese style playing cards. The card play called "Bali Eco Karuta" brings informative and educational messages in each of 40 different color-illustrated cards in total. Since 2010, they have visited over 30 schools demonstrating the play and donating the cards. This has been also exhibited in a booth of the 2011 Bali Clean and Green Weekend Festival in Kuta beach. They target two to three schools per month for the card demonstration/donation with increasing member of young Balinese volunteers such as students from the Udayana University who learn the Japanese language.

There is no doubt that such similar activities dedicated to a costal environment protection are increasingly active in Bali. For example, the Environment Board of Denpasar City invites students from elementary schools to universities for beach cleaning activities. The International Bali Tourism Institute conducts a mangrove plantation program in Sanur for new students every year.

(4) Summary of the Current Situation on Beach Management

According to the above inventory survey, the current situation of various activities for beach management between government institutions and stakeholders are summarized in Tables 2.3.5 to 2.3.7. Most of beach monitoring and maintenance have been carried out by BWS-BP and local governments such as the province of Bali, Denpasar City, and Badung Regency which have been responsible for indirect activities such as environmental monitoring. On the other hand, stakeholders have been involved in various beach management on their own initiative. However, their activities were limited in scale in spite of the high awareness on beach management since this activity has not been organized well by the public and private sectors In addition, cooperative and coordinative organizations for beach management composed of private and public sectors such as central and local governments have also not been established. It is important to establish an organization under the cooperation of public and private sectors and clarify the demarcation of responsibility between central and local governments as well as between government institutions and stakeholders.

Cate gory	Area	Relative Group	Beach Monitoring	Beach Maintenance	Environmental Management	Beach Cleaning
to beach management	se-1 Area	BWS-BP	Beach monitoring is being conducted twice a year since the completion of the project. The works will be carried out by local consultant and usually conducted in June-November	Controlling of shoreline and structures along the Sanur Beach. If unstable condition happened, they will study countermeasures and prepare budget allocation.		
Government institutions related	ole Sanur Pha	Dinas PU of Bali province			Controlling water quality on the beach, and publish it with the Environmental Agency (BLH)	
	MW	Denpasar city			Control sewerage outflow to the beach. But during rainy season, uncontrolled rubbish comes out from the outlet	
	Whole Sanur Area	Yayasan Pembangun an Sanur (YPS)			They improve the welfare of the community.	Hold beach cleaning campaign once a year between August and November involving the entire community, major hotels , schools, private companies, NGOs, etc.
	G38 - GA3	Sanur Kauh Village				Carried out cleaning at Permanent Sand Stockpile (two employees). For cleanliness in Mertasari area, they control the cleaning activity of each local seller along the beach.
ler		Blanjong Sub-village				Carried out beach cleaning in G38 - GA3 area.
Stakeholder	GN1 - G38	Sanur Village				They are in charge of securing, maintaining, and cleaning the beach. But they have no beach management activity.
	North of GN1 - G3	Sanur Kaja Village				They manage beach sellers to clean the beach twice a week every Monday and Wednesday from 5:30 to 8:00 in the morning. The sellers were divided into two groups : 1) Sunrise Beach (north area of alit bungalows : 95 sellers) and 2) Le Mayeur Beach (Hang Tuah Art Market : 24 sellers)
		Sanur Lifeguard				Involving maintenance of beach cleanliness surrounding the area

Table 2.3.5	Summary o	f the (Current	Situation	on Beach	Management	(Sanur)
Table 2.5.5	Summary	n une v	untun	Situation	on Deach	Management	(Danui)

Cat ego ry	Are a	Relative group	Beach Monitoring	Beach Maintenance	Environmental Management	Beach Cleaning
is related to beach	Phase-1 Area	BWS-BP	Beach monitoring is being conducted twice a year since the completion of the project. The works will be carried out by a local consultant and usually conducted in June-November.	Controlling of shoreline and structures along the Nusa Dua Beach. If unstable condition happened, they will study countermeasures and prepare budget allocation.		
ernment institutior manage	Whole Nusa Dua	Dinas PU of Bali Province			Controlling beach pollution by taking sample and gradually publish it together with the Environmental Agency (BLH)	
Gove		Badung Regency			Controlling sewerage outflow to the beach in cooperation with Dinas PU Province.	
Stakeholder	UG1-Nusa Besar	Bali Tourism Developm ent Center (BTDC)				 Implementing beach cleaning program in coordination with hotel side. 18 employees for beach cleaning every day.
		Benoa Village				Implementing beach cleaning during rainy season (A lot of rubbish drift down to the beach)
		Terrora Sub- village				Implementing beach cleaning program in cooperation with other sub-village)
	- UG1	Tanjung benoa Village				Safety control, maintaining and cleaning the beach. But they have no beach management activity.
	GA2	Tengkuku ng Sub- village				Implementing beach cleaning program in cooperation with other sub-village)

 Table 2.3.6
 Summary of the Current Situation on Beach Management (Nusa Dua)

Cate gory	Area	Relative Group	Beach Monitoring	Beach Maintenance	Environmental Management	Beach Cleaning
nagement		BWS-BP	Beach monitoring is being conducted twice a year since the completion of the project. The works will be carried out by local consultant and usually conducted in June-November.	Controlling of shoreline and structures along the Kuta Beach. If unstable condition happened, they will study countermeasures and prepare budget allocation.		
ated to beach mar	ohase-1 Area	Dinas PU of Bali Province			Controlling beach pollution by taking sample and publish it together with the Environmental Agency (BLH)	
nent institutions relat	Whole Kuta P	Environment al Agency of Bali Province			 Controlling the air and water quality and beach utilization monthly. Controlling the conditions of coral and seagrass at several points in coral reef area. 	
Govern		Badung Regency			 Controlling sewerage outflow to the beach in cooperation with Dinas PU Province. Keeping plantation around the beach to keep it in good condition. 	
eholder	- 1 Area	Kuta Village				Established "Kuta Beach Task Unit" to perform several activities. Controlling the beach cleaning from Kuta Graveyard to Pullman Hotel from 8 am every day.
Stake	Phase	South Kuta Beach Business Association				Member of SKBBA responsible in cleaning the beach at each respective area. For the entire Kuta area, SKBBA donated to Kuta Village for Kuta Cleaning Activity.

 Table 2.3.7
 Summary of the Current Situation on Beach Management (Kuta)

2.4 Current Situation on Beach Management Policy

(1) Chronology of Discussion for Beach Management System

The demarcation of responsibilities for beach management have been discussed and recorded since 2004 as shown in Figure 2.4.1. According to the Minutes of the Meeting (M/M) in March 2004, Badung Regency and the governor of Bali agreed to arrange budget allocation and implementation for the operation and maintenance of BBCP in combination with the change of design from headlands type to offshore breakwater type in Kuta Beach. After that, statement letters for budget allocation for related O&M were submitted by the Regent of

Badung Regency and the Governor of Bali to JBIC. The beach management scheme and demarcation of responsibilities for beach management were discussed and determined among the central and local governments in the workshop held in February 2009.



(Source : JICA Study Team)

(2) Demarcation of Responsibility for Beach Management Set Up in the Workshop 2009

As mentioned above, the basic concept on the demarcation of responsibilities for beach management was set up among central and local governments based on the conclusion obtained in the "Workshop of Beach Management and Coral Restoration/Transplantation in Bali Province" held in February 2009 after completion of all packages. According to the conclusion, beach management consists of three components: 1) Routine maintenance work, 2) Re-forming beach, and 3) Continuous coral transplantation work. The government institutions related to beach management consist of the central and local governments as follows.

۶	BWS-BP for all beaches	(Central government)
≻	Loka Pantai, Coastal Research Center for all beaches	(Central government)
≻	Province of Bali for all beaches	(Local government)
≻	Denpasar City for Sanur Beach	(Local government)
\triangleright	Badung Regency for Nusa Dua and Kuta beaches	(Local government)

The demarcation of responsibility for routine maintenance work and re-forming beach was determined as follows.

Beach Management Item	Responsibility
Routine Maintenance Work	
• Repair works of coastal facilities (revetment, groin, headland, and breakwater)	Province of Bali
• Repair works of other facilities (public facility, parking area, walkway, landscape, etc.)	Denpasar City and Badung Regency
• Beach cleaning works	Denpasar City and Badung Regency together with stakeholders
• Controlling and permission of beach utilization	Denpasar City and Badung Regency
Re-forming of Beach	
• Monitoring of the shoreline	BWS-BP in cooperation with Loka Pantai, Coastal Research Center
• Sand transportation from permanent sand stockpile in the south of Sanur (supplementary beach filling)	Province of Bali
• Refilling sand in permanent sand stockpile, if needed	Province of Bali and BWS-BP

Table 2.4.1 shows the comparison of demarcation of responsibilities that was set up in the workshop in 2009 and present situation. Although each demarcation of responsibility was shared considering balance, beach management has been carried out by BWS-BP except for cleaning works and controlling and permission of beach utilization. Originally, BWS-BP, taking the side of the central government, should take responsibility on the technical consideration especially on monitoring works which include evaluation of monitoring data and recommendation of countermeasures after it is handed over to the local government. In addition, BWS-BP should also take responsibility for the implementation of additional facilities in case serious beach erosion occurred in the Phase-1 area. Basically, at least local government and stakeholders should take responsibility for routine maintenance because they have been getting a lot of benefits from recovered beaches for a long period of time.

The problem is that there are no further actions being done after the agreement/responsibility statement made by the governments (BWS-BP, Bali Province, Badung Regency and Denpasar City). As a reason why government institutions did not follow this agreement except BWS-BP, is thought to be that the signatories of this agreement were not the top level executives of each central and local government such as director class, mayor of Denpasar, regent of Badung Regency and governor of Bali considering the consuetude of Indonesia. However, government institutions related to beach management should consider and carry out continuous beach management to keep the beach in good condition for a long time based on the previous MoM and discussions in 2004 as mentioned above.

≥		Demarcaton of responsibilities for beach management			
Catego	ltem	Set up in Workshop in 2009	Present situation (2011)		
	Repairing work of coastal facilities (revetment, groin, headland, breakwater)	Province of Bali for all beaches		BWS-BP	
ince work	Repairing work of other facilities (public facility, parking area, walkway, landscape)	Badung Regency, Denpasar City		BWS-BP	
eue	Cleaning work on the beach area	Badung Regency and Denpasar City	Sanur	 Denpasar City 	
linte		with participation of stakeholder	Nusa Dua	- BTDC	
ma			Kuta	 Kuta Village 	
ne				 CSR (Coca Cola, 	
outi			- Legan Village		
Ř	Controlling and permission of beach		Sanur	Dinas PU, Province	
	utilization	Badung Regency, Denpasar City		Denpasar City	
			Nusa dua a	nd Kuta Dinas PU, Province	
				Badung Regency	
of	Monitoring of shoreline	BWS-BP in coorperation with Loka			
ing Ch		Pantai, Water Resources Research		BMS-BP	
orm 3ea		Center, Department of Public Works			
Refo	Sand re-nourishment transported from permanent sand stockpile	Province of Bali for all beaches		BWS-BP	
ers	Controlling of air, water, beach utilization	None	Environm	nental Agency, Bali Province	
Othe	, coral, seagrass, etc based on AMDAL				

Table 2.4.1 Summary on	the Demarcation	of Responsibility f	or Beach Management

(3) Regulation and Permission of Coastal Zone at Phase-1 Beaches

One of the main problems related to beach use are the permanent buildings constructed at the nourished beach area. Permanent structures are still being built at the beach area. The illegal facilities and buildings located in the project area are listed as follows and are summarized in more detailed information in Appendix 2.4.1~3.

	Utilization of Beach				
Location	Permanent Structure and Building in	Builder	Year of		
	the Nourished Beach		Completion		
G38–GN5 (Sanur)	Sofa and boardwalk in front of the hotel	Puri Santrian Hotel	1998		
GN5–G37 (Sanur)	A lot of local cafés were built Walkway was shifted to offshore side	Small cafés were constructed by Semawang Traditional Sub-village.	2010		
		Walkway was shifted by owner of the land.	2007		
GN1–GN2 (Sanur)	Restaurant with floor pavement on the beach	Restaurant	2008		
G5–G4	Plant bed and boardwalk	Local people	2010		
(Sanur)	Restaurant with floor pavement on the beach				
G4–G3 (Sanur)	Restaurant with floor pavement on the beach	City Planning Agency of Denpasar City	2007		
	Plant bed and boardwalk				

	Utilization of Beach				
Location	Permanent Structure and Building in	Builder	Year of		
	the Nourished Beach		Completion		
UG1–G10	Baywatch	BTDC	December		
(Nusa Dua)			2009		
G5–G4	Souvenir shop in the north side of G5	Local people	2005		
(Nusa Dua)					
GN8–G.TB	Groin was constructed by private	- Taman Begawan Management	- Groin March		
(Nusa Dua)	Walkway was shifted to offshore side by	- Walkway was constructed by	2010		
	private	BWS-BP	- Walkway		
			shifted 2011 by		
			BWS-BP		
GN5–GA2	Permanent chapel and plant/grass on the	Grand Mirage Hotel Management	2007		
(Nusa Dua)	beach				
Novotel –	Marine sports with floor pavement on the	Water Sport	2011		
GA1	beach				
(Nusa Dua)					

In the Phase-1 area, the walkway was constructed for the purpose of demarcating the public area from the private area. This purpose was well considered by all stakeholders along the Phase-1 beaches. Unfortunately, the purpose of the walkway was never legalized into official regulation in Sanur, Nusa Dua, and Kuta beaches by the government. Only BWS-BP who was involved during project implementation and all stakeholders of the Phase-1 area understood this rule. On the other hand, local government regulated the beach use through official regulation, but it is no longer applicable given the present beach condition of the Phase-1 area (nourished beach) because the shoreline of nourished beach was extended from the original position which has mostly been eroded.

Regulations relating to beach use being followed in Phase-1 beaches are as follow:

No.	Regulation	Distance of 'Beach Conservation Area'	Application Area Related to Phase-1 Area
1.	President Degree No. 45/2011 : Spatial Plan of Sarbagita	100 m from HHWL	Sanur, Nusa Dua, and Kuta beaches
2.	Bali Province Regulation No. 16/2009 : Spatial Plan of Bali Province	100 m from HHWL	Sanur, Nusa Dua, and Kuta beaches
3.	Badung Regent Degree No. 638/2003: Spatial Plan of Kuta District	25 m from HHWL	Kuta Beach
4.	Badung Regent Degree No. 639/2003: Spatial Plan of South Kuta District	30 m from HHWL	Nusa Dua (Benoa Village) Beach
		25 m from HHWL	Tanjung Benoa Beach
5.	Denpasar City Regulation No. 10/1999: Spatial Plan of Denpasar City	100 m from HHWL	Sanur Beach

Fable 2.4.3 Official Regulation	ations Relating to Beach	Use in Phase-1 Area
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(Source: JICA Study Team)

The definition of distance varies in each regulation stated above. The higher level of regulation defines distance as 100 m, but the lower regulations have shortened it to less than 100 m. As regulated by the provincial regulation, the implementing unit giving building permits at the regency and city level will be under the authority of the regency/city. But if the area requested is located in a place where two or more administration territories overlap, the provincial level is the implementing unit. Looking into that condition, all Phase-1 beaches are located in one administration territory and the regency/city unit should control and manage the beach use according to each regulation.



Photo 2.4.1 Property Built at the Beach Area (Tanjung Benoa Beach)



Photo 2.4.2 Permanent Restaurant Built at the Nourished Beach Area (Sanur)



Photo 2.4.3 Permanent Restaurants Built by Local Community Authority at the Nourished Area (Sanur)



Photo 2.4.4 Permanent "Chapel" Built by Hotel Operator at the Nourished Beach (Nusa Dua)

The problems of the present beach use related to coastal zone regulation can be concluded as follows:

- The function of the walkway and rule on the beach area was never legalized by a government regulation for the Phase-1 beaches. And this rule was only known by BWS-BP as implementing unit during Phase-1;
- No coordination among government sides after completion of Phase-1 to manage the beach utilization;
- No legal regulation available for BWS-BP to manage the beach utilization referring to the basic concept of beach use at the nourished beach;
- Lack of knowledge and control by local government in making regulation (at natural beach and nourished beach);

(4) Summary of Beach Management with Policy Matter Issues

Beach management is the proper use of the nourished beach area. As recognized in the Phase-1 area, the regulation was issued by government to manage and control the beach use. Regulation issued by each authority (Bali Province, Denpasar City, and Badung Regency) has

varied definition of "distance" for the beach conservation area. On the other hand, during implementation stage, the walkway was constructed to demarcate the boundary between public and private areas.

The function of the walkway was only understood by parties involved in the Phase-1 implementation stage, which were the BWS-BP, consultant, and stakeholders along the beach. Most of the stakeholders still follow the rule but some of stakeholders do not. Problems related to beach use can be described as follows:

Difference in determining the distance of 'beach conservation area' by each level of government. In Phase-1 beaches (nourished beach), the rule on the walkway was not legalized as an official regulation. If the present regulation will be applied, it will not be suitable anymore because the beach width was extended from its original position.

[Examples]

- Distance of beach conservation area in Nusa Dua Beach was defined as 30 m from highest high water level HHWL by present legal regulation. On the other hand, position of the walkway varies from 30 m to 60 m from HHWL due to nourished beach; and
- Beach conservation area in Kuta Beach is 25 m from HHWL by present legal regulation. On the other hand, position of walkway varied from 30 m to 80 m from HHWL due to nourished beach.
- Lack of knowledge and low level of public awareness regarding beach use rule (as demarcated by walkway) to control the level of beach use. This condition still permits some illegal structures to be built at the beach area, same with motorcycles/cars passing through the walkway.

Chapter 3 Beach Management Issues and Improvement Plan

3.1 Overview of the Beach Management Issues and Improvement Plan

The following three items were studied in order to improve the beach management system in accordance with various current situations on beach management as described in Chapter 2.

- Improvement plan on beach monitoring and maintenance [3.2]
- Improvement plan on beach management system [3.3]
- ➢ Improvement plan on beach management policy [3.4]

As a result of the studies, improvement points against various beach management issues were pointed out as follows; 1) enhancement of skills for beach monitoring and maintenance, 2) update of beach operation and maintenance manual, 3) establishment of beach management system and organization, 4) cooperation and coordination between the public and private sectors, 5) enhancement of awareness and involvement of end users, 6) enhancement of policy matter related to beach management, and 7) enhancement of consensus building for stakeholders.

According to these management issues, the improvement plans for beach management were studied and proposed in this chapter in detail. The contents of this chapter are described in Figure 3.1.1. These improvement plans will become the basic concept and policy for the establishment of sustainable beach management system as described in Chapter 4.



Figure 3.1.1 Flow of Improvement Plan on Beach Management

(Source: JICA Study Team)

3.2 Improvement Plan on Beach Monitoring and Maintenance

Monitoring works have been continued by BWS-BP since it was handed over by each contactor after the completion of the project. However, quality and reliability of the monitoring data have a tendency to decline as compared with the monitoring data before it was handed over. To improve this condition, problems should be resolved in the capacity building program. The points, issues and improvement plans are summarized as shown in Table 3.2.1.

No	Points at issues	Improvement plans
1	Some permanent bench marks in Sanur and Nusa Dua have already been lost or become non-functional due to the construction of new hotels and some development activities behind the beach. These issues have been an obstacle to an accurate field survey.	In order to improve the accuracy of survey results, it is necessary to install new permanent benchmark as required (number) at a safe place.
2	Beach profile survey was carried out by local private survey company through tender by BWS-BP. However, result of the beach profile survey varied from each company. Some of the beach profile data could not be used in the analysis of shoreline change and volume of sand lost caused by being inconsistent with the current situation.	The cause of this problem is not just the skills of the private survey company but also the lack of a BWS-BP engineer when evaluating the survey result. These conditions become worse because some of the benchmarks have been lost. In order to solve this problem, it is necessary to install additional benchmarks at 400 m interval at the least. BWS-BP as ordering party should rigorously instruct the private survey company based on sufficient understanding and improvement of survey method.
3	BWS-BP as ordering party does not sufficiently understand the issues of monitoring method and have not instructed the private survey company on site.	The operation and maintenance manual (O&M manual) prepared by the international consultant before the completion of the Phase-1 Project should be revised so as to make it useful for government institutions.
4	The monitoring works have been following the existing O&M manual. On the other hand, the monitoring area sometimes changes because the area was decided according to the degree of fiscal scale. The reason perhaps is that unstable budget was allocated by the central government.	Regarding unstable budget allocation, we think that BWS-BP has insufficiently understood the significance and importance of monitoring activities. Therefore, it is necessary to get someone to understand the importance of the monitoring based on adaptive management by using the revised O&M manual. It is also important to periodically involve the Coastal Research Center (Lola Pantai) so as to enhance technical backup system.
5	Some information such as work items, frequency, personnel, and so on for the monitoring works are described in the O&M report. However, the accuracy and quality of monitoring results showed different output due to capability of the investigator The checklist, evaluation sheet, etc., to qualitatively evaluate the condition of the beach and facilities were not included in the O&M manual.	In order to gain an understanding of the qualitative condition such as the extent of damage and obsolescence of the beach and facilities, it is necessary to carry out primary observation by using a checklist. Furthermore, it is necessary to prepare survey sheets, evaluation sheet for degree of soundness, and so on, as secondary survey to gain an understanding of the quantitative evaluation and to have control over the errors of personnel.
6	The quality of data archive for monitoring data has gone down since it was handed over by the international contractor and consultant. The cause of these issues pointed out loss of quality of monitoring activities as mentioned above and the lack of ability to archive data by BWS-BP.	The improvement of monitoring and data archive activities should be enhanced with the technical and management skills of BWS-BP as responsible member within government institutions which relate to beach management through capacity building. The O&M manual should also be revised as mentioned above.

 Table 3.2.1 Summary of Beach Monitoring Issues and Improvement Plan

(Source: JICA Study Team)

On the other hand, some of the monitoring items have not been carried out, and the frequency and method of monitoring have not followed the O&M manual. The O&M manual was transferred from the Consultant to BWS-BP as one of the government institutions, especially in charge of technical matters. The O&M manual consists of eight chapters as shown in Table 3.2.2. According to present beach operation and management issues, important considerations for review of the O&M is summarized in this table.

Chapter	Improvement points
Chapter 1	The contents should be renewed based on present information.
Outline of maintenance works in	
post-project stage	
Chapter 2	Specific methodology, checklist, and evaluation sheet for monitoring
Monitoring works	activities should be prepared to keep the same accuracy. It is
	aroun WC and/or capacity building program
Chapter 3	Specific maintenance methods should be described in this chapter
Routine maintenance works	showing photographs of the actual parts damaged. According to
	present site situation based on the monitoring data, frequency and
	area for monitoring works should be reviewed and additional beach
	nourishment and repair facilities should be recommended.
Chapter 4	The concept of adaptive management should be reviewed based on
Adaptive management for	monitoring data, beach utilization condition, and requirements of
re-forming of beach	stakeholders' meeting SHM, etc.
Chapter 5	The sharing of responsibilities should be clarified based on the result
Responsibility for each	of WG by government institution related to coastal management.
maintenance work	
Chapter 6	Adaptive management for Sanur and Nusa Dua should be reviewed
Adaptive management for Sanur	based on monitoring data, present beach conditions, and
and Nusa Dua	and SHM etc
Chapter 7	Adaptive management for Kuta should be reviewed based on
Adaptive management for Kuta	monitoring data, present beach conditions, and requirements of
	government institutions and stakeholders though WG and SHM, etc.
Chapter 8	The necessary correspondences and countermeasures should be
Summary and recommendation	recommended and concluded in this chapter based on the
	abovementioned points. These recommendation are described in
	"Chapter 6 Review of Operation and Maintenance for Phase-1"

	Table 3.2.2	Important Notice for Review of the Beach O&M Manual
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(Source: JICA Study Team)

The following capacity building programs were conducted during the JICA Study to enhance the skills and understanding of government institutions (BWS-BP and Loka Pantai) which have the responsibility for technical management. The detailed information of these programs is described in Section 5.3 Programs for Capacity Building.

- Program-1: Technical support for "Enhancement of Understanding for Adaptive Management and Planning Skill on Beach Maintenance"
- Program-2: Technical Support for "Enhancement of Technical Skills for Monitoring Data Analysis and Archive System"

The main goals of the program are as follows:

- Improving technical skills of government institutions for monitoring and data archive works. It includes planning skills and monitoring skills; and
- > Intensify understanding of the "Beach Adaptive Management" through iterative cycle.
3.3 Improvement Plan on Beach Management System

(1) Improvement of Overall Beach Management System

The lack of technical skills, budget allocation, arrangement of engineers and staffs, unclear demarcation of responsibility, and so on are pointed out as beach management issues in Chapter 2. In order to establish a sustainable beach management system for Phase-1, it is important to 1) understand the original purpose of continuous beach monitoring and maintenance among government institutions, 2) establish organization under the cooperation between the public and private sectors, and 3) make clear demarcation of responsibility for beach management between public and public sectors. These actions and goals should be discussed and set up among government institutions and stakeholders in parallel to matters that are required to connect thoroughly among them. The following three points are pointed out as important matters to improve beach management system.

- > Understanding the basic principle of integrated beach management;
- Establishment of beach management organization under the cooperation between government institutions and stakeholders; and
- Determination of demarcation of responsibility of beach management between government institutions and stakeholders.
- a) Understanding the basic principle of integrated beach management

The beach management, which needs many sectors, should be managed as an integrated organization to perform sustainable beach management concerning each sector; such as technical aspect, policy aspect, stakeholder awareness, and beach user level. Through this process, beach management is united into one complex "general system" government and community, science/technology and planning, and sectoral and public interest by promoting and implementing an integrated plan for the protection and development of the coastal system and resources.

Integrated beach management covers the cycle of information collection, design of planning, decision making, management, and implementation, but the cycle is repeated as it is dynamic and iterative. This means that there is a need to review and adapt to the new conditions continuously so that the cycle can restart.



Figure 3.3.1 Steps of the Beach Management Cycle, Richter 2001

Integrated beach management is also based on awareness, i.e., it is necessary to use not only traditional and scientific knowledge but also adequate participation and cooperation of all stakeholders in order to assess the societal goals in a given beach area and take actions towards meeting those objectives. The key points are the discussion and cooperation among related parties (government, public stakeholders, and community) and its coordination and integration.

In the long term, integrated beach management can keep the balance among environmental, economic, social, cultural, and recreational objectives, within limits of natural dynamics. These concepts were presented and explained to government institutions which relate to beach management and stakeholders in working group, capacity building, and stakeholder meeting as part of the enhancement of awareness.

b) Establishment of beach management organization under the cooperation between government institutions and stakeholders

In order to implement sustainable beach management based on the integrated beach management system as mentioned above, it is necessary to establish the organization under the cooperation between government institutions and stakeholders. The basic concept of this organization called "Coordination Team for Beach Management" (TKMPP) is proposed and discussed in Figure 3.3.2. Government institutions which relate to beach management should enhance its partnership among them as center of BAPPEDA and Public Works of Bali Province. Loka Pantai (Coastal Research Center, PU) which will move its head office north of Bali from Bandung in fiscal year 2012 should involve itself in government institutions through technical support such as monitoring activities, analysis of monitoring data, study of countermeasures, construction method, and so on. Furthermore, JICA will support technical and management advisors for comprehensive beach monitoring and maintenance from the point of view of long term and multidirectional beach management.



Figure 3.3.2 Organizational Structure of Coordination Team for Beach Management

(Source: JICA Study Team)

The organization of stakeholders consists of some representative groups which include communities, organization boards which relate to beach management and representative from hotels that receive direct and indirect benefit from the beach conservation project. The Stakeholder Consensus Building (SCB) should be established and conducted to achieve sustainable beach cleaning, environmental monitoring, beach use control, etc. The records of SCB are described in Section 5.4, Stakeholder Meeting.

Furthermore, it is necessary to consider the possibility of the participation of private companies at Sanur and Nusa Dua beaches in reference to corporate social responsibility (CSR) activities for the beach cleaning program at Kuta Beach. This consideration is also described in Section 5.5, Collaboration with Private and Other Sectors, and Public Relations.

c) Determination of demarcation of responsibility between government institutions and stakeholders

In order to carry out beach management for a long period of time, one point to remember is to consider balance among three components such as beach protection, beach utilization, and beach environment as shown in Figure 3.3.3. It is possible to maintain the beaches in good condition by exchange and linkage among the three components. In order to maintain the beaches used by the general public, it is important to work together, share information, and clarify demarcation of responsibility among government institutions (central and local government) and stakeholders.



Figure 3.3.3 Basic Philosophy for Beach O&M Structure

(Source: JICA Study Team)

Some of the government institutions and stakeholders have been engaged in beach management in diverse ways. However, these activities have not led to comprehensive beach management due to the unclear demarcation of responsibility, unorganized and unshared information among each other.

In the three components of beach management, there are different tasks between government institutions and stakeholders. Members of government institutions who are executants of the project should be engaged in all components, and should have higher proportion on beach protection such as supplementary beach fill, repair, and reinforcement works of beach facilities related to the technical and financial capabilities On the other hand, the demarcation of responsibility for stakeholders are mainly assumed as familiar activities such as daily cleaning, monitoring for beach utilization and environment because they have limitations on fiscal scale and technical capacity. As to the activities of stakeholders, especially in hotels and restaurants, they have been maintaining the beach in front of their property in clean condition as an independent and continuous effort for service and care to guests. Most public areas have been cleaned by seller, stall holders, and beach cleaners employed by the local government and communities. However, these activities have not led to sufficient beach cleaning because rubbish and seaweed still accumulate on the beach. In order to improve these situations, it is important to clarify demarcation of responsibility, organizations, methods, among stakeholders in the early stage.

(2) Improvement Plan for Beach Cleaning Activities by Stakeholders

There is a clear difference in cases between cleaning the beach in front of hotels and other beach areas used by fishermen and village people. Beach garbage degrades the value of tourism resources, not only the beach but also of the surrounding areas. Despite the stakeholders' efforts, the beaches are receiving dishonorable reputation from the outside world. Raising the cleaning level of public areas closer to the level of hotels is an urgent task.

	Subject	Cause of Problem	Preferable Improvement by Stakeholders
A	Laws/ Regulations	Regulations for operation and maintenance of the respective beach are missing.	Propose necessary laws or regulations to the law makers or government organization.
7	Organization	There are many organizations; however, the efforts to integrate them are weak and have just begun.	Establishment of stakeholder organization for each beach is recommended.
<i>></i>	Integrated Action Plan	There is no official plan which covers operation and maintenance of the respective beach. The Operation Manual of Phase-1: Bali Beach Conservation Project needs to be represented to the related organizations, and implemented with their agreement.	Formulation of beach O&M rules for each beach, which clarifies the responsibilities of the stakeholders, is recommended. Beach cleaning goals, method, number of personnel, subject area, responsibilities of each organization, monitoring plan, and section of contact to the responsible organization of the government need to be defined in the plan.
•	Fund	Non-governmental organization (NGO) and traditional village lack fund for beach cleaning. These organizations require beach trash loaders and trucks for transporting the collected trash.	Fund allocation to implement beach O&M is necessary.
A	Activities	There are a lot of beach cleaning activities but they do not cover the area systematically and continuously.	Activities integrated with the beach O&M under the proposed beach O&M board of stakeholders need to be established.
A	Monitoring	Traditional villages are monitoring the beach every day.	Monitoring items and frequency of monitoring, evaluation and analysis of the monitored results, analysis, and feed back to action plan should be clarified in the plan.

 Table 3.3.1
 Issues and Countermeasures of Beach Cleaning with Stakeholders

(Source: JICA Study Team)

(3) Improvement Plan for Beach Management with End Users

a) Basic Issues

Some readings on solid waste management reveal clearly a degradation of coastal environment in Bali. For example, a frequently cited warning is a situation of river rubbishes that drift into the sea. Various recommendations are given in improving institutional, regulatory, and facilities/equipment matters in waste management of urban areas such as Denpasar city. But what is relevant to this chapter and probably the most basic issue is a matter of public education and awareness about sanitation and waste management at the level of each individual. In other words, without education there is no fundamental solution to improving coastal environment.

The education in this sense includes not only formal education within school but also non-formal and informal education. The non-formal education is organized systematic education provided by non-academic institutions such as NGOs. The informal education indicates all leaning activities processed through any information of not-intentionally-education-oriented such as publicities.

Thus educating actors who can play a role of changing people's minds and behaviors can be schools, NGOs, institutions and volunteer groups engaged in educational activities and events. Private companies can also become such actors, for example, in their CSR activities. In the sphere of informal education, the public relations and the media activities can play a far-reaching role to the public in general.

On top of the rationale above, there is another compelling empirical reason why education becomes basic issue in beach management for and by the end users. A blueprint of consensus building and organization on beach cleaning work had already been described in the BBCP Completion Report based on a result of the workshop on "Beach Management & Coral Restoration/Transplantation in Bali Province" in February 2009. According to the Report, a routine maintenance work encompasses three kinds of activities: 1) Cleaning work, 2) Repairing work, and 3) Observation and controlling of beach utilization. A fairly detailed plan on demarcation of the work among all stakeholders had been laid out, but this mechanism has not been implemented as expected. A lesson learned from this experience was a necessity to incorporate a component of education and trainings into the mechanism before and during the implementation. No institutions and systems can work in a sustainable manner without those soft components.

b) Countermeasures

The basic issues over education related to end users of beaches can converge into one question: What kind of countermeasures can be taken in order to make those users acquire environmentally-friendly knowledge that can be translated into some positive behaviors? What ought to be challenging is to translate those educational achievement into actions for a beach management. A success to the challenge should lie in establishing the best coordination mechanism in which all concerned actors can build consensus and work in collaboration with concerted efforts. A framework model to create such educational mechanism is proposed under this section. Then a further attempt is to be made to reinforce the mechanism by means of informal education outreach, i.e., publicity. It aims at raising awareness of the public in an attempt to mobilize CSR by a private sector.

i) Consolidating educational network on beach management: Proposed Case in Sanur Beach

An effective educational network consolidation would require at least three powers; (1) political, (2) knowledge/skills, and (3) financial. Relevant proponents to those powers can be simply represented by (1) a leadership with the maximum confidence by the local people, (2) schools and NGOs, and (3) the business community respectively.

Against this background, Sanur would be able to provide a model case with comparatively more favorable factors among three beaches in Phase I. There are at least four salient factors that satisfies three powers mentioned above: (1) Local population are more visible; (2) the Sanur Development Foundation (YPS) with people's strong confidence and technical expertise in development/welfare work; (3) solid experiences of environmental education in schools under the technical support from NGOs; and (4) a strong presence of local business community. In addition to these factors, a hearing result from the YPS reveals that they are very much satisfied with the

BBCP and yet at the same time they are well aware of a subject of beach management and environment.

The YPS established in 1966 is a very important non-governmental organization unique to Sanur (equivalent entities exist neither in Nusa Dua nor in Kuta) and they are the most influential agent to the local government authorities. Their decision-making is made by representatives of 27 villages (banjars) of 30,000 Sanur populations. A father of the current president of YPS Secretariat was a member of cofounders. Their activities encompass promotions of business/co-operation, religion/culture/arts/sports, education, health, waste/sanitation/environment, tourism and safety/stability of Sanur community. The president is a big hotel owner with open mind who would be able to make an effective influence to a business community in Sanur. For example, a garbage accumulation from rivers in the mangrove area of south-west Sanur has been an acute environmental problem. The YPS organizes cleaning activities in the area and some festivals incorporating environment and cleaning activities throughout a year.

According to the Table 3.3.2 of a proposed framework model below, it is needed to pay a special attention to the following points.

- 1. Better ordinations/implementations must go through the YPS.
- 2. The YPS does not always welcome occasional/sporadic beach cleaning activities by companies with the overt publicity-only-purposes.
- 3. No big company's CSR presence in beach management/cleaning activities yet. YPS welcomes such initiatives, but companies are requested to work with YPS.
- 4. What makes Sanur different and attractive is the fact that most of beach hotels are owned by locals (such as the YPS president royal family).
- 5. Increasing presence of business/shops by non-Balinese Indonesians in Sanur cannot be ignored.
- 6. The Reef Check Foundation plans to re-launch a Costal Clean Up Program involving schools in Sanur as soon as funding is assured.
- 7. Potential collaborators in Sanur are right around the corner. YPS are always ready to facilitate their introductions: e.g., PPLH Sanur, Eco Sanur and other would-be-CSR-interested companies.

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	Rationale for Cho	oosing Sanur			Misgivings
(1) Local communitie	es are more visible.)			
(2) The Sanur Develt technical expertis Community (BGG	opment Foundation (ie and a relevant poli CC)", embracing all	(YPS) enjoys period (YPS) enjoys period Cicy "Blue and Cicy stakeholders or	eople's confidence, breen and Clean 1 beach management.	Should a large capital in it may become a destabil force around the YPS mi	vestment and development in tourism occurs, lizing factor in this framework. A centripetal ght be weakened or/and disturbed by influx of
(3) Schools in Sanur activities under th	have solid experience the technical and advi	ce in environme isory support fr	ental education and om NGOs.	outsiders. Not to menti non-Balinese Indonesian forming some misoriving	ion international, even the influx of is in tourism industry in Sanur is in fact s to some extent in the local community
(4) Strong presence c	of local business con	amunity is there	ò	Surviseum Sunoc Summor	
Supervision			Sanur Deve	lopment Foundation (YPS	
		Info	rmal Education		Notes: 1 Names of candidate informal education
-	Media/PR	4	Von-Formal Edue	cation	of Awareness Mobilization".
Principal Actors		SAG	Formal Ed	lucation	2. DPS: Denpasar City Tourism Office Extension Program.
	Business(CSR)	NGOs	Schools/Univ	ersities	 NGOs: Among others, the Reef Check Foundation Indonesia and the PPLH
					Saltu .
	1. Making YPS st	andard environ	mental education progra	ums and materials with NG	O technical and CSR financial support.
Progress Stages	2. Promoting a pr public).	ogressive expai	asion of the program to t	the sphere of non-formal a	nd informal education (from students to the
	3. Applying the p	rogram to acqui	iring life skills and beha	viors over solid waste, san	itation and coastal environment management.

The model of Sanur shall eventually be applied to other project sites taking into account of unique features of a certain beach. The application process can be facilitated by NGOs the best. It is because the fact that not only they possess the knowledge base relevant to localities but also do they enjoy well-established networking. There are dozens of environmental NGOs in Bali. Some of their activities can shed light on an effective implementation of the BBCP. The study team has made contacts with some of them and identified a few as collaborators. Above all, the Nusa Dua Reef Foundation is well aware of the BBCP and wishes a close collaboration with the Project.

The Foundation established in 2009 is gaining a momentum in networking by forming the Bali Marine Conservation Community (BMCC). The BMCC is a networking group consisting of some NGOs, national parks, private sectors and local fishermen associations. Some of the main partner-NGOs are the Coral Reefs For Life working in the North since 2003, the Reef Check Foundation working in the North and the East since 2005, and the Indonesia Nature Foundation (LINI) working in the North and the East since 2000. The Reef Check Foundation takes a multi-sartorial approach with participation of larger stakeholders, incorporating for example an environmental education and beach/river cleaning activities. The LINI has been engaged in a coral monitoring since 2003 and conducting a social-economic survey at local community. They have a technical support program for the Marin Fishery Department.

ii) Awareness Mobilization Involving Private Sector

In addition to the educational network consolidation model presented in Table 3.3.2, another effective countermeasure sheds light on informal education. This measure can influence upon the people's sub-consciousness that can trigger a critical awareness among the masses.

Government policies and regulations with regard to the environment protection and the private sector's involvement in social affairs by way of CSR can stimulate the people's awareness. There is also little doubt that increasing awareness on coastal environment is growing in Bali. An example of embodiment of such awareness is a concerted gesture toward the Bali Beach Clean Up (BBCU) program sponsored by the Coca Cola Amatil and the Quicksilver as shown in Chapter 2.3.(3).

Awareness-raising also contributes to making the people observe regulations well. It has been pointed out so often that what is more required to do is to establish a mechanism to enforce the existing regulations. For example, against a seven-meter regulation for each vendor site in beach, a hotel manager reports a sheer reality that three to four times larger number of vendors installed along a 70-meter hotel beach in Kuta in the past few years. Such a problem cannot be eradicated overnight without tackling deeper underlying causes in a larger scale for a longer term. One of the effective measures is an awareness campaign and education mobilizing maximum number of stakeholders especially from the beach end users.

It is therefore clear that in a long run the awareness-raising by means of informal education measure has a far reaching impact in affecting actions from a level of government to a level of private company.

Against this background, the BBCP employs one of the most effective and popular measures for raising awareness, that is to say the publicity. The publicity should be more effective if it includes not only an introduction of BBCP but also educational elements on environment and waste management. When the mobilization gains a momentum and reaches a threshold over the critical masses, behavioral changes shall occur to even a small local vendor in beach.

The target groups of the BBCP publicity are threefold: tourists, the public and children/the youth. A financial support in the form of CSR is to be sought with the business community/private sector. It goes without saying that one of the most important tourist groups is the Japanese tourists. It is therefore indispensable to ask a collaboration of the Japan Tour Operator Association of Bali (JTOA) composed of five travel agencies. Such equivalent associations exist in Bali for Australian nationals and Chinese ones, not to mention the Association. In terms of preventive, long-term and sustainable effects, the third group, the succeeding younger generations, is most important.

A blueprint matrix of such awareness mobilization is shown in the Table 3.3.3 and a list of candidate collaboration with PR and CSR is shown in Appendix 3.3.1. Some concrete examples of collaboration are presented in Chapter 4.5.

Matrix of Public	Relations (PR) and Corporate Social Responsibility (CSR) on BBCP
Objective	To make the target groups (i.e., tourists, the public, the youth) aware of the Bali Beach Conservation Project (BBCP) and eventually to enhance their understanding and behaviors toward clean beach conservation in particular and costal environmental issues in general.
Methods	 Brochure/Pamphlet distribution. Article contribution. Website presentation. Signboard installation. Panel presentation Lecture/tour.
Steps to Proceed	 PR materials to be prepared. Principle agreement to be signed with collaborator. Budget estimation to be made. Budget arrangement to be assured. Detailed agreement to be signed with collaborator. Coordination and sustainability mechanism to be programmed among collaborators. Implementation. Monitoring/Evaluation/Feedback/Re-programming to be implemented among collaborators.

 Table 3.3.3
 Blueprint of Awareness Mobilization

3.4 Improvement Plan on Beach Management Policy

(1) Improvement of Policy Matter related to Beach Management

Various physical issues including damage of walkway and revetment due to partial retreat of beach and damage of walk road and gazebo, etc., caused by wave overtopping have become more serious as time advances. Actually, maintenance works have been carried out after the situation worsened. As a result, delay of correspondences has created an adverse result to beach utilization and environment.

The causes of these issues are pointed out as follows:

- Demarcation of responsibility for beach management was not clarified among government institutions which relate to beach management;
- Tasks for beach maintenance have not been followed up among central, provincial, regency, and city.
- Government institutions lack understanding of the significance of beach conservation, beach O&M, etc.

In order to discuss and make a conclusion for the abovementioned issues, it is necessary to establish a working group which consists of the following government institutions. The detailed organization for the working group is described in Section 5.2, Working Group Meeting.

Central Government	Province of Bali	Denpasar City	Badung Regency
- BWS-BP	- BAPPEDA	- BAPPEDA	- BAPPEDA
- Coastal Research Center	- Dinas PU	- Dinas PU	- Dinas PU
- PU, Jakarta	- BLH		

If necessary, the demarcation of responsibility for beach management will be legalized through a regulation.

(2) Improvement of Policy Matter and Stakeholder Consensus Building related to Beach Utilization and Regulation

As described in previous sections, illegal beach use or practices are still found at Phase-1 area. Illegal beach use is not limited only on the construction of permanent buildings on the nourished beach. Besides various beach utilization issues caused by built souvenir shops and water sport stalls, planting of lawn grass, flowers, and low trees are also serious. The main cause of this condition lies in the lack of knowledge of beach use regulations.

At the present condition, inconsistent regulation in defining the distance of beach conservation area was already pointed out. Regulations that are presently available did not mention the following:

- The function of walkway and rule of beach use as ruled during implementation of beach conservation works. This rule was only known by BWS-BP as implementing unit during Phase-1;
- No coordination between governments after completion of Phase-1 to manage the regulation and permission of beach use at Phase-1 area; and
- Lack of knowledge of the regulation on beach utilization at community level. Information from the government is not conveyed.

As explained in the beginning of this chapter, integrated beach management involves many sectors. Relating to beach use at Phase-1, clear demarcation of beach areas should be defined.

The WG among related parties as mentioned above should be established to discuss and formulate the beach conservation area based on fundamental understanding of nourished beach. The final goal is to revise or redefine the beach conservation area at Phase-1 beach area. Definition of beach conservation area should be modeled on natural beach area in different ways.

Consensus buildings related to beach use at stakeholder level should also be conducted. Beach use at stakeholder level such as planting of grass, flower, low tree and souvenir stall at nourished beach area should be discussed first and be concluded to build consensus at the stakeholder level, since all of these activities support the tourism business. Finally, the consensus relating to beach use should meet with the regulations concluded by the WG. The results of consensus building are described in Section 4.4, Stakeholder Meeting.

Chapter 4 Support for Consensus Building and Capacity Building

4.1 Outline of Programs for Consensus Building and Capacity Building

The current situation and issues on monitoring, maintenance, and beach management of Phase-I Project beaches were presented in Chapters 2 and 3. Some problems are common to Phase-I Project beaches and other beaches including the study area for Phase-II.

Based on this understanding, some programs are recommended to improve the current situation of Phase-I Project beaches as well as other beaches, and to enhance the possibility of sustainable and integrated beach management in which related government institutions and stakeholders will gain benefit from the beach and end users (tourists and residents) participation.

Figures 4.1.1 and 4.1.2 show the image of desirable integrated beach management and proposed programs based on the survey results by checking the current situation of beach monitoring, maintenance, and management. In order to simplify overlapping problems, beach management was divided into four categories as follows;







Realization of Sustainable Beach Management based on PPP Scheme by Indonesia

Figure 4.1.2 Proposed Programs for Each Group

(Source: JICA Study Team)

- Technical matter: mainly for beach management bodies, which consist of BWS-BP and Loka Pantai
- > Policy matter: mainly for government institutions related to coastal management
- > Public (stakeholders) matter: mainly for communities, hotels, and other beneficiaries
- End user matter: mainly for tourists (both foreign and domestic) and residents

The programs for capacity building, consensus building, and establishment of working group (WG) are summarized in Table 4.1.1.

Category	Title Name	Background	Participants	Suggest under Action Taken by JICA Study Team
Establishment of WG	WG for "Demarcation of beach management and beach area"	 Demarcation for the responsibility (Task and Budget Allocation) on beach maintenance is not clear Demarcation of beach area is not clear and not effective (problem on regulation and permission). This causes intrusion of property into beach conserve area, and induce the damage of facility and acceleration of beach retreat 	-BALAI -DINAS PU of Bali Province -DINAS PU of Denpasar City -DINAS PU of Badung Regency - BAPPEDA (if required from beginning)	 Support to establish WG To coordinate for holding frequent WG meeting Preparation of material to be discuss and presentation to explain current condition and problems
Capacity	Technical Support to "Enhancement of understanding for Adaptive Management and Planning skill on beach maintenance"	 Their understanding for Adaptive Management applying accumulated of monitoring data is insufficient. Due to this, the effective and systematic planning and implementation of maintenance work didn't conduct 	BWS-BP and Loka	 Periodical lecture based on OM Manual Joint site inspection as on-the- job training and discussion
building of government institutions	Technical Support to "Enhancement of technical skill for monitoring and data analysis and archive system"	 Even though the monitoring has been carried out until now, the collected data was not well maintained by Management Body, and most of data cannot be well utilized. The skill for checking of monitoring method, quality of data, etc. is insufficient. This is causing the misunderstanding of actual condition. 	Pantai	 Lecture for planning of data archive method Lecture for data analysis, monitoring method and procedure
	Consensus building on "Enhancement to understanding for <i>common</i> <i>property of nourished sand</i> among stakeholders" <target area=""> South Sanur between G39 and GN2</target>	Most of property and building owners misunderstand that the accumulated sand at up-drift side of groin is his own property sand, and they want to keep this accumulated area. Sometimes, they construct their own facilities on this area.	Communities, Hotels and Private property owner	 Section of related stakeholders Frequent discussion between related stakeholders to enhance their understanding for "sand movement" and "common property of sand", and possibility to improve by stakeholders level Coordination between stakeholders and beach management body regarding implementation of required
Consensus building of stakeholders	Consensus building on "Beach cleaning based on benefit principle" <target area=""> German Beach at Kuta</target>	 Some area of beach cleaning condition seems not so good, especially at public area. Some of beneficiary at public area didn't shear their responsibility and not cooperate for public-level beach management activities such as beach cleaning (benefit principle). 	community, restaurant, fishery and marine sports beneficiary	 Selection of related stakeholders Frequent discussion between related stakeholders to enhance their understanding for "advantage and necessity" and "benefit principle" Introduce and site visit to show another success case Coordination with NGO, private company and other sectors, if necessary
	Consensus building on " Basic rule for use of beach area in public level" <target area=""> Tanjung Benoa (North Nusa Dua)</target>	- Illegal contraction on the recovered beach - Unsatisfied use of walkway (ex. Intrusion of motor bicycle into walkway)	Communities, Hotels and Private property owner	 Selection of related stakeholders Frequent discussion between related stakeholders to enhance their understanding for "desirable beach use" and "basic rule" Coordination with beach management body to control and punishment for illegal use

Table 4.1.1 Recommended Programs on Capacity Building and Consensus Building

4.2 Working Group (WG) Meeting

The main objective for the establishment of the WG is to discuss the following two main agenda related to policy matters of beach management:

- 1) Agenda-1 : The purpose of the following agenda is to discuss demarcation of responsibility on beach management including task sharing and budget allocation
 - Clarification of category of beach management
 - Demarcation and responsibility between governments and stakeholders for every beach management items
 - Process of monitoring and maintenance of every beach management items
- 2) Agenda-2 : The purposes of the following agenda are to make clear the demarcation and boundary of space for Phase-I Project beaches, and to discuss control measures
 - Legalization of walkway as the boundary between public space and private space
 - Clarification of illegal structures on the beach

The WG meeting shall be held frequently until a consensus from all organizations is reached. Further, the agenda discussed in WG meetings include not only technical matters but also policy matters on beach management. Thus, the decision maker from each organization is required to participate in WG meetings for a certain period. In order to establish beach management system and clarify demarcation and responsibilities among relevant parties, WG and pre-WG meetings were held three times and twice, respectively, among central government, local government and stakeholders from January to July 2012. The results of the above mentioned five WG meetings are summarized in Tables 4.2.1 to 4.2.5.

The members of WG consist of central/local government institutions related to beach management, observers (BAPPENAS, JICA) and organizers (JICA Study Team). The detailed members of WG are shown as follows. Organization and structure of WG are shown in Figure 4.2.1. In the 3rd WG meeting, related stakeholders of Sanur, Nusa Dua, and Kuta also act as members of WG.

Government institutions related to coastal management

(Central government)

- Ministry of Public Works
 - Department of River and Coastal
 - Department of Operation and Maintenance
 - Department of Planning Program
 - Bali Penida-River Basin Bureau (BWS-BP)
 - Experimental Station for Coastal Engineering (Loka Pantai)

(Local government)

- Province of Bali
 - Regional Development Agency (BAPPEDA)
 - Public Works Service Agency (Dinas PU)
 - Environmental Agency (BLH)

- Denpasar City
 - BAPPEDA
 - Public Works Service (Dinas PU)
 - Urban Planning and Housing Service (Dinas Tata Kota and Perumahan)
 - Peace, Order and Civil Police Force Service (Dinas Trantib and Satpol PP)
- Badung Regency
 - BAPPEDA
 - Highways and Irrigation (Dinas Bina Marga and Pengairan)
 - Settlement Service (Dinas Cipta Karya and Perijinan)
 - Civil Police Force Government Service (Satuan Polisi Pamong Praja)

WG Observers

- Watering and Irrigation, National Development Planning Agency (BAPPENAS)
- Japan International Cooperation Agency (JICA)





Table 4.2.1	Summary	of 1 st	Pre-WG	Meeting	

Outline	• Date : January 20	0, 2012			
	• Time : 10:00 am	– 12:15 pm			
	Venue : Tirta Roc	om, Dinas PU of Bali Province			
	 Chaired by : Mr 	Ketut Suharta (Head of Water Resou	rces Division of PU, Bali		
	Province)		···· · · · · · · · · ·		
	Agenda : Establis	shment of working group			
Contents of	 Introduction of the 	e JICA study			
presentation	 Establishment of 	working group for enhancement of opera	tion and maintenance		
	Regulation and p	ermission for beach utilization			
Conclusion	As forms of coop	peration in beach management, the JIC	A Study Team suggested		
	that implementin	g unit scheme (UPT) as well as the tec	hnical agency as to have		
	legal binding force	e.			
	The JICA Study	Team need further discussion on sha	ring of budget allocation,		
	principal tasks, a	nd functions of each member to attain op	timal results in the WG-1.		
	WG-1 meeting s	shall be attended by decision makers	because the meeting will		
	discuss policies	and active follow-up, formation of busir	ness entities/unit manager		
	of Beach Post BE	3CP I.			
	 Agreement and 	a strong will to find a solution are the	foundation that must be		
	shared by all r	nembers of the WG. About how mu	ich sharing, concepts of		
	cooperation, and organizational arrangements shall be determined in the WG-1				
Dentisin en te	Meeting Name of the Institutions Number of Derticipante				
Participants Central Name of the Institutions		Number of Participants			
		BWS-BP	1		
	Province of Ball	Bappeda			
		Dinas PU	<u></u>		
	Donnooor City	BLH Dines DU	<u> </u>		
	Denpasar City	DINAS PU Bannada	<u> </u>		
	вацину кеденсу	Dinas Dina Marga and Dangairan	ן ר		
	IICA Study Toom	Dinas bina warya anu Penyanan	<u> </u>		
		Total	ے ۱۸		
		10(a)	14		
mail					



(Source: JICA Study Team)

Table 4.2.2 Summary	of the 1 ^s	st WG Meeting
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Outline	 Date : January 30 Time : 10:00 am Venue : Melati Mo Chaired by : Mr C), 2012 – 12:00 nn eeting Room, Bappeda of Province, Bali Cok, Ngurah Pemayun (Head of Bappeda	a, Bali)		
Contents of presentation	 Introduction of the Integrated beach Objective of the e Discussion point Discussion point 	e JICA study management and proposed programs establishment of working group -1:Task and budget allocation -2: Regulation and permission for beach	utilization		
Conclusion	 Working group is the beach manageme BWS-BP will draw of economic deve Weakness of th equipment and be Sources for beac a. Corporate se b. Direct retribut c. Retribution f Participation of s be improved. The management invisucceed. 	a means of coordination between release agement. Through cooperation in the ent is expected to be fulfilled and legalize w a map of the existing condition relate elopment. e implementing agencies: the limitation udget (insufficient human resources, equ h management fund: ocial responsibility (CSR); ution from visitor at beach; and from guest of starred hotel around the be- takeholders and traditional villages in b rough appropriate schemes, the organi- volving all elements of both formal	evant agencies involved in management of the WG, ed. d to services and potential ons of human resources, upment, and budget). each. each management should zed and controlled coastal and informal sectors will		
Participants	Central Government	Name of Institutions	Number of Participants		
		BWS-BP	6		
	PU-Jakarta 1				
	Drawings of Dali	BAPPENAS	2		
	Province of Ball		5		
	Doppasar City	BLIT Bannoda	2 1		
	Denpasar City	Dinas PLI	1		
	JICA Study Team		8		
	Total		27		
Total 27					

(Source: JICA Study Team)

he

Table 4.2.3 Summary	of 2 nd	WG Meeting
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Outline	Date · April 5 20)12	
	 Time · 10·00 am 	h = 1.00 nm	
	Venue · Meeting	Room of Banneda, Province of Bali	
	Chaired by : Mr	Diavadijava (Secretary of Banneda, Bali I	Province
Contents of		Djayadijaya (Secretary of Dappeda, Dali 1	Towneey
presentation	Ayenua I	h haadh managamant ayatam haaad an	nublic private portporchin
		n beach management system based on	public-private partnership
	(PPP) scheme?		
	How to share ta	asks and responsibilities between <i>the gl</i>	overnment and the private
	sector and cent	<i>ral government and local government</i> on k	beach management?
	Agenda 2		
	Management of	beach riparian	
	1) BBCPTare	ea (nourishment area)	
Oppolyteitere	2) Other gene	eral beach area	
Conclusion	Conclusion of Agend	<u>a 1</u>	
	• It is agreed th	at Coordination Team of Beach Manag	gement and Maintenance
	(TKMPP) should	be established for BBCP I beaches.	
	BAPPEDA of E	Bali Province will form a 'small team'	for the establishment of
	coordination tea	im (TKMPP). This should be reported at	the 3 rd WG Meeting (June
	2012).		
	JICA will provide	e support by preparing agenda and conce	ept of beach management,
	which later will b	become part of discussion agenda at TKM	IPP.
	TKMPP will fun	ction as the coordination forum of prope	r beach management and
	maintenance by	preparing relevant programs. The progra	ms will be implemented by
	each governme	nt task unit or stakeholder.	
	Conclusion of Agend	a <u>2</u>	
	 Model of task sl 	naring and responsibility between the gov	ernment (central and local
	government) an	d stakeholder will be discussed further aft	er TKMPP is established.
	Problem in impl	ementing beach riparian regulation is typ	ical - easy to regulate, but
	difficult to imple	ment.	
	With legalization	n of coordination team structure and its m	embers, it is expected that
	all related autho	rities can be involved to discuss and solve	e the problem
Participants	Central Government	Name of Institutions	Number of Participants
		BWS-BP	3
		Loka Pantai	2
		PU-Jakarta	1
	Dury in a soft Dall	BAPPENAS	1
	Province of Bali	Bappeda	3
		BLH	1
	Dennasar City	Dinas PU	1
	Denpusur ony	Dinas Tata Kota and Perumahan	1
		Dinas Trantib and Satpol PP	1
	Badung Regency	Bappeda	1
		Dinas Bina Marga and Pengairan	2
		Dinas Cipta Karya and Prtijnan	1
		Satuan Polisi Pamong Praja	1
	JICA Sludy Team		
	IUIdi		21

Outline	• Date : July 16,	2012	
	 Time : 10:15 am – 12:30 pm 		
	Venue : Melati Meeting Room Office of BAPPEDA Bali Province		
	Chaired by : Ms Naning (Head of Regional Infrastructure Division, Bappeda of Bali		
	Province)		
Contents of	Determination	and legalization of member and task of co	ordination team for beach
presentation	management	(TKMPP) among central government,	local government, and
	stakeholders		Ŭ
	 Finalization of 	demarcation and responsibilities for be	ach management among
	central governi	ment, local government, and stakeholders	0 0
	 Legalization of 	walkway as boundary between public spa	ce and private space, and
	finalization of b	asic concept of illegal buildings and structu	ires on the beach
	Finalization of	road map for sustainable beach manageme	ent
	Confirmation o	f commitment of above four points based of	n conclusion of WG3
Conclusion	1. All participants	realized the importance of coordination t	eam for the management
	and monitoring	of beach facilities, thus, TKMPP is expected	d to be established.
	2. All participants	agreed to form a coordination team with	their respective tasks and
	responsibilities	at regency/city level, but still under the co	poperation of coordination
	team at provinc	sial level.	
	3. Regency of Ba	dung and the city of Denpasar governmer	it will provide commitment
	statement to im	plement TKMPP.	·
Participants	Central	Name of Institutions	Number of Participants
-	Government	BWS-BP	1
	Province of Bali	Bappeda	2
		Dinas PU	1
		BLH	1
	Denpasar City	Bappeda	1
		Dinas PU	2
		BLH	1
		Camat	1
	Badung Regency	Dinas Bina Marga and Pengairan	3
		Dinas Cipta Karya and Perijinan	1
		Satuan Polisi Pamong Praia	1
		BLH	1
		Dinas Kebersihan and Pertamanan	2
		Dinas Pariwisata	1
		Camat	1
	IICA Study Team	Cunat	5
	Storrotady roam	Total	25
	-		
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			

Table 4.2.4 Summary of the Pre- 3rd WG Meeting

(Source: JICA Study Team)

Outline	• Date : July 20, 20	12		
	• Time : 9:15 am – 1	12:15 pm		
	Venue : Cempaka	Meeting Room, Bappeda of Bali Provinc	e	
	Chaired by : Ms F	Putu Naning (Head of Regional Infrastru	cture Sector, Bappeda of	
	Bali Province)			
Contents of	 Background 			
presentation	Summary of the 1st	st WG and 2 nd WG		
	 Establishment of c 	coordination team for beach managemen	t (TKMPP)	
	Basic concept of r	oad map for establishment of beach mar	agement system	
	Basic concept of d	lemarcation and responsibilities of beach	management	
	 Legalization of water 	Ikway as boundary between public and	private spaces and basic	
	concept of illegal k	building and structures on the beach		
	Commitment for N	100		
Conclusion	1. In order to preserv	e beaches as among Bali's tourism asse	ets, a mutual commitment	
	is required among	the central government, province, and	regency/city to synergize	
	the implementation	n of sustainable beach management in B	ali Province.	
	2. Concept of beach	management for Sanur, Nusa Dua, a	nd Kuta, which proposed	
	that five managem	pents principally could be acceptable. In	oting that division of task	
	and responsibility	should be clarified among the central g	overnment province and	
	regency/city	enour bo olarinoù among ino oontañ g		
	3 Commitment to sy	nergize the implementation of sustainab	le heach management in	
	Badung Regency	and Dennasar City will be realized by ev	stablishing a coordination	
	team for heach r	management (TKMPP) in both the pro-	ovincial government and	
	regency/city with	the leading sector in their respect	ive RAPPEDA of local	
	aovernments	the leading sector in their respect		
	A Tasks rosponsibil	itios and tochnical implementation of be	ach managomont in Bali	
	4. Tasks, responsibilities, and technical implementation of beach management in ball Dravines will be autilized in technical guidelizes that will some as a mutual guidence			
	in the realization of	a supervisition officer of custoinable beach	ne as a mutual yuluance	
		of synergistic effect of sustainable beact	i management by central	
		vill be followed up with a memorand	up of agreement (MaA)	
	5. This agreement will be followed up with a memorandum of agreement (NOA)			
	among central government, provincial and district/municipality concerned, so that			
	goals that must be met in terms of mechanism of coordination, funding for team			
	operation, as we	eil as other lunding requirements ca	an be implemented as	
	appropriate.			
	6. Preparation of Mc	A will be done together with the centra	al government, provincial,	
	and regency/city,	and will be further coordinated by Bali	BAPPEDA together with	
Dentisiaente	BAPPEDA of regel	ncy/municipality concerned.	Number of Doublein onto	
Participants	Central Government			
		BAPPENAS	3	
	Province of Bali	Bappeda	5	
		Dinuas PU	1	
		BLH	1	
		PHRI Bali	1	
	Denpasar City	Dinas PU	1	
		BLH Dipua Kabaraiban and Dortamanan	1	
		Lurah Sanur	1	
	Badung Regency	Banneda	1	
		Cinus Cipta Karya and Perijinan	1	
		BLH	1	
		Dinas Parwisata	1	
		Dinas Kelautan & Perikanan	1	
		Camat	2	
1		I LUIAN RENOA		

Table 4.2.5 Summary of the 3rd WG Meeting

(Continued to the Next Page)

Stakeholders	Desa Sanur Kaja	1
	Desa Sanur Kauh	1
	Bendesa Sanur	1
	Bendesa Intaran	1
	YPS	2
	PHRI Denpasar	1
	Bendesa Bualu	1
	BTDC	1
	PHRI Badung	1
Karangasem Regency	Dinas PU	1
(Observer)	PHRI Karangasem	1
JICA Study Team		8
	Total	45

(Source: JICA Study Team)

In the 1st WG meeting, central government recommended that necessary budget for beach maintenance should be obtained from CSR by a private sector, direct beneficiary, beach user and so on, in consideration of lack of budget from government institutions and raising awareness of stakeholders. The implementation of beach monitoring and maintenance was also recommended to establish collaborative structure between government and stakeholder sectors.

In the 2nd WG meeting, importance of establishment of coordination team was confirmed between the central government and local government in order to determine a suitable beach management system and demarcation of responsibilities as it takes a long time to solve such outstanding matters. In addition, it is necessary to conduct discussions and coordination among government institutions and stakeholders related to beach management, through the coordination team.

In the 3rd WG meeting, all participants (central government, local government, and stakeholders) basically agreed to establish a coordination team for beach management (TKMPP), and to discuss and decide demarcation of responsibilities based on the proposed five management items. However, some participants insisted on the necessity of follow-up and support to establish TKMPP, and prepare the technical and implementation guidance by experts from JICA. Their insistence is due to a concern that TKMPP will not be able to function after demobilization of JICA Study Team since there are few members among government officials and stakeholders related to beach management who have initiative and technical capabilities.

Contents of the agreement through conclusion of the 3rd WG meeting for beach management of Phase-1, signed by central governments and local governments, are described in Table 4.2.5. The signatories of above agreement are as follows:

- Mr N. Donny Azdan (Director of Watering and Irrigation, BAPPENAS)
- Mr I Gusti Ngurah Raka (Head of BWS-BP)
- Mr Tjol. Pemayum (Head of Bappeda, province of Bali)
- Mr Wayan Suambara (Head of Bappeda, Badung Regency)
- Mr I Gusti Anindya Putra (Head of Bappeda, Denpasar City)

The presentation materials for working groups are shown in Appendixes 4.2.1 to 4.2.5.

4.3 **Programs for Capacity Building for Government Institutions**

As presented in Chapters 2 and 3, one of the main problems on beach management is that government institutions in charge of beach management lack technical capability on monitoring, maintenance work, and management skills. To improve this, it is very important to enhance various beach management skills and capabilities through OJT and lecture in a systematic manner. The following programs for capacity building were proposed and conducted by the JICA Study Team:

- Technical Support for "Enhancement of Understanding for Adaptive Management and Planning Skill on Beach Maintenance"
- Technical Support for "Enhancement of Technical Skill for Monitoring, Data Analysis, and Archive System"

However, enhancement of skills and capabilities for beach management especially related to monitoring and maintenance, are actually not so easy due to the following:

- Even though project that applies coastal protection structures (mostly seawall or revetment) has been undertaken frequently in Indonesia, beach conservation project for sand nourishment measure was very rare (Only Bali Beach Conservation Project Phase 1, hereafter defined as BBCP-I). Due to this, most engineers who work in the coastal field have no opportunity to learn about beach conservation work.
- To manage nourished sandy beaches, adaptive management (feedback approach based on monitoring, evaluation, and implementation) is required. Thus, sufficient technical background on coastal engineering and experience are required. However, it is difficult to find engineers who have such a high level of skills.

For abovementioned reasons, it is difficult to achieve capacity building on beach management in a short period. The continuous technical support for a long duration capacity building is strongly required. Two programs were prepared in this study, but will need continuous capacity building for a long period since such programs are just the initial steps.

The target persons of this program are mainly BWS-BP engineers engaged in coastal engineering. On the other hand, a new head office of Experimental Station for Coastal Engineering (Loka Pantai) under the Ministry of Public Works is under construction at the north Bali. All of its members will mobilize there in 2013 (plan) after completion of construction of building with laboratory. Even though the current member is limited (five engineers), this organization is expected to provide technical support for coastal works in Indonesia, not only for Bali beaches, but also for other islands in the whole of Indonesia in the future. However, this organization is also insufficient in terms of experience based on actual beach conservation work, and required capacity building. Therefore, a member from Loka Pantai should participate in this program.

(1) Technical Support for "Enhancement of Understanding for Adaptive Management and Planning Skill on Beach Maintenance"

The reasons why this program was proposed to beach management body are as follows:

- The understanding about "Adaptive Management" based on the accumulated monitoring data is insufficient.
- Due to this, the effective and systematic planning and implementation of maintenance work are difficult to undertake.

The program was set up as follows:

- Joint site inspection as part of OJT and discussion about cause of erosion and countermeasures based on the basic concept of adaptive management (Lectured by Dr T. Uda : See Photo 4.3.1).
- Adaptive sand management and human habitat sustainability (Lectured by Dr S. Seino : Refer to Photo 4.3.2).

The participants in this program are manager/staff of BWS-BP and Loka Pantai who have been carrying out monitoring and maintenance at beach fill area.

All participants have deepened their understanding on the importance of continuous beach management based on the concept of "Adaptive Management". Moreover, their skills for monitoring and maintenance work were enhanced through presentation and discussion in these meetings. The final goal is to enable government institutions related to beach management prepare plans and perform maintenance works based on the adaptive management procedure.



Photo 4.3.1 Lecture in this Study-1 (Source: JICA Study Team)



Photo 4.3.2 Lecture in this Study-2 (Source: JICA Study Team)

(2) Technical Support for "Enhancement of Technical Skill for Monitoring, Data Analysis, and Archive System"

The reasons why this program was proposed are as follows:

- Even though monitoring has been carried out frequently until now, collected data was not kept well by government institutions related to beach management (for this case BWS-BP OM Section), and most data have not been well utilized.
- Skills for checking monitoring method, quality of data, etc., are insufficient. This causes misunderstanding of actual condition.

The program was set up as follows:

- Joint field investigation.
- Planning of data archive method (selection of required data as long term monitoring, fixing of format, etc.).
- The skills for checking monitoring method, quality of data, etc., are insufficient. This causes misunderstanding of actual condition.
- Conduct periodic lecture for data analysis, monitoring method, and procedure.

In order to follow up the results of the 3rd WG, capacity building was conducted to enhance the management of beach fill area (Management 1) and management of coastal structure (Management 2). The JICA Study Team invited staff from BWS-BP and Loka Pantai (Coastal Research Centre of Public Works), which are central government institutions responsible for executing beach monitoring, data analysis, and several case studies of data failure. The participants of this program consist of managers and staff of BWS-BP and Loka Pantai who have been carrying out monitoring and maintenance in the beach fill area.

All participants have developed an advanced understanding as to the importance of continuous beach monitoring based on the concept of adaptive beach management using several study cases, through presentation and discussion in the meeting. The final goal is to develop the skills of government institutions to coastal monitoring in terms of checking monitoring method, quality of data, etc., which are insufficient for several actual conditions. Moreover, monitoring data with high reliability can be accumulated. Such data will be kept properly, and can be readily available anytime when needed.



Photo 4.3.3 Lecture for Beach Monitoring (1) (Source: JICA Study Team)



Photo 4.3.4 Lecture for Beach Monitoring (2) (Source: JICA Study Team)

4.4 Stakeholders' Meeting

Active participation of local stakeholders is essential for maintaining the nourished beaches in good condition. It was found that the local stakeholders are beneficiaries of the JICA coastal protection project. However, they are also causing the degradation of beach environment in BBCP-I beaches.

The way to support the local stakeholders is by providing appropriate information on maintenance, mobilizing their resources by offering incentives for better beach environment, and organizing each stakeholder in an integrated manner through series of stakeholders meetings described as follows.

A questionnaire survey was conducted at the first stage, and focus group SHM was held at each beach site within a limited area, regarding typical issue. Such information will be the basis for the questionnaire in the second stage. Then, a comprehensive stakeholder's meeting of stakeholders from all three beaches was held to discuss all beach maintenance issues. The JICA Study Team provided results of prior discussions at three beaches, and encouraged participation of local stakeholders to initiate beach maintenance (Figure 4.4.1). This section describes the following three consensus building items to enhance understanding of self-management and to support establishment of beach management system by stakeholders level:

- > Individual discussion at each beach to enhance understanding of self management
- Comprehensive stakeholder meeting for consensus building on self management
- Proposal for concrete plan of self management system "Adopt Program" and its discussion (Sanur)

Purpose: Formula	ation of sustainable man	agement system of the	beaches
	Sanur	Kuta	Nusa Dua
[Questionnaire survey on present status of beach maintenance by local stakeholders] Subjects: Hotel managements, communities, fisherman groups, beach users groups	Questionnaire survey on each stakeholder	Questionnaire survey on each stakeholder	Questionnaire Survey on each stakeholder
[Stakeholders' Meeting] Participants: Stakeholders of each beach (community, hotels, NGO etc.), and coastal management body as observers (BWS-BP)	Stakeholders' meeting on a focused issue [Partial Retreat of Beach] Dec.22,2011	Stakeholders' meeting on a focused issue [Beach Trash] Dec.21.2011	Stakeholders' meeting on a focused issue [Beach Utilization] Dec.20,2011
[General Stakeholders' Meeting] Participants: Stakeholders of all coast (community, hotels, NGO etc.), and coastal management body as observers (BWS-BP, Bali Province, Badung Regency/ city of Denpasar)		Consensus formulation on coastal management system among stakeholders Jan.26,2012	
Working Group 3 Participants: Stakeholders of all beaches and chiefs of regency (including city), province, and BAPPENAS	Negotiations	Consensus building on ach management responsibil ng all stakeholders including government Jul.20, 2012	tities g the
Negotiations among local stakeholders (leading organizations for beach management) and the government	Sanur Development Foundation (YPS)	Suggestion f Program' b Jul.19, 2012	for 'Adopt y JICA Study Team → Chap.5.4 Kuta Beach Management

Figure 4.4.1 Sequence of Stakeholders Meetings on Phase-1 Beaches

- > Individual discussion at each beach site to enhance understanding on self management
- Stakeholders' Meeting in Kuta (Agenda: Beach Trash)
- Stakeholders' Meeting in Nusa Dua (Agenda: Beach Utilization)

(1) Individual discussion at each beach site to enhance understanding on self management

- a) Stakeholders' Meeting in Sanur (Agenda: Partial Retreat of Beach)
 - i) Background

Partial retreats of beaches are evident at some places in three beaches. One of the locations chosen for evaluation of applicability of sand transformation among stakeholders is in Sanur. A beach at the southern end of Intaran Traditional Village has eroded severely; however, remarkable accumulation of sand is seen at the adjacent area (Figure 4.4.2). In order to keep the designed shoreline, continuous sand transportation activity is required with understanding that "the nourished sand is a public property" and the accumulated sand needs to be removed from where sand is excessively accumulated.

In this case, beach in front of Intaran Traditional Village has suffered from partial retreat of beach compared with the area in front of Mercure Hotel used by the hotel and Naya Gandhi (boat rental business). The JICA Study Team provided stakeholders with the nature of nourished sand and asked them for their understanding and cooperation for sand transportation.



Figure 4.4.2 Sand Erosion and Accumulation in Intaran Traditional Village

(Source: JICA Study Team)

- ii) Contents of the Presentation
- Precedent projects with JICA's assistance
- Necessity of spontaneous beach management practice due to the dynamic nature of the shoreline
- Periodic sand transfer from the accumulated to the eroded section is recommended, but taking sand from stockpile is the last choice since due to its limited availability.

iii) Summary of Discussions

All stakeholders, such as traditional village, fisherman's association, beach users group, and hotel (Mercure Hotel did not attend but was interviewed after the stakeholders' meeting) agreed on the following:

- Sand transportation is confirmed as a good erosion control measure in their area and will support the idea,
- > Implementation of sand transfer requires consultation with all stakeholders, and
- Further coordination with government and stakeholders is essential for technical and financial matter, including usage of sand stockpile.

The outline of SHM and list of participants are shown in Appendices 4.4.1 and 4.4.2, respectively.

- b) Stakeholders' Meeting in Kuta (Agenda: Beach Trash)
 - i) Background

Beach trash is one of the biggest problems in three beaches. Beaches in front of hotels are maintained in good condition. On the other hand, beach trash at public areas degrade the quality of beach environment.

Beach cleaning is a type of operation where local stakeholders can play a principal role. Jarman Beach in Kuta was selected as the case study to be used during the stakeholders' meeting. Public area in Kuta Beach is known for its unfavorable condition due to issue on cleanliness.



Photo 4.4.2 Scattered Trash on Jerman Beach (Source: JICA Study Team)

- ii) Contents of the Presentation
- Results of cleanliness evaluation of Kuta Beach : public spaces are not kept in good condition
- Analysis of the cause: attribution of responsibility for the dirtiness of public spaces
- > Explanation on the consequences of not cleaning the public area
- > Proposal for "Integrated Beach Cleaning Management System" as a solution



Figure 4.4.3 Results of Beach Cleanliness Evaluation
(Source: JICA Study Team)

iii) Summary of Discussions

[Illegal occupation of the land]

Although some discussions went on to other fields of issue, stakeholders agreed that beach trash on Jarman Beach is caused by some families who came from other regions and use the area illegally. The families reject moving away but expel other parties from coming into the area to establish business. Said families construct many hatch establishments with vending machines for drinks, food, and other uses, then scatter trashes in the area. The Kuta Beach cleaning task forces refuse to clean the area to solely benefit the families staying illegally. Villagers are not willing to eject the families from the place, and have no authority to urge them to leave. Government support is strongly requested by the villagers to oust the families.

[Beach cleanliness]

- Hotels are complaining about the dirtiness of the beach. Hotel managements feel a strong sense of crisis.
- ▶ Low awareness of local users regarding cleanliness of the beach is pointed out.
- The local residents are ready to clean the beaches; but machineries such as loaders and trucks are required because of the volume of trash, especially from December to March.

[Government support required]

- A comprehensive policy, plan, garbage loading and transportation machines, facilities, budget, and action for beach management are missing. Traditional villages and the Badung Regency should work closely.
- The government should spare a budget, especially for beach management, considering large amount of taxes they are earning from hotels and restaurants on the beach.
- Participants realized that no one takes the responsibility for fixing broken lamps. Hotels are willing to pay the electricity fee if these are repaired.
- > The government organization responsible for nourished sand is not clear to every stakeholder.

The outline of SHM and list of participants are shown in Appendices 4.4.1 and 4.4.2, respectively.

- c) Stakeholders' Meeting in Nusa Dua (Agenda: Beach Utilization)
 - i) Background

Beach encroachment is a serious problem, which is common in Nusa Dua. Although building a permanent structure is prohibited by law, many new buildings are being constructed on beaches newly established under the JICA project. Beach encroachment narrows the beach, and reduces the area where sand can be deposited by large waves during high tide. Illegal buildings are not only endangering the stability of the beaches, but are also causing strong return waves, which aggravate partial retreat of beaches. It is noted that such beach encroachment is getting worse.

The JICA Study Team selected a beach in front of Mirage Hotel in Nusa Dua as the model for the study. A chapel was constructed by the beach users in the area. The participants jointly sought a solution for the prevention of beach encroachment.



Photo 4.4.3 Illegal Permanent Buildings Encroaching Shoreline on Nourished Sand

(Source: JICA Study Team)

- Explanation of beach encroachment in Bali Island as an example, and similar cases in other Asian countries. The JICA Study Team explained how beach encroachment degrades the area as a tourism resource. The instances of serious progress of beach encroachment in Tanjun Benoa are also presented using satellite photos.
- Agreement between the landowners and BWS-BP on the boundary (walkway) of public land is also explained to the participants.

iii) Summary of Discussions

ii) Contents of the Presentation

- > The agreement that 'no permanent building in public area' is clear and agreeable.
- > The participants do not know who is responsible for enforcing the regulation.
- > The violators (hotels) were granted permissions by higher authorities of the government to construct the illegal buildings.
- The term "permanent building" needs further explanation. Its specific definition is required with regards to planting trees, grass, placing stones, installing shades, temporary decks, protection walls, etc.
- > Public border is not clear on beaches without walkways.
- Bali Khama Hotel initiated construction of a private protective wall as they received no reply to their official letters sent to the government. Consequently, severe erosion is progressing since 2005, and no information about long-term plan of the government is laid out.

The outline of SHM and list of participants are shown in Appendices 4.4.1 and 4.4.2, respectively. In addition, presentation materials for Stakeholders' meeting and consensus formulation as described above are shown in Appendices 4.4.3 to 4.4.6.

(2) Comprehensive stakeholders' meeting for consensus building on "self management"

a) Background

In order to maintain Phase I beaches (Sanur, Kuta, and Nusa Dua) in preferable condition, local stakeholders participation is essential as they are the beneficiaries and users who are sometimes causing degradation of beaches. Based on the results of discussions from three stakeholders meetings, a general stakeholders' meeting was further organized to discuss relevant beach maintenance by themselves. Stakeholders from all three beaches gathered in one place, and management bodies such as BWS-BP, Badung Regency, city of Denpasar were also present as observers.

- b) Contents of the Presentation
 - Introduction of BBCP-1 was introduced with photographs showing "before and after" the project. The benefits and difficulty of maintaining sand nourishment were explained.
 - > The purpose of the stakeholders' meeting was defined as follows:

Super Goal

To sustain the attractiveness of Sanur, Nusa Dua, and Kuta beaches for good tourism business.

Output of the SHM

Agreement on commencement of talk on "appropriate beach maintenance system" by stakeholders

- Case Studies: stakeholders' meetings were conducted in Sanur, Kuta, and Nusa Dua where conclusions were introduced.
 - <u>Sanur</u> : Sand transportation is agreed
 - <u>Kuta</u> : Impacts on Bali beaches' reputation due to beach trash were acknowledged by all participants. Integration of traditional village with hinterland management bodies (Badung Regency and city of Denpasar), formulation of beach management policy, and the implementation plan were requested from the stakeholders.
 - <u>Nusa Dua</u> : Negative impacts on tourism resources and the illegality of building permanent structures were acknowledged by all participants.
- > The following proposals are presented.

Proposal-1 :	To establish a "Beach Management Board" for each beach
Proposal-2 :	To agree on the responsibilities of each stakeholder
Proposal-3 :	To collect "beach environment tax" from beach users to be utilized
	only for beach maintenance

c) Summary of Discussions

[Beach cleaning]

- > The traditional village of Kuta has prepared a proposal for beach cleaning system.
- Traditional village of Sanur Kauh thinks that formulation of systems for beach conservation and maintenance of Sanur Beach is of utmost importance.
- Waste management of inland area is important for the coastal area considering that the river carries trashes to the beaches.

[Land usage (Illegal building)]

- The city of Denpasar has a regulation on beach utilization, but has none on beach conservation and maintenance.
- > Definition of illegal "permanent structure" needs to be clarified.

[Erosion]

- > Responsible organization for sand nourishment should be clarified.
- Sand transportation is important but if the cause of erosion is due to the shape of groins, such shape should also be modified.
- > Severe erosion is found in front of Bali Garden Beach Resort.

[Facility maintenance]

▶ Responsible organization for maintenance of walkway is unclear.

[Budget]

- > The city of Denpasar hopes to discuss budget on beach operation with BWS-BP.
- > Levies for entering cars may cause social conflict.

[Laws and regulations]

Some laws on beach use are not practical (i.e., area between the shoreline and 100 m from the high water toward inland is a public land;. No.16/2009 forbids constructing beaches within 5 km radius from the holy temple) BAPPEDA should take care of this matter.

The outline of SHM and list of participants are shown in Appendices 4.4.3 to 4.4.6., respectively.

(3) Proposal for concrete plan of self management program by stakeholders

a) Outline of "Adopt Program"

The purpose of self management program by stakeholder (called "Adopt Program" generally in Japan) is to raise the quality of management condition of public facilities (the main practice in Japan is cleaning and planting). The government agency entrusts to organizations such as private company or community organization that have a strong relationship with public owned properties, facilities, and so on. Practices done under Adopt Program are similar to volunteer cleaning activities but with heavier responsibilities. Table 4.4.1 summarizes the difference between 'volunteer activities' and Adopt Program.

	Volunteer Activities	Adopt Program
Contractor/ Contributor	 No contract Individual or organization 	Contact signed by interested organization that has common interest with the government agency on the condition of the public infrastructure.
Rules	Type of activities and the quantity of work can be decided by volunteer flexibly.	Duration, type of work are determined by the contract.
Support from the government	(In most of the case) information, or no support.	(In most of the case) information, technical, equipment, and materials
Announcement of the contract	None	Dissemination of the contract information as much as possible by public magazine, bulletins, signboards

Table 4.4.1	Comparison	between	Volunteer A	Activities	and Adopt	Program
	Comparison	Nee II Cell	, oranteeer r	activities.	and indepe	/ I U SI WIII

Table 4.4.2	Comparison	of Adopt Program	between Japan and	Phase-I Beaches
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Adopt Program in Japan (Example)	Proposed Adopt Program for Phase-I Beaches (<u>Underlined item is original action in Bali</u>)
 Beach cleaning Plants maintenance Monitoring erosion and illegal practice Environmental research and education Establishment of information center 	 <u>Sand recycle (within groins)</u> Beach cleaning and <u>installation of trash bins</u> Plants maintenance <u>Fixing of walkway surface</u> <u>Installation of lights and supply electricity, and the maintenance</u> <u>To raise security level of the area by hiring security personnel</u> Monitoring erosion and illegal practice <u>Priority use of the public beach for tourism use</u>

(Source: JICA Study Team)

b) Effectiveness of Application of Adaptive Management in Phase-I Beaches

i) Cause of Beach Degradation

Appropriate management of the beach in front of their business facilities is private sectors' utmost importance. Beaches in front of public sectors (managed by the government) are often more deteriorated than those in front of the hotels. These are causes of tourism resource degradation of the whole area.

ii) Responsibilities of the Private Sector

The governmental beach management organizations have been discussing their responsibilities in WGs, and the outcome would likely to request private sector to manage:

- Beach cleaning
- Repairing of walkway surface
- Monitoring of beach erosion and illegal usage of the beach, and
- ➤ Sand transportation between groins.

However, the private sectors are likely to oppose the proposal of the WG. Based on reports from previous hearing survey with private sector, they claim that they are already paying huge taxes, and thus, such public property should be maintained by the government themselves.

iii) 'Beach and the Strongest Interest Group'

Keeping the beach in good condition, with proper security and pleasant atmosphere provided by plants and other structures are essential; therefore, delegation of management rights to organizations with strong interest, such as a hotel, is expected to have positive impacts. Nourished beaches of Phase-I (Sanur and Nusa Dua) are protected by groins on both sides. However, littoral drift may occur during large waves and high tide. Moreover, sand has the tendency to be transported to one direction. The civil works to bring back the shifted sand to its original position (sand recycle) should continuously be implemented in order to prevent erosion and keep the appropriate width.

c) Application of Adopt Program for Phase-I Beaches

The following are the implementation plan of Adopt Program to Bali beaches.

i) Selection of Beach

Sanur Beach was chosen as a model for Adopt Program case because there is a clear leading organization, Sanur Development Foundation (YPS), which represents private sectors in Sanur. YPS is expected to understand and implement Adopt Program in Sanur. Then, Adopt Program will be disseminated to the other two beaches.

ii) Discussions with Leading Agency in Sanur

The JICA Study Team explained to YPS the concept of Adopt Program and its benefits, including undergoing discussions among government agencies regarding responsibilities in beach management. YPS was also invited to be part of WG-III. The result of discussions is presented in Appendix 4.4.7.

d) Implementation Plan of Adopt Program

Implementation of Adopt Program is planned to be taken through the following steps:

YPS obtains Minutes of Understanding from city of Denpasar
\downarrow
YPS designates beach section to be adopted
\downarrow
YPS to invite 'host parent' \rightarrow Business firm (Hotel) should be given first priority; other
business firms can participate if there is no participation from the hinterland area.
\downarrow
Adopt Program to be submitted by the candidate host parent to YPS
\downarrow
YPS to select host parent
\downarrow
Discussion on contents of contract \rightarrow Activity, duration, reporting (agency, frequency, contents)
\downarrow
Agreement, contract
\downarrow
Implementation of the activities \rightarrow BWS-BP to provide technical guidance on sand recycle
\downarrow
Host parent to submit report periodically

4.5 Collaboration with Private and Other Sectors, and Public Relations

(1) Corporate Social Responsibility (CSR)

Along a CSR movement from a private sector, it is recommended that BWS-BP, Badung Regency and Denpasar City start joint coordination on beach maintenance activities taking

into account the CSR initiatives. The background of this CSR is described in Appendix 4.5.1(1). Necessity of such coordination involving important stakeholders has been consulted to BWS-BP with a view to organizing a committee. The BWS-BP has done a social study on beach maintenance in Bali, yet an application of the study results does not seem to be in practice at the moment. Considering the capacity of the institution (e.g., limited number of staff in charge of socialization of beach management), it would be more realistic at the moment to promote and encourage such coordination mechanism among local communities, NGOs, and related companies. One example can be made in Sanur. YPS enjoys the potential of CSR. Not only by their technical expertise in development based on their traditional culture and spirit, but also by a strong leadership of the President of Indonesia who is also an influential and successful businessman in tourism, would they be able to become a flagship in leading CSR activities on beach maintenance/management and coastal environment. This positive observation is based on hope expressed by the President during an interview. The President very much appreciated the results of BBCP and expressed gratitude on behalf of the people of Sanur. Yet he was very much concerned about its maintenance. He clearly recalled the February 2009 stakeholders' workshop in which there had been some results of discussions in quite detail with regards to the maintenance organization/management among participants. Although there had been some written agreements over maintenance of BBCP beaches, application/execution of such agreements has remained a big question to him. He encouraged follow-up and re-establishment of the agreement, as well as welcomes CSR beach cleaning activities in Sanur. Further, diligent consultations with YPS are certainly necessary. One of the consultation issues would be their Sanur Development Accompany Fund (DPSPS).

(2) Concrete Action of Public Relations (PR)

The BBCP PR activities shall be well accepted and adopted by all stakeholders of the project in particular, and the public in general. Furthermore, within a collaboration framework with CSR activities, the BBCP PR activities would be able to improve and expand, interacting with a certain company's PR expertise. The background of this PR is described in Appendix 4.5.1(2).

Incidentally, a consideration over characteristics similar to that of BBCP, dealing with the issue on coastal environment, has generated an idea to initiate some collaborative PR activities with the Mangrove Information Center that had been established under JICA cooperation projects. However, it turned out that the current central situation had not yet been well-organized enough to launch a publicity with the BBCP.

As to formulation of the BBCP PR strategies, three target groups have been identified; (1) tourist, (2) the public, and (3) the youth. Considering the project characteristics as Japan's ODA, priority has been given to Japanese tourists in terms of starting with concrete actions.

Among the member agencies of the Japan Tour Operator Association of Bali (JTOA), hearing surveys have been done with two well-known larger agencies, the Japan Travel Bureau (JTB) and the HIS. It has been confirmed that BBCP can be advertised in JTB's yearly publication (approximately 50,000 copies) called "My Bus Bali" for its 2013 fiscal year edition. In principle, US\$1,600 per page can be charged, but a negotiation is under way. It is also suggested that their supplier companies such as Dekom and Bali Kurabu can become effective by means of PR. HIS has a ten-year reputation of publishing 10,000-15,000 copies of free monthly publication on touristic information in the Japanese language called "*Bali Freak*". With a spirit of CSR, the head of its Bali office welcomes the BBCP publicity in the publication. A discussion with the "Bali Freak" editor-in-chief later poses a question about the style of writing. A further consultation has to be made with JICA to see if the style is characterized with a light-touch story-telling, consistent with some standards and criteria expected by JICA.
Besides the two Japanese tourism agencies, a groundwork has been laid out by contacting various institutions as follows.

- (1) The Association of Indonesian Tourism Education Institutes is the sole association of its kind in Bali embracing more than 6000 students in 12 universities. The association members include 50,000 hotel staff in Bali. Its president welcomes the PR activities through the association network.
- (2) The International Bali Tourism Institute, one of seven well-known four-year universities on tourism in Bali with about 1300 students, welcomes the BBCP PR initiatives in their magazines and extra-curriculum lectures to the students.
- (3) The Wisnu Foundation has been executing an eco-tourism program incorporating land use/water management education in Balinese villages. They express collaboration in disseminating the BBCP information in their project villages.
- (4) The Bali Japan Club has 356 individual members and 50 company members. The BBCP article contribution to their quarterly publication called *Rakuen Tsushin* and to their event posters can be realized through a final approval from its president.
- (5) The Triatma Surya Jaya Foundation manages educational institutions. Among four undergraduate level universities under the foundation, two are on tourism in which about 600 students study. They also offer vocational tourism to 900 high school students. The president of the foundation welcomes the BBCP PR activities through lectures, magazines, web sites and so on, free of charge.

(3) Educational Programs

Education as broadly defined is treated as the basic issue and a key tool for maintaining a sustainable beach management for and by the end users. Based on the countermeasures proposed in the Chapter 3.3.(3), a pilot educational program can be launched with more detailed studies on the actual situation of environmental education and practice in the Denpasar City area. According to the city statistics, there are 216 elementary schools, 44 junior high schools and 26 senior high schools in Denpasar City. Further consolidation and coordination with more intensified and enlarged efforts on the part of YPS is indispensable. The pilot program should be formulated with careful examinations of the proposed countermeasures and include the following components:

- (1) The BBCP lecture is to be integrated in the Extension Program by the Denpasar City Tourism Office.
- (2) The Bali Japan Club organizes for its Japanese school students a spring excursion every year. The excursion to the BBCP beaches and a prior special lecture on coastal environment is to be incorporated especially for its OB class students.
- (3) Such activities in the Japanese school can be duplicated at Bali International School, the Australia International School, and other private local schools with English curriculum.
- (4) Collaboration with the Bali Japan Club volunteers who have been implementing the "Bali Eco Karuta" project is to be done.
- (5) In YPS standard environmental education program, a successful Japanese project entitled, "Foster Parent" beach management is to be introduced. In its application in Sanur, a team of collective stakeholders can be organized in each section between two groins, whose activity on financing can be partly channeled through a collective business

community by means of their CSR. Names of a team, its members and publisher sponsors are to be displayed in plates and signboards between the designated groins. YPS coordinates and supervises their activities within a systematic program and motivates them to perform better. Such incentive practices should be encouraged in order to stimulate healthy competitions among those teams. This initiative should also be designed to facilitate a multiplier effect and synergy among the local government, the private sector and the social sector, especially that of education. Because of the fact that more than 80% of Sanur population is engaged in tourism-related work, involving its residents into the project would not be so difficult.

4.6 Seminar on the Sustainable Beach Management

The main objective to convene the seminar is to present the importance of the beach management for both governments and stakeholders, and enhance the coordination of TKMPP (Team of Beach Management and Maintenance). Overview of the seminar is shown the table below and the details are shown in Appendix 4.6.1.

|--|

Outline	 Date : 13 September, 2012 Time : 09:00 – 14:40 Venue : Meeting Room "Batukaru", Inna Sindhu Bali F Sanur, Bali 	lotel, Resort and Meeting,					
Contents of presentation	 Sustainable Beach Management (Head of Subdit of Technical Planning) Bali Beach Conservation: A Beach Protection and Preservation Effort (Head of BWS Bali-Penida) Integrated Beach Management Strategy for Bali Environmental Vision and Sustainable Development (Dr. K.G. Dharmaputra) Natural and Cultural Beach Conservation and Multi-sectoral Collaboration are the Key to Sustainable Coastal Communities (Dr. Satoko SEINO) Review & Activities of JICA Study on "Beach Maintenance & Management" Comparison of Beach Management System Between Bali & Mauritius (Mr. Susumu ONAKA) Impacts of Artificial Alteration to Beach Topography (Dr. Takaaki UDA) 						
Conclusion	 Stakeholders and Central Government (BWS-BP) realized mutual coordination for beach management and maintena Stakeholders are ready for involve actively and looking for for establishment and implementation the beach manage TKMPP. The Central Government (BWS-BP) and Province Govern the establishment of TKMPP immediately. 	e that how the important is ance. orward the further fast step ement program through the nment promise to complete					
Participants	Affiliation	Number of participant					
ranopanto	Central government	8					
	Bali Province	3					
	Dennasar City	14					
	Badung Regency	18					
	Karangasem Regency	1					
	Stakeholder	31					
	Udayana University	1					
	JICA study team	6					
	Total	82					

(Source: JICA Study team)

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Chapter 5 Establishment of Sustainable Beach Management System

5.1 Overview

Until now, there was no authorized system for beach management system in Indonesia. This is one of the main reasons to cause the problems on beach maintenance and management as presented in Chapter 3. To improve such situations, it was required to keep the same perception for the necessity of beach management in cooperate with public and private sectors, and to establish the beach management system and start the activities, immediately.

As the first step to achieve the establishment of the beach management system in the Phase-1 beaches, the establishment of working group (WG) was proposed by JICA study team to discuss above mentioned issues among related parties, and the official meeting has held on 3 times as presented in Chapter 4. As important conclusion in the WG 3 meeting held on 20th September 2012, the central and local governments agreed to take necessary actions for the early establishment of the "Coordination Team on Beach Management (TKMPP)"

These action for the establishment of TKMPP has been just started, and continuous discussions and active performance which strong ownership of Indonesian governments are required for the establishment of TKMPP and for running well of this system. In order to support this, the following studies are conducted in this chapter taking, into account of beach management issues described in Chapter 3 and based on the results of the discussion of working group meeting.

\triangleright	Background on the establishment of beach management system	[5.2]
\succ	Establishment of a beach management system under the cooperation between	
	the public and private sectors	[5.3]
	Proposed road map for the establishment of a beach management system	[5.4]

The contents of this chapter are summarized in Figure 5.1.1.





(Appendix 5.3.2) Adequate Beach Zone Management (Draft)

 Legalization of walkway as boundary between public and private lands
 Basic concept of illegal structure on the

beach

Figure 5.1.1 Flow for the Contents of Chapter 5

(Source: JICA Study Team)

5.2 Background on Establishment of Beach Management System

(1) Summary of Improvement Plan for Beach Management

In accordance with the studies for beach management, issued in Chapter 3, required improvements on beach maintenance and management were summarized as follows;

- > Enhancement of skill for beach monitoring and maintenance of government institutions;
- Necessity for revision of the existing beach operation and maintenance manual;
- Enhancement on the understanding of the basic principles integrated in the "Adaptive Beach Management System" among all government institutions to comprehend the need for continual beach monitoring and maintenance;
- Establishment of a beach management organization under the cooperation between public and private sectors to share responsibilities and exchange information and requirement;

- Determination of the demarcation of responsibility among government institutions and stakeholders to clarify the division of roles for beach management;
- Clarification on the function of walkways as boundary between the public and private control construction of facilities, building, planting, etc., on nourished beach; and
- Enhancement of knowledge on the regulations of beach utilization at community level to control various illegal activities.

(2) Summary of Conclusions in the Working Group Meeting

The summary of conclusions in connection with the establishment of a beach management system on WG 1 to WG 3 is shown as follows.

WG 1 (January 30, 2012)

- Need to establish a form of organization which will manage the condition and utilization of the beach as well as to keep the beach shore wide
- ➤ The beach management should coordinate with all relevant parties such as the central and local governments and stakeholders
- Main issues raised on the local government side are lack of human resources, equipment, technical skill, etc.
- The demarcation of tasks and responsibilities should be clarified between governments and stakeholders

WG 2 (April 5, 2012)

- The Coordination Team on Beach Management (TKMPP) should be established among government institutions (central government, Province of Bali, Denpasar City, Badung Regency) to clarify their specific tasks and responsibilities
- BAPPEDA will establish a small team for preparing the TKMPP with support from the JICA Study Team
- ➤ The function of TKMPP will be a coordination forum for beach management and maintenance. Schemes, tasks, and responsibilities will be discussed in this coordination team after being established by the Bali Governor's Degree.

Final Agreement in WG 3 (September 20, 2012)

- Governments agreed to take necessary actions for the early establishment of the "Coordination Team on Beach Management (TKMPP)".
- ➢ Five management items related to beach management were accepted among the governments who are related to beach management.
- Governments and stakeholders agreed to establish a beach management system under the cooperation of the public and private sectors.

In addition, a road map consensus was obtained among government institutions and stakeholders as a milestone for the establishment of a sustainable beach management system in the WG 3 meeting. The following actions were also confirmed in the said meeting to be the next action of the public and private sectors:

- Establishment of TKMPP by 2012 at the latest;
- Continuous discussion and consultation to set up the demarcation of responsibilities of the TKMPP;
- > Consultation to legalize walkways as the boundary between public and private properties;

- Consultation on how to control illegal buildings and structures built on nourished beaches;
- Budget allocation for related government institutions based on the fixed demarcation of responsibilities through discussions of the TKMPP;
- Consultation on the significance of sand stock pile and the role of sand utilization and transportation among government institutions and stakeholders;
- Consultation on the clarification of the permit's approval system, role, regulation, etc., to be used for beach utilization;
- Trial of pilot case study to show the beach management cooperate with public and private sectors that were indicated in the road map.

(3) Necessity of Coordination Organization under the Cooperation Between Public and Private Sectors

Based on the above results from the study of the improvement plan and results of the working group, the necessity of coordination team among government institutions and stakeholders was evaluated in the following procedure;



Figure 5.2.1 Flow for the Necessity of Coordination Team for Beach Management

(Source: JICA Study Team)

In accordance with the above evaluation, the necessity for a coordination team was confirmed to establish sustainable beach management. Therefore, specific organization, task, action plan, etc., for the coordination team were proposed and discussed in the third working group meeting (July 20, 2012). Finally, a road map was set for future direction and milestone as described in this chapter.

5.3 Establishment of Beach Management System Under Cooperation between Public and Private Sectors

(1) Category and Required Actions for Beach Management

The required beach management is categorized into five items in accordance with the basic categories described in the Beach Operation and Maintenance Manual and the results of discussion of the Working Groups. These five items are as follows;

- Management-1: Monitoring, evaluation and maintenance of sandy beach
- > Management-2: Maintenance of coastal facilities
- > Management-3: Maintenance of landscape and public facilities
- ➤ Management-4: Beach cleaning
- Management-5: Control of beach utilization (for illegal construction)

The categorized management items and required actions for each are summarized in Table 5.3.1. Management-1 for monitoring, evaluation and maintenance for nourished beach should be carried out based on the basic concept of integrated beach management (Adaptive Beach Management), as described in Section 3.3 Chapter 3. Managements-2 and -3 consist of: 1) monitoring of facilities, and 2) evaluation of required maintenance and implementation. Management-4 consists of: 1) daily beach cleaning 2) transportation of rubbish to disposal areas and 3) public participation as environmental education program. Management-5 consists of: 1) daily checking and self-control of beach utilization and 2) sanctions for violation of beach utilization.

	Category of Beach Management	Required actions				
		Monitoring (by visual) and reporting				
	Monitoring, Evaluation and Maintenance	Monitoring (by survey)				
1	of Sandy Beach	Analysis and evaluation				
	(Adaptive Management for Sandy Beach)	Planning and design for required adaptation				
	(·····)	Implementation of adaptation (rotation/refilling of sand)				
2	Maintenance of Coastal Facilities	Monitoring and reporting				
2	(Revetment, Groin, Breakwater)	Evaluation and repairing				
2	Maintenance of Landscaping and Public	Monitoring and reporting				
3	Facilities (walkway, gazebo, lamp, etc.)	Evaluation and repairing				
		Daily cleaning				
4	Beach cleaning	Disposal of gabage				
		Public participation as environmental education program				
	Control of beach utilization	Daily checking and self-control of beach use				
5	(for illegal construction on the Beach)	Sanction for violation of beach utilization				

 Table 5.3.1 Categorized Management Item and Required Actions

(2) Objectives of the Coordination Team for Beach Management (TKMPP)

The cross-sectional actions between them are needed in order to implement adequate beach management in the five management items stated above. The official pre-WG meetings were held three times while official WG meetings were held three times. The meetings discussed about the necessity of a beach management system in the Phase-1 Beaches and required action under the cooperation between the public and private sectors. Measures for organization and systematization among the central governments, local governments, and stakeholders were also discussed. The establishment of TKMPP was settled as one of the main conclusions in the WG meeting, among government institutions. A small team was set-up for the preparation committee in BAPPEDA, Province of Bali.

The main function of TKMPP is expected as follows:

- To enhance shared awareness on beach maintenance and management among all members.
- ➤ To maintain the same understanding for the problems on beach maintenance and management at the Phase-1 Beaches due to exposing from each parties (especially from stakeholders) in TKMPP
- > To discuss and determine the measures for the issue on beach maintenance and management at the Phase-1 Beaches including sharing of responsibility and budget allocation.
- > To determine the common roles on beach utilization among governments and stakeholders. Further, to control and to make clear the sanction for the violation on beach area such as illegal use of sandy beach in the Phase-1 Beaches and other beaches in Bali.
- To promote awareness programs to a wide range of beach users and enhance the ability of beach management
- ➢ To establishment the successful beach management system for the Phase-2 Project Beaches based on the experience of both implementation and activity of beach maintenance and management for the Phase-1 Beaches.
- To examine and if possible to establish the comprehensive beach management at whole Bali beaches.

(3) Proposed Members and Organization of TKMPP

Members of TKMPP consist of different government sectors such as the central government, Bali Province, Denpasar City, and Badung Regency. Also members are stakeholders such as traditional villages, administrative villages, tourist development board and center, hotel and restaurant associations. The detailed member of TKMPP is shown in Figure 5.3.1. And the expected organization of TKMPP was indicated as a basic concept of an organizational diagram, as shown in Figure 5.3.2. It was recommended that TKMPP will be organized by BAPPEDA in Bali Province as chairman, the provincial public works as vice-chairman. BWS-BP was recommended as secretariat to lead the right way for beach maintenance and management, because only BWS-BP has undertaken the beach monitoring and maintenance after the completion of the Phase-1 Project. Other members from both governments and stakeholders were recommended as shown in Figure 5.3.1.

The final members and organization will be determined and legalized as Bali Governor's Decree as implementation body for sustainable beach management of the Phase-1 Beaches.



Figure 5.3.1 Members of the Coordination Team for Beach Management (TKMPP)

(Source: JICA Study Team)



Figure 5.3.2 Expected Organizational Structure of TKMPP

(Source: JICA Study Team)

(4) Implementation Image of TKMPP and Draft Idea of Responsibility

The TKMPP meeting will be basically held periodically in the year by the official announcement of BAPPEDA with all members participate to discuss and determine the annual required beach maintenance and management. The image of the frequency for holding the meeting is three or four times per year. However, if it is necessary to discuss and determine the urgent issues regarding beach maintenance and management matters, the irregular meeting will be also considered to be held by the instruction of BAPPEDA.

The members of TKMPP will report the present situation and issues of every management item. Discussions on necessity of measures, strategy and implementation plan against several management issues will also be tackled. They will also discuss some subjects for sustainable beach management that was set up during previous meetings and will conclude on improvement plan and enforcement policy in TKMPP.

The draft idea for the demarcation of responsibilities for each management item and its required action is summarized in Table 5.3.2. The draft of detail procedure and responsibility for each management item were examined by JICA Study Team (shown in Appendix 5.3.1). However, the final demarcation plan will be further discussed and concluded among all members of TKMPP refer to the draft idea shown in Appendix 5.3.1.

	Category of Beach Management	Required Actions	Main Responsibility		
		Monitoring (by visual) and reporting	Stakeholders		
		Monitoring (by survey)			
1	of Sandy Beach	Analysis and evaluation			
	(Adaptive Management for Sandy Beach)	Planning and design for required adaptation	Central Government (BWS-BP and Loka Pantai)		
		Implementation of adaptation (rotation/refilling of sand)			
	Maintananaa of Cooptal Epsilition	Monitoring and reporting	Stakeholders		
2	(Revetment, Groin, Breakwater)	Evaluation and repairing	Central Government (BWS-BP)		
	Maintenance of Londocaning and Dublic	Monitoring and reporting	Stakeholders		
3	Facilities (walkway, gazebo, lamp, etc.)	Evaluation and repairing	Local Government (Badung Regency, Denpasar City)		
		Daily cleaning	Stakeholders		
4	Beach cleaning	Disposal of gabage	Local Government (Badung Regency, Denpasar City)		
		Public participation as environmental education program	Stakeholders cooperate with NGO		
	Control of beach utilization	Daily checking and self-control of beach use	Stakeholders		
5	(for illegal construction on the Beach)	Sanction for violation of beach utilization	Local Government (Bali Province, Badung Regency, Denpasar City)		

Table 5.3.2 Demarcation of Responsibilities of TKMPP Members (Draft Idea)

5.4 Proposed Road Map And Action Plan for the Establishment of a Beach Management System

It is expected that various beach management issues will be improved through the discussion and determination in TKMPP meeting hereafter. However, this activity is the first trial as beach management in Indonesia, and it was thought that they will have a difficulty in operating TKMPP and sustainable beach management as they have no specialist for coastal management and no experience on comprehensive beach management based on both technical and institutional point of view. To assist the activity conducted by Indonesia with their ownership, it is recommended to hold TKMPP meeting and required action for beach maintenance and management continuously in accordance with the proposed road map that describes the goals and action plans as a milestone in order to take initiative in solving problems.

Table 5.4.1 shows the proposed road map to show the target or achievement in each stage.

- The preliminary stage is divided into "1st term" and "2nd term". The 1st term is to set up a basic concept of suitable sustainable beach management system during the JICA study. 2nd term is to establish TKMPP and holding the regular meeting to discuss and implement countermeasures against beach management issues in the Phase-1 Beaches while basically there is no support of JICA experts from the completion of JICA study until starting of engineering services in the Phase-2 Project.
- ➤ The middle stage is divided into "3rd term" and "4th term". The 3rd term is to holding the regular meeting of TKMPP not only for the Phase-1 Beaches but also for the Phase-2 Beaches to establish the suitable beach management system before the commencement of implementation of the Phase-2 Project. Annual beach maintenance and management are undertaken in accordance with the decision of TKMPP. Capacity development for beach management are also conducted by the assist of Japanese experts as soft component programs in the Phase-2 Project (refer to Chapter 12). The 4th term is to holding the regular meeting of TKMPP for both Phase-1 and Phase-2 Project Beaches, and annual beach maintenance and management for both beaches are undertaken and monitored in TKMPP.
- The final stage (5th term) is the last term in the Phase-2 Project. The beach maintenance and management for Phase-1 and Phase-2 Beaches is expected going well only by Indonesian side. The beach management system including other beaches in Bali is discussed to expand the successful result of beach management for Phase-1 and Phase-2 Project.

Specific action plan especially in the 2^{nd} term of the preliminary stage is shown in Table 5.4.2. This stage is very important because TKMPP should be established, and some fundamental issues shall be discussed and determined in the TKMPP by Indonesian side without assistance of Japanese expert.

This action plan describes regularly scheduled discussion, subjects of discussion, and contents of pilot case studies and the timing of its implementation. As the pilot case study, the maintenance of sandy beach at specific area of Sanur and Nusa Dua in cooperation with related stakeholders is expected. The objective of the pilot case study is to enhance the understanding and right way of maintenance of sandy beach in corporation with the public and private sectors. As pilot case study, the trial of sand rotation with re-filling of sand from stockpile at south Sanur (between groin No.G38 and GA2), and north of Nusa Dua (north of

groin No.GA2) was recommended as model case based on the monitoring result presented in section 6.4, Chapter 6.

Year	2011	2012	2013	2014		20	015	2016	2017	2018
	JICA (Preparatory Su	Study rvey on BBCP-2)	Preparation Period for Phase-2	E/S for (DD & Biddir	Phase	e-2 sistance)	Implementation for Phase-2			
Stage	1st t	term	2nd term	3rd	term		4th term			5th term
		(Preliminary	Stage)			(Midd	le Stage)			(Final Stage)
Main Activity	- Establishment of Working Group (WG) and holding meeting (WG1 -WG3) - Seminar		- Establishment of TKMPF and holding regular meetir (for Phase-1 Beaches)	-Holding regul (for Phase-1 & - Capacity bui up of beach m	-Holding regular meeting (for Phase-1 & 2 Beaches) - Capacity building for skill- up of beach management			egular meet e-1 & 2 Bea building for nagement	ting ches) r skill-up of	ditto
Target or Achievement	Obtaining common understanding for importance of Beach Maintenance and Management cooperate with Governments and Stakeholders Agreement for sharing of responsibility on beach maintenance and management Agreement to establish coordination team for beach management (TKMPP)		Establishment of TKMPF Finalization of responsib for each management iter Determination of beach management system (common rule, control of beach area, etc.) Trial of pilot case for maintenance of sandy bea with PPP scheme	 Identification for each beac decision for a maintenance Establishm determination management Phase-2 beac 	o of pro th and nnual I work ent and of bea syster ches	oblems to make beach d ach m for	- Continuo managem Beaches - Starting at Phase-2 scheme	us beach ent at Phas beach mar 2 Beaches	e-1 agement with PPP	 Continuous beach management at Phase-1and 2 Beaches Discussion to expand whole Bali beaches
Image for Skill- up & Experience of Indonesia										

Table 5.4.1 Road Map for the Establishment of Beach Management System

(Source: JICA Study Team)

Table 5.4.2 Action Plan in the 2nd Term of Preliminary Stage in 2013 (Draft)

Vara 8 Marth					2	201	2					2013 2014															
	Year & Month Jan Apr Jul Sep Oct Nov Dec			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Feb	Mar							
	Tours	JICA	Study	(P	repara	tor	y Sur	vey of	Phas	se-2)			. I	Prepa	ration	Stage	for P	hase-	2				E/S S	Stage	for Ph	ase-2	
	Term	1st Term (in Preliminary Stage)					2nd Term (in Preliminary Stage)						Зr	d Ter	m (in	Middle	e Stag	je)									
Su	pport and Capacity Development by JICA	ł						+			· · · · · · · · · · · · · · · · · · ·					ţ											
	Working Group (WG), Seminar	▲ WG1	▲ ₩G	2	▲ ₩G3	\$	∆ emin	ar															Alrea	l ady un	dertak	en	
	Establishment of TKMPP	blishment of TKMPP			Go	overn	▲ or Dec	ree	Revi (as	A Planned					lanned												
vity	Discussion among Governments (BAPPEDA, BWS-BP, Central)																						now to city ar egally	o partio nd Sta	cipate keholo	reger ders	ncy,
Activ	TKMPP Meeting (to establish management system)																		4								
	Trial of Pilot Case											Main for	tenano specif	e of Sa ic area	indy B at Sa	each nur	Ma for	ntena specif	nce of ic area	Sand at Nu	y Beacl Isa Du	h					
	TKMPP Meeting (to discuss and determine annual maintenance)																										

Chapter 6 Beach Change After the Nourishment and Review of Adaptation Measures

6.1 Overview

After the execution of nourishment at the three beaches in Sanur, Nusa Dua, and Kuta, the monitoring survey for shoreline change continued its implementation during the Phase-I implementation period by the Consultant (Nippon Koei). The nourishment was completed on December 2003 at Sanur and Nusa Dua, and its monitoring survey started in January 2004. At Kuta, the nourishment was completed in November 2008, and its monitoring survey started in December 2008. The monitoring survey for shoreline change continued until the end of 2008 by the Consultant. After the completion of the project (Phase-1), BWS-BP was carried out twice (November 2009 and October 2011) at Sanur and Nusa Dua, twice (November 2009 and October 2011) at Kuta. According to the monitoring result, sand loss calculated at Sanur and Nusa Dua was not significant at roughly 10% (shown in Tables 6.2.1 and 6.2.2), which was less than the original presumption (20%). On the other hand, sand loss at Kuta was higher than that of Sanur and Nusa Dua as what was presumed. Even though sand loss at Sanur and Nusa Dua was not significant, if shoreline changes were to be checked at each section (divided by each groin and headland), beach retreat which was more than expected or unexpected, was observed at several sections. This has been causing the damage of walkways, resulting to unproductive availability of its beach as a tourism beach.

In this section, beach behavior after nourishment was rechecked based on the continuous monitoring data. The unstable sections for each beach were identified and the corresponding required adaptation measures to improve its condition were recommended. The flow of this section is shown in Figure 6.1.1.



Figure 6.1.1 Process Flow on the Review on Countermeasures for Adaptation

6.2 Beach Change and Sand Remaining after the Nourishment

(1) Sanur

The project area at Sanur beach is shown in Figure 6.2.1. This area is divided into three sub-areas which are called S1, S2, and S3. The shoreline change after the nourishment until this year is shown below for each sub-area.



Figure 6.2.1 Layout of Sanur Beach

(Source: JICA Study Team)

a) Section S1

The beach condition in S1 is shown in Photo 6.2.1 and the shoreline change based on the initial position just after beach fill is shown in Figure 6.2.2. S1 is enclosed by two headlands (G3 and G4) and one existing groin (G5) with a 430 m alongshore distance. In Figure 5.7.2, although the shoreline position has moved from its initial position, an almost stable beach condition was already obtained.

From the result, there is no need to consider further adaptations at this time.



Photo 6.2.1 Bird's Eye View of S1

(Source: Nippon Koei Co., Ltd & BWS-BP)



Figure 6.2.2 Shoreline Change at S1 (Based on its Initial Shoreline Position)

b) Section S2

(Source: Nippon Koei Co., Ltd & BWS-BP)

The present beach condition in S2 is shown in Photo 6.2.2 and the shoreline change based on the initial beach position just after beach fill is shown in Figure 6.2.3. S2 is enclosed by six groins and headlands with 1700 m alongshore distance. Unstable condition is recognized at section S2-1 (between GN7 and GN4). Continued beach recession at the north side of GN4 were observed. The narrowness of the beach is causing unsatisfactory results in beach use as shown in Photo 6.2.3.



Photo 6.2.2 Bird's Eye View of S2

(Source: Nippon Koei Co., Ltd & BWS-BP)





Figure 6.2.3 Shoreline Change at S2 (Based on its Initial Shoreline Position)

(Source: Nippon Koei Co., Ltd & BWS-BP)



Photo 6.2.3 North Side of GN4 at Section S2-1

(Source: JICA Study Team)

c) Section S3

The present beach condition in S3 is shown in Photo 6.2.4 and the shoreline change based on the initial beach position just after beach fill is shown in Figure 6.2.4. S3 is enclosed by five groins and headlands with a 1700 m alongshore distance. Two additional groins (G37 and GN5) were constructed between G32 and G38 by BWS-BP, owing to the strong request of the Purisantrian Hotel. Unstable conditions were recognized at section S3-1 (north side of G32), S3-2 (between G37 and GN5), S3-3 (between G38 and G39), and S3-4 (between G39 and GA2).



Photo 6.2.4 Bird's Eye View of S3



Figure 6.2.4 Shoreline Change at S3 (Based on Initial Shoreline Position) (Source: Nippon Koei Co., Ltd & BWS-BP)

Photo 6.2.5 shows the beach condition at the north side of G32 in section S3-1. Beach recession continued and beach slope has reached the position of walkway.

Photo 6.2.6 shows beach conditions at the south side of G37 (constructed in 2006) in section S3-2. After the construction of additional groin G37, the beach recession at the south side of G37 occurred and the narrowness of its beach width is causing unsatisfactory conditions on beach use.





Photo 6.2.5 North Side of G32 at Section S3-1

Photo 6.2.6 South Side of G37 at Section S3-2

(Source: JICA Study Team)

Photo 6.2.7 shows the beach condition at the south side of G38 in section S3-3. Beach scarp due to the recession was observed. On the other hand, the accretion of the beach at the north side of G39 in section S3-3 was observed as shown in Photo 6.2.8.



Photo 6.2.7 South Side of G38 at Section S3-3



Photo.6.2.8 North Side of G39 at Section S3-3

(Source: JICA Study Team)

Photo 6.2.9 shows the beach condition at the north side of GA2 in section S3-4. Significant beach recession was observed resulting in damage of some walkway parts. The impermeable type concrete seawall was constructed in October 2011, however, this seawall has been already damaged due to high wave action in February 2012, as shown in Photo 6.2.10.



Final Report (Simple Version)



Photo 6.2.9 North Side of GA2 at Section S3-4 (Sep 18, 2011)

Photo.6.2.10 Same Position (Feb 5, 2012) (Source: JICA Study Team)

Table 6.2.1 shows the comparison of evaluation result on beach condition between the previous (in 2007 presented in the O&M report) and present (2011) beach sections. Results for the volume of sand loss for both sections after 4 and 8 years are also shown.

Sub-area	Section	Previous Evaluation (by the Consultant	Present Evaluation (by the Study	Volume of Sand Loss (Based on Initial Condition)			
		of BBCP-1in 2007)	of BBCP-1in 2007) Team in 2011)		After 8 years		
	G3-G4	Stable	Stable	-5%	0%		
S1	G4-G5	Stable	Stable	-1%	0%		
	South G6	Stable	Stable				
	North GN1	Unstable	Stable	-46%	-52%		
	GN1-GN2	Stable	Stable	-8%	-10%		
~ ~	GN2-GN3	Stable	Stable	-5%	-8%		
S2	GN3-G7	Stable	Stable	-5%	-7%		
	G7-GN4	Unstable	Unstable	-5%	-11%		
	GN4-G16	Stable	Stable	-6%	-5%		
	South G16	Stable	Stable	-7%	-8%		
	North G32	Unstable	Unstable	-25%	-27%		
	G32-G37 ^{*)}		Stable	21%	30%		
~~	G37 ^{*)} -GN5 ^{*)}	Stable	Unstable	11%	10%		
S3	GN5 ^{*)} -G38		Stable	-28%	-27%		
	G38-G39	Unstable	Unstable	-18%	-21%		
	G39-GA2	Unstable	Unstable	-18%	-23%		
	GA2-GA1	Stable	Stable	-2%	5%		
			Total	-9%	-9%		

 Table 6.2.1
 Comparison of Evaluation Result on Beach Condition at Sanur

*) G37 and GN5 were constructed by BWS-BP in 2006

(Source: JICA Study Team)

(2) Nusa Dua

The project area at Nusa Dua beach is shown in Figure 6.2.5. This area is divided into three sub-areas which are called N1, N2, and N3. The shoreline change after beach fill is shown for each sub-area.



Figure 6.2.5 Nusa Dua Beach

(Source: JICA Study Team)

a) Section N1

The present beach condition in N1 is shown in Photo 6.2.11 and the shoreline change based on the initial beach position just after beach fill is shown in Figure 6.2.6. N1 is enclosed by six headlands (from G12 until GN1) with a distance of approximately 1200 m alongshore. In Figure 6.2.6, although the shoreline position has moved from its initial position, the almost stable beach condition has already been obtained. However, unstable condition was observed at section N1-1 (between G12 and GN2).



Photo 6.2.11 Bird's Eye View N1

(Source: Nippon Koei Co., Ltd & BWS-BP)





(Source: Nippon Koei Co., Ltd & BWS-BP)

Photo 6.2.12 shows the beach condition at the north side of G12 in section N1-1. Even though the beach change was observed, sufficient beach width is still maintained.



Photo 6.2.12 North Side of G12 at Section N1-1

(Source: JICA Study Team)

b) Section N2

The present beach condition in N2 is shown in Photo 6.2.13 and the shoreline change based on the initial beach position just after beach fill is shown in Figure 6.2.7. N2 is enclosed by five groins and headlands (from GN1 until G0) with a distance of approximately 810 m alongshore. The distance for each sub-area enclosed by each groin or headland is shorter than other areas. The beach can be maintained in its stable condition. The condition at the north of GN1 has been changed to stable as compared with the previous evaluation because the shape of the shoreline changed from unstable to stable due to natural events such as wave and current flow.



Photo 6.2.13 Bird's Eye View of N2

(Source: Nippon Koei Co., Ltd & BWS-BP)





c) Section N3

(Source: Nippon Koei Co., Ltd & BWS-BP)

The present beach condition in N3 is shown in Photo 6.2.14 and the shoreline change based on the initial beach position just after beach fill is shown in Figure 6.2.8. N3 is enclosed by four headlands (from G0 until GA2) with a distance of approximately 1400 m alongshore. According to the original scope of BBCP Phase-1, this area was out of the project area. N3 was included as part of the conservation area, owing to the request of communities in the area. However, the communities requested not to construct the groins in the same image as that of

the original scope area, as well as to reduce the number of groins even if it was insufficient to maintain the filling sand. It is also the reason why the distance for each sub-area enclosed by each headland was significantly longer than that of the original scope area.

Meanwhile, most part of down drift side (north side) groins was facing serious beach recession after conducting the nourishment. Stakeholders located at the down drift side groins have strongly requested to improve the condition since the beach recession became serious which disturbed its beach activities.



Photo 6.2.14 Bird's Eye View of N3

(Source: Nippon Koei Co., Ltd & BWS-BP)



Figure 6.2.8 Shoreline Change at N3 (Based on Initial Shoreline Position)

(Source: Nippon Koei Co., Ltd & BWS-BP)



Photo 6.2.15 Additional Groin GN6 at Section N3-2



Photo.6.2.16 Additional Groin GTB at Section N3-3 (Source: JICA Study Team)

Owing to their request, BWS-BP has taken the adaptations as countermeasures to construct two additional groins with refilling of sand between GN5 and GN6 in section N3-2 as shown in Photo 6.2.15. However, the monitoring survey after undertaking the adaptation has not carried out, the efficiency of the adaptation was not clear.

Furthermore, one groin was constructed between GA3 and GA8 in section N3-3 by the owner of the property in this area without permission from government (Photo 6.2.16). The new additional groins (GN4) in the same section were constructed by BWS-BP in 2011. According to the monitoring result, the shoreline change at this area seems to have continued. One of the reasons why the shoreline change still happened is that the height of each additional groin seems to be lower than the existing berm height. The filling sand at the top position of the berm still passes to the next section through the crown part of the groins.

Serious beach recession which causes the obstruction on beach use was observed at the north side of GA2 in section N3-1. A concrete pile type revetment was constructed by a stakeholder as shown in Photo 6.2.17.



Photo 6.2.17 North Side of GA2 at Section N3-1

(Source: JICA Study Team)

The monitoring period after construction of several additional groins is still insufficient. Thus, continuous monitoring is required to check the beach condition and to evaluate the effects of additional countermeasures.

Table 6.2.2 shows the comparison of evaluation result on beach condition between the previous (in 2007 presented in the O/M report) and present (2011) beach sections. Results of the volume of sand loss for both sections after 4 and 8 years are also shown.

Sub- area	Section	Previous Evaluation (by the consultant of	Present Evaluation (by the Study Team in	Volume of (Based on Init	Sand Loss ial Condition)
ureu		BBCP-1 in 2007))	2011))	After 4 years	After 8 years
	G12-GN2	Stable	Unstable	-8%	-11%
	GN2-UG1	Stable	Stable	-3%	-3%
N1	UG1-G10	Stable	Stable	-17%	-18%
	G10-G9	Stable	Stable	-4%	-4%
	G9-GN1	Stable	Stable	-9%	-9%
	GN1-G5	Stable	Stable	-14%	-14%
N2	G5-G4	Stable	Stable	-16%	-18%
	G4-G1	Stable	Stable	-5%	-5%
	G1-G0	Stable	Stable	-8%	-8%
	G0-GA8	Unstable	Unstable	-16%	-17%
	GA8-GTB ¹⁾				
	GTB ¹⁾ -GN4 ⁴⁾	Unstable	Necessary for Checking	-4%	7% ³⁾
N/2	GN4 ⁴⁾ -GA3				
113	GA3-GN6 ²⁾				
	GN6 ²⁾ -GN5 ²⁾	Unstable	Necessary for Checking	-19%	-22% ⁴⁾
	GN5 ²⁾ -GA2				
	North GN2	Unstable	Unstable	-77%	-98%
			Total	-12%	-12%

 Table 6.2.2
 Comparison of Evaluation Result on Beach Condition at Nusa Dua

<u>Remark</u>

1) GTB was constructed by a private property owner in 2010

2) GN5 and GN6 was constructed by BWS-BP in 2009

3) Sand refilling was conducted by BWS-BP in 2009 ($V=8,000m^3$)

4) GN4 was constructed by BWS-BP in 2011

5) Sand refilling was conducted by BWS-BP in 2011 ($V= 13,000m^3$)

(Source: JICA Study Team)

(3) Kuta

The area of nourishment at Kuta beach is shown in Figure 6.2.9 and Photo 6.2.18. The area is divided into five sub-areas from K1 until K5 described as follows:

K1: from sand stopper to southern offshore breakwater (BWN1)

K2: between BWN1 and BWN2

K3: between BWN2 and BWN3

K4: from BWN3 to Hard Rock Café Hotel

K5: from Hard Rock Café Hotel to Alam Kul Kul Hotel (end of nourishment)



Figure 6.2.9 Area of Nourishment at Kuta Beach

(Source: JICA Study Team)



Photo 6.2.18 Bird's Eye View of Kuta

(Source: Nippon Koei Co., Ltd & BWS-BP)

The change of the position of shoreline and the difference from the initial position six months after undertaking nourishment from June 2009 until September 2011 are shown in Figure 6.2.10.

a) Section K1 (from Sand Stopper to BWN1)

The area behind offshore breakwater BWN1 obtained almost a stable condition. On the other hand, the shoreline retreat in the open area between the sand stopper and BWN1 continues with more than 10 m from the beginning. Taking into consideration the direction of littoral drift at Kuta beach, which is from south to northward, it was thought that a part of sand at this area might be shifted to the next area (K2). However, even though the beach gradually retreats, this area still maintains the sufficient beach width.

b) Section K2 (BWN1 ~ BWN2)

The beach at this area can be maintained in good condition. The retreat of the beach was not observed since the beginning, and stable condition seems to be obtained. This condition might be obtained probably due to the effect of reef flat restoration (submerged breakwater) as well as the inflow of sand from the K1 area.



Figure 6.2.10 Change of Position of Shoreline and Difference from the Initial Position

(Source: Nippon Koei Co., Ltd & BWS-BP)

c) Section K3 (BWN2 ~ BWN3)

K3 has difficulty in maintaining the sandy beach which has been already anticipated during the design stage. It is the reason why the revetment was constructed at this area even though nourishment was undertaken. Significant retreat was observed behind BWN3 with more than 50 m distance. The filling sand behind BWN3 has almost moved and the constructed revetment is exposing roughly 500 m of distance alongshore. This is due to the disappearance of tombolo behind BWN3 after 11 months of nourishment. At the open area between BWN2 and BWN3, continuous beach retreat was observed since the beginning.

d) Section K4 (BWN3 ~ Hard Rock Café Hotel)

Significant beach retreat was observed up to the north end of the new revetment, which is still continuing. However from Line No. 41 to the north part where no coral reef exists, beach retreat is suddenly decreasing. Sand accumulation was observed from Line No.42. This accumulation might be caused by the inflow of sand from the retreat area at K3.

e) Section K5 (Hard Rock Café Hotel ~ Alam Kul-Kul Hotel)

This area is maintained in good condition. The shoreline has been gradually increasing after the completion of nourishment with more or less than 10 m. The beach at this area is sandy beach which has continuous shoreline until Canggu. It is difficult to identify the reason for accumulation of sand in this area. However, one of the possibilities is that sand inflow from the south area (K3 and K4) might have contributed to the accumulation of sand in this area.

Figure 6.2.11 shows the volume of sand loss for each sub-area. At K1 and K2, even though some degree of sand loss was observed especially at K1, the beach is almost balanced. On the other hand, significant sand loss was observed with a volume of approximately 55,000 m³ at K3 until September 2011. At K4, sand was balanced until November 2010. However on September 2011, the retreat area has intruded K4. More than 15,000 m³ of sand loss was observed until November 2010, although sand accumulation was observed during its monitoring period in 2011 (June and September 2011) with a volume of 13,000 m³ by September 2011.



Figure 6.2.11 Sand Loss for Each Sub-Area

(Source: Nippon Koei Co., Ltd & BWS-BP)

Sub-area	Previous Evaluation	Present Evaluation (by the JICA Study Team)				
K1 (Sand Stopper - BWN1) G12 - GN2		Become worse, necessary careful checking				
K2 (BWN1 - BWN2) GN2 – UG1		Good, but necessary continuous monitoring				
K3 (BWN2 - BWN3) UG1 - G10	No	Worse, adaptation is required				
K4 (BWN3 - Hard Rock Café) G10 - G9	evaluation	Become worse, necessary careful checking				
K5 (Hard Rock Café -Alam Kul kul)		Good, but necessary continuous monitoring				
K5 (Hard Rock Café -Alam Kul kul)		Good, but necessary continuous monitoring				

Table 6.2.3	Comparison of Evaluation	on Result on Beach	Condition at Kuta
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(Source: Nippon Koei Co., Ltd & BWS-BP)

(4) Summary of Sand Remaining Rate

The rate of sand remaining after the nourishment for Samur, Nusa Dua and Kuta was summarized in Figure 6.2.12.

High remaining rate of sand with approximately 90% can be secured at Sanur and Nusa Dua. On the other hand, significant outflow of sand was observed at the south part of nourishment area at Kuta. According to the monitoring result, the total amount of sand loss during the last three years since 2008 to 2011 was estimated at roughly 80,000 m³ (20% of the total quantity of nourishment). This quantity of sand loss was significantly higher than that in Sanur and Kuta (10% for eight years) as shown in Figure 6.2.12.



Figure 6.2.12 Rate of Sand Remaining after the Nourishment in Phase-1 Project

6.3 Evaluation and Necessity of Adaptation Measures

Beach behavior after the nourishment was checked by the result of continuous monitoring as presented in Section 6.2. The necessity for the adaptation will be evaluated based on this result taking into account obstacles of beach use at the recession area.

Table 6.3.1 shows the evaluation result for the necessity of adaptation at Sanur. The following three sections were selected as a required adaptation area.

- Section between G7–GN4 in S2
- North of G32 in S3
- Section between G37–GN5 in S3
- Section between G39–GA2 in S3

Table 6.3.2 shows the evaluation result for the necessity of adaptation at Nusa Dua. The following two sections were selected as a required adaptation area.

- Section between G0 GA8 in N3
- Section at North GN2 in N3

It seems that no adaptation is required at other sections of N3 at this moment based on visual checks for obstacles of beach use. However, it is difficult to evaluate the necessity of adaptation in these sections due to insufficiency of monitoring data after undertaking additional countermeasures. Thus, further accumulation of monitoring data is strongly required.

Sub-area	Section	Section Present Evaluation C (by the JICA Study Team)		Necessity of Adaptation (Now)
S2	G7–GN4	Unstable	Yes	Yes
	North G32	Unstable	Yes	Yes
62	G37–GN5	Unstable	Yes	Yes
55	G38–G39	Unstable	No	
	G39–GA2	Unstable	Yes	Yes

 Table 6.3.1
 Evaluation for Necessity of Adaptation at Sanur

(Source: JICA Study Team)

Table 6.3.2	Evaluation for Ne	ecessity of Adaptation	at Nusa Dua
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Sub-area	Section	Present Evaluation (by JICA Study Team)	Obstacle to Beach Activities	Necessity of Adaptation (Now)
N1	G12-GN2	Unstable	No	
	G0-GA8	Unstable	Yes	Yes
	GA8-GTB		No	
	GTB-GN4	Unstable	No	
N2	GN4-GA3		No	
15	GA3-GN6		No	
	GN6-GN5	Unstable	No	
	GN5-GA2		No	
	North GN2	Unstable	Yes	Yes

6.4 Recommended Adaptation Measures

The adaptation measures have been recommended in the O/M report (Technical Edition, Volume III, Monitoring and Maintenance Part of the Project Completion Report). Based on the monitoring data included in the latest result, the adaptation measures at unstable area was re-examined.

(1) Categorizing of Required Adaptation

As presented in the previous O/M report, the required adaptations for maintenance of the beaches are divided into several levels depending on the condition of the beach at each section.

a) Adaptation Level 1: No Action (only continue beach monitoring, but not frequently)

If the beach seems to be stable or it is expected to be stable in the near future, and the present beach conditions do not disturb the beach activities as a high tourism area, there is no need to consider further any additional adaptations. Only beach monitoring to check the condition of beach change is recommended. It is also not necessary to carry out monitoring frequently as compared with unstable areas. On the other hand, the filling sand is always exposed to the wave actions, and contents of fine sand which was included into the filling sand will gradually flow offshore and never come back to the beach. According to the results of sieve analysis between sediment and recession section after the nourishment, it was realized that roughly 20% of the total volume of nourished sand was not expected to remain on the beach due to the existence of fine contents. Thus, even if the beach condition is in level 1, some amount of sand filling (\pm 5,000 m³) is assumed to be required for beach maintenance at Sanur and Nusa Dua every five years during its maintenance at each adaptive countermeasure.

b) Adaptation Level 2: Sand re-rotating from Accumulation Area to Retreat Area

If the remarkable sedimentation of sand is observed at some parts of the project area and the negative impact on the beach environment and utilization is not expected, sedimentation sand can be available as the refilling material at recession beach areas. An example is the section which is enclosed by groin G39 and GA2 at south Sanur. For the said area, this method will be applied.

c) Adaptation Level 3: Only refilling of Sand (without new construction or modification of existing coastal structures)

This adaptation can be applied at unstable beach areas with the condition that both side of the existing groins (or headlands) in certain section still have sufficient length to keep the enclosed filling sand. Basically, the most desirable beach for tourism is only sandy beach that is natural and without any additional artificial coastal structures such as groins, headlands, etc. Thus, this aspect shall be considered to avoid the construction of additional artificial structures as much as possible.

d) Adaptation Level 4: Refilling of sand with new construction or modification of existing coastal structures

If the beach is still under unstable condition and significant sand outflow is continued, it is evaluated that the total maintenance cost including the additional implemented countermeasures are expected to be smaller than that of the present condition. It is therefore recommended to carry out the additional countermeasures at the final level (level 4) of adaptations. The adaptation measure is the refilling of sand with the construction of an additional coastal facility to minimize the sand outflow, or with the modification of the existing facilities to enhance its functions to control the littoral sand movement. However, the construction of additional artificial structures commonly causes the deterioration of its natural condition due to beach use and landscaping when compared with that of the present condition. Furthermore, the construction of additional facility might cause new coastal problems at surrounding areas. Thus, it is required that this level of adaptation is considered as a final solution to minimize the maintenance cost in a technical and economical viewpoint.

(2) Adaptation Plan at Sanur

a) Section Between G7 and GN4 in S2

This section is one of the high tourism areas in Sanur beach. A lot of foreign tourists stay at surrounding hotels and the beach area is highly utilized for beach activities such as swimming and sunbathing. The beach recession north of GN4 still continues and narrowness of the sandy beach disturbs these activities. The distance of this area enclosed between G7 and GN4 is approximately 320 m, longer than that of the other surrounding enclosed areas. Based on the monitoring result, the filling sand is shifting to the north side (toward G7), although shifting sand at the south side of G7 will not overflow the next section. Also, the length of groin G7 is still sufficient.

Figure 6.4.1 shows two alternatives for adaptation. Alternative-1 is to construct the additional groins between G7 and GN4 to shorten the longshore length and to reduce the littoral sand drift northward. Alternative-2 is to do periodical maintenance by the combination of sand refilling from stockyards and sand rotation from sedimentation areas to the recession area. Figure 6.4.2 shows the comparison of expected maintenance cost between the two alternatives.







Figure 6.4.2 Comparison of Maintenance Cost for each Alternative between G7 and GN4 (Source: JICA Study Team)

The desirable beach resort area in Bali is to keep the natural sandy beach as much as possible. Taking into account the difference of maintenance cost for each alternative, the combination of sand refilling from sand stockpile and sand rotation (Alternative-2) is recommended as the form of adaptation (Adaptation Level 3). The estimated sand volume for refilling presented in the previous O/M report was 10,800 m³. According to the monitoring result, sand is drifting from south to north, causing the beach recession at the north side of GN4. Thus, it might be effective that the sand is refilled mainly at the recession part only and leave the northward sand movement as natural phenomena. Some degree of refilling sand can be relocated from the accumulation area. However, the total sand volume in this section was decreasing than its initial condition. Thus, additional refilling of sand will also be required. Based on the monitoring result, the following adaptation is recommended.

Table 6.4.1 Recommended Adaptation between Groin G7 and GN4	ļ
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Adaptation Method	Combination of sand refilling from sand stockpile and sand rotation from accumulation areas to recession areas (Level-3)
Expected Volume	Refilling from sand stockpile: 1,200 m ³ Sand rotation: 500 m ³
Frequency for Refilling	Every 5 years

(Source: JICA Study Team)

b) Section at north side of G32 in S3

Beach recession is continuing at the north side of G32. There is a large-scale reef gap in front of G32 groin. The sand movement around this area is significantly influenced by the topographical change due to the existence of reef gap. According to the beach change surrounding this area, the littoral sand drift at the northern side from the reef gap is flowing northward. On the other hand, the littoral sand drift at the south side from the reef gap is flowing southward. The position of G32 is just the diverging point of littoral sand drift as shown in Figure 6.4.3. If the additional groin is constructed at the north side from G32 to reduce the recession of the beach at this area, it is anticipated to cause further beach recession at the north side of the new additional groin. Taking into account that the speed of the beach recession at this area has not been significant based on the monitoring result, it is recommended to do periodical refilling of sand at this area as adaptations (Adaptation on Level 3). Based on the monitoring result, the sand loss at this section is approximately 2500 m^3 from initial nourishment. If the refilling of sand is carried out until the recovery of the initial beach line after nourishment, the significant outflow of the sand will occur again in the initial stage. Thus, it is recommended to refill the sand considering the present beach shape and to refill the sand with not too much volume. Based on this opinion, the following adaptations are recommended.

Table 6.4.2 Recommended Adaptation at North Side of G32 in S3

Adaptation Method	Sand refilling from sand stockpile (Level-3)
Expected Volume	$1,000 \text{ m}^3$
Frequency for Refilling	Every 5 years



Figure 6.4.3 Wave Propagation and Littoral Transport Surrounding G32

(Source: JICA Study Team)

c) Section between G37 and GN5 in S3

After the completion of the project at Sanur in 2004, beach recession occurred between G32 and G38. The distance between G32 and G38 was longer than in other sections with approximately 600 m. It might be difficult to keep the conditions of the section stable. Considering the condition after the completion of the project, BWS-BP decided to construct two additional groins (G37 and GN5) in 2006. However, the unstable condition has been observed until now. Narrowness of the beach width at the south side of G37 is causing obstruction to beach activities at this area.

According to the monitoring result, the sand is shifting southward, and some degree of shifting sand has overflowed to the next south section through the crown part of GN5 as shown in Photo 6.4.1. One of the reasons why the beach recession south side of G37 has still continued even though the additional groin (GN5) was constructed is that the crown elevation

for GN5 was not sufficient to interrupt the southward longshore transported sand.

Based on this understanding and the obtained monitoring result, the adaptation as shown in Table 6.4.3 was recommended. As the modification of the existing groin GN5, the increase of crown elevation at least up to the same level of the existing berm elevation is recommended not to cause the overflow of sand into the next section. However, this adaptation will cause the decrease of sand inflow at the next south section (section between GN5 and G38). Continuous monitoring is important to check the impact to surrounding areas.



Photo 6.4.1 Overflow of Sand through Crown Part of GN5

Adaptation Method	Sand refilling from sand stockpile with modification of existing groin (increase of crown elevation for GN5) (Level-4)
Expected Volume	$1,000 \text{m}^3$
Frequency for Refilling	Every 5 years

Table 6.4.3 Recommended Adaptation between Groin G37 and GN

(Source: JICA Study Team)

d) Section Between G38 and GA2 in S3

Beach recession has been continuing at the north side of GA2. Its shoreline has already reached the walkway. The walkway was damaged and repair of the walkway was conducted

several times. Even though the additional construction of impermeable type revetment was constructed by BWS-BP in 2011, this revetment was suddenly damaged by further wave overtopping. The beach recession at this area was caused by the shifting of sand southward. A part of the southward area transported its sand to G39 which already overflowed to the next south section as shown in Photo 6.4.2. This is why the beach recession at south side of GA2 still continues. The domestic southward littoral transports only at this area and was caused by the change of incident wave direction due to large-scale coral digging which was carried out by private companies in 2004. The beach condition at this recession area is serious and it is necessary to take suitable adaptations.



Photo 6.4.2 Condition between G38 and GA2

(Source: Nippon Koei Co., Ltd & BWS-BP)

Two basic ideas can be considered as alternatives; one is to stop the overflow of sand by forming a static condition as much as possible due to modification or add new additional construction (Alternative-1 and 2). Another idea is to keep the present natural conditions as much as possible. Sandy beaches will be maintained by sand recycling (addition of sand filling as required) without any construction or modification to the coastal structure (Alternative-3).

Table 6.4.4 shows the comparison of three alternatives and Figure 6.4.6 shows the comparison of running cost for the three alternatives.

	Alternative-1	Alternative-2	Alternative-3
Image			
Idea	To form static condition due to the extension of G39 and sand refilling (Extension of G39: 20m Sand refilling: 7,800 m ³)	To form a static condition due to the construction of additional offshore breakwater + sand refilling (New breakwater: L=50 m, Sand refilling: 4,000 m ³)	Periodical sand relocation from deposit areas with sand refilling (as required) in order to minimize construction of artificial structures and to keep its natural and open image (Sand recycle from deposit area: 3,000 m ³)
Advantage and Disadvantage	Advantage Periodical maintenance can be minimized than in Alternative-3. Disadvantage - Initial cost for extension of groin is required. - Sand refilling is required for all area in this section - Extension and refilling of sand causes further undesired widening of the beach width at deposition area	Advantage Periodical maintenance can be minimized than in Alternative-3. Disadvantage - Initial cost for construction of breakwater is required. - Construction of breakwater encloses an open-image beach. This will cause the deterioration of the coastal environment on natural landscaping, stagnation of water, and disturbance of beach	Advantage Natural landscaping can be maintained than in Alternative-1 and Alternative-2. There is no disturbance to beach activity <u>Disadvantage</u> - Repetitive maintenance (mainly sand recycle) is required
Total cost (Initial and Maintenance for 15 years)	Extension of G39: 890 (mil. Rp.) Sand refilling: 790 (mil. Rp.) Total: 1,780 (mil. Rp.)	Offshore BW: 2,500 (mil. Rp.) Sand refilling 410 (mil. Rp.) Total: 2,910 (mil. Rp.)	Periodical sand relocation: 120 (mil. Rp./time) Total (every 3 year *5 times): 600 (mil. Rp.)

Table 6.4.4 Comparison of Three Alternatives of Adaptations between G38 and GA2 in S3

(Source: Nippon Koei Co., Ltd & BWS-BP)

Based on the result, Alternative-3 was recommended as the suitable adaptations between G38 and GA2 in S3 as shown in Table 6.4.5.

Adaptation Method	Sand rotation from accumulation area to recession area (Level-2)
Expected Volume	Sand rotation: 3,000 m ³
Frequency for Refilling	Every 3 years

(Source: JICA Study Team)

(3) Adaptation Plan at Nusa Dua

a) Section between G0–GA8 in N3

At this section, the retreat of shoreline happens at the south part (down drift G0) and accumulation happens at GA8 position. From the monitoring data, it is shown that shoreline retreat at G0 trunk is almost stable when compared with the data between October 2011 and June 2008. This year, the shoreline retreat is disturbing the conditions of walkway and damaging the walkway. Present distance of the flat part of its beach fill surrounding G0 is less than 10 m. This condition happens approximately 100 m from G0 which disturbs the use of the beach.

The littoral drift to the north is still observed from the monitoring data. The shoreline position of GA8 still show the accumulation at up drift from the monitoring data. Observed sand loss was determined at about 1900 m^3 . The sand was lost to the next groin section by passing through the top of GA8. It was proven that sand elevation was higher than the groin (GA8) crown elevation.

The recommended adaptation at this section is to increase the crown height of GA.8 to stop the sand outflow. Sand renourishment at about 1500 m^3 (adaptation level 4) is also recommended. The shoreline position of sand renourishment is recommended to be similar with the position of the shoreline in December 2007 (four years after the project), which is the stable position line based on the monitoring data.



Photo 6.4.3 Damaged Walkway at G0 Trunk



Photo 6.4.4 Shoreline Condition Surrounding G0 Trunk (Low Tide)

(Source: Nippon Koei Co., Ltd & BWS-BP)

Table 6.4.6	Recommended Adaptation between Groin G0 and GA
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Adaptation Method	Sand refilling from sand stockpile and modification of existing groin (increase groin GA8 crown elevation) (Level-4)
Expected Volume	Refilling from sand stockpile: 1,500 m ³
Frequency for Refilling	Every 5 years

(Source: JICA Study Team)

b) Section between GA2 to the north

Beach retreat at the down drift of GA2 is caused by the littoral drift of sand that is filled to the north. From the monitoring data, it was shown that the sand was accumulated at the northward position from GA2. Littoral drift at this position cannot be avoided due to main littoral transport at Tanjung Benoa area moving in the northern direction. From the natural shoreline condition, undulation at the northern side of GA2 is functioning naturally to stop the littoral flow from the south.


Figure 6.4.4 Littoral Transport at Tanjung Benoa Area

Considering the littoral transport direction in the area and the present condition of the beach, the concept of maintaining the beach in its natural state is recommended. Additional structures to retain the sand are not necessary due to the natural shoreline that has undulation at the northern side which will retain the sand flow. Periodic sand rotation is recommended at this section to maintain the beach width at the north side of GA2.

Based on the monitoring data, the most stable shoreline position is the shoreline in December 2007 (four years after the project). To obtain that position, sand rotation of about 2500 m³ from the present condition is required. Even the littoral drift to the north is continuing. From the monitoring data, it was proven that the amount of sand will be transported to the north in approximately four years. It is therefore recommended that sand renourishment should be done every five years.



Figure 6.4.5 Recommended Sand Rotation at GA2

(Source: JICA Study Team)

 Table 6.4.7
 Recommended Adaptation at GA2 to the North

Adaptation Method	Periodic sand rotation from northern side (Level-2)
Expected Volume	Rotating sand: 2,500 m ³
Frequency for Refilling	Every 5 years

(Source: JICA Study Team)

Figure 6.4.6 below show the cost comparison if additional structure (groin) and sand re-nourishment from stockpile is selected to maintain the sandy beach at the north side of GA2 (Alternative 1) when compared with the repetitive sand rotation every five years. A groin with length of approximately 50 m and sand re-nourishment of 13,000 m³ is required to

⁽Source: JICA Study Team)

replace the beach condition as an initial beach fill. On the other hand, repetitive sand re-nourishment only requires 2500 m^3 of sand from the stockpile every five years.



Figure 6.4.6 Cost Comparison of Repetitive Sand Re-nourishment and Additional Groin to Maintain Sandy Beach at GA2

(Source: JICA Study Team)

(4) Adaptation Plan at Kuta

Serious condition for the beach retreat was observed at the section of K3. Furthermore, the condition of the beach at the section of K1 and K4 became worse and still didn't obtain the stable condition.

It is necessary to do the continuous monitoring at Kuta beaches to check the beach behavior, and the suitable improvement to reduce the further beach retreat was recommended. Further explanation at Kuta was described in the Chapter 11 and 12 as one of the scopes for the Phase-2 Project.

6.5 Implementation Plan of Adaptation Measures

(1) Cost and Schedule

Figure 6.5.1 shows the maintenance schedule and predicted maintenance cost for Sanur and Nusa Dua beaches. Repetitive adaptive beach management is recommended basically every five years at the required areas as explained above. A volume of sand (5000 m³ for each beach) from the stockpile is assumed to cover adaptive maintenance at other sections as required based on the monitoring result.

														asur	notion :	inflation rate 6	% per vear	
No.	Work Item	Qty (m3)	Frequency							Perio	d and Cost (II	JR * 1,000,00	0					
-	Section G7- GN4 Level 3																	
	Sand rotation	500	@ 5Y	_			_	>			>	_		>		>	_	>
	Cost							2	5.3		33.8			45.3		60.6		81.
	Sand re-filling from stockpile	1,200	@ 5Y					>			>			>		>		>
	Cost							12:	1.3		162.4			217.3		290.8		389.
2	Section G.32 - north Level 3																	
	Sand re-filling from stockpile	1,000	@ 5Y					>			>			>		>		>
	Cost							10.	1.1		135.3			181.1		242.3		324.
e	Section G37 - GN5 Level 4																	
	Sand re-filling from stockpile	1,000	@ 5Y					>			>			>		>		>
	Cost							10:	1.1		135.3			181.1		242.3		324.
	Increase of groin crown height	150	1 time					>			•			•		-		•
	Cost							10:	1.1							•		•
4	Periodic sand filling for other section Level 3	5,000	@ 5Y					>			>			>		>		>
	Cost							50	2.6		676.6			905.5		1,211.7		1,621.
	Total Cost (IDR *	1,000,000)		0				956	26		1,143.5			1,530.3		2,047.9		2,740.
		Year		2004				7	014		2019			2024		2029		203
) the second second		
9	Work Item	Qty (m3)	Frequency							Perio	d and Cost (II	JR * 1,000,00	(0	nco			/v hci kcai	
-	Section GA.2 - G.39 Level 2																	
	Sand rotation	2,000	@ 3Y					>		٨		۸	>		٨	٧	V	
	Total Cost (IDR *.	1,000,000)		0				10	1.1	120.4	1	43.4	170.8		203.5	242.3	288.6	324.
		Year		2004				5	114		2019			2024		2029		203
	Nusa Dua Beach																	
/air	ntenance works									Impelem	entation sche	edule and ON	M cost	uiise	nntion -	inflation rate 6	% пег vea r	
Ň.	Work Item	Qty (m3)	Frequency							Perio	d and Cost (II	JR * 1,000,00	0					
-	Section G.0 - GA.8 Level 4																	
	Sand re-filling from stockpile	1,500	@ 5Y					>			>			>		>		>
	Cost					-		25	2.8		338.3			452.7		605.9		810
	Increase of groin crown height	150	1 time					>	_									•
	Cost					_		10	1.1		0.0			0.0		0.0		9
2	Section GA.2 to the north Level 2				-				-			-			-			
	Sand rotation	2,500	@ 5Y					>			>			>		>		>
	Cost							12	6.4		169.2			226.4		302.9		405
m	Periodic sand filling for other section Level 3	5,000	@ 5Y			_		>			>			>		>		>
	Cost							84	2.7		1127.7			1509.1		2019.6		2702
	Total Cost (IDB *)	1 000 000 1		c														
		Innn'nnn't		2				1,32:	50		1,653.Z			2,188.3		2,928.4		3,918.

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(Source: JICA Study Team)

(2) Planning for Use of Sand Stock

The use of sand from Stockpile Mertasari for maintenance work at this time is planned for beach maintenance of Sanur and Nusa Dua Beaches only. The required sand for maintenance work at Kuta Beach is not yet decided at present because the maintenance plan for Kuta needs a more detailed study in order to reduce the rate of sand outflow observed from the monitoring data up to this year. At present, the remaining sand available at Mertasari is about 120,000 m³. About 20,000 m³ of sand was already used by BWS-BP to do adaptive maintenance at the Nusa Dua area in 2009 and 2011.



Figure 6.5.2 Plan of Use of Sand Stock at Mertasari for Sanur and Nusa Dua Maintenance Works

(Source: JICA Study Team)

FEASIBILITY STUDY ON PHASE-II PROJECT

Chapter 7 Basic Information about the Study Area

7.1 Overview

Existing data and information were collected in order to know the basic characteristics of the study area, including its natural, socio-economic, and other external conditions, which are related to beach erosion. Table 7.1.1 shows the overview of Chapter 7.

	Study Items	Ref. to	Obtained Information	Utilized for
Rev	view of Existing Reports			
	Feasibility Study Report		- Information for outline of Phase- 1 Project	-Planning & Design for Phase-2 project
	Detailed Design Report	7.2	Information for natural conditionsInformation for contribution of	-Study on the mechanism of beach erosion and littoral sand
	Project Completion Report etc.		project, etc.	drift
Rev	view of Natural Conditions			
	Geographical Conditions	7.3 (1)	General information for seabed topography, distribution of coral reef at the study area	Study on the mechanism of beach erosion and littoral sand drift
	Metrological Conditions	7.3 (2)	General information for Rainfall, Temperature and Wind at Bali Island	Input condition for the study on the mechanism of beach erosion and littoral sand drift
	Hydraulic Conditions	7.3 (3)	General information for tide and offshore wave characteristics at the study area	Input condition for the study on the mechanism of beach erosion and littoral sand drift
Rev	view of Socio-Economic Condition	ons		
	Tourism Development in Bali	7.4 (1)	Tourism growth and its contribution on economy	Study on Economic analysis
	Process of Tourism Development and Beach Erosion	7.4 (2)	Relation between tourism development and beach erosion	Study for the cause of erosion in Bali Island
	Further Development and Strategic Plan in Bali	7.4 (3)	Future development plan at the study area	Study on the selection of candidate site on economical point of view
Rev	view of External Conditions Rela	ated to B	each Erosion	
	Decrease of Sand Inflow from River	7.5 (1)	Significant impact of river development to the beach erosion at east coast area	Study for the cause of erosion at east coast area
	Coral Mining on the Reef Flat	7.5 (2)	Significant impact of coral mining to the coral beaches at Phase-1 beaches and Candidasa	Study for the cause of erosion at coral reef beaches

 Table 7.1.1 Overview of Chapter 7

(Source: JICA Study Team)

7.2 Review of Existing Reports for Phase-1 Project

Several reports were prepared and submitted to DGWR for the Phase-1 Project. Table 7.2.1 shows the summary of the existing main reports, which are required for review, and its overview.

No	Title of the Report	Year	Issued by	Overview
1	Feasibility Study Report on the Urgent Bali Beach Conservation Project	1989	ЛСА	 4 sites was selected as candidate for the Project, such as Sanur, Nusa Dua, Kuta and Tanah Lot. Field measurements for waves and current observation in short period, Hydraulic model test (waves and current measurements) and numerical analysis (sediment transport and shoreline change) was conducted Basic design for 4 sites was proposed
2	Detailed Design Report	1992	ЛСА	 Detail design for 4 sites was carried out. Field observation for waves and current for a few month and numerical analysis for waves, current and beach change was conducted
3	Reviewed Detailed Design Report	1998	DGWR	 The detailed design report was reviewed taking into account of latest beach condition for 4 sites Field observation for waves and current for a few month and numerical analysis for waves, current and beach change was conducted
4	Additional Detailed Design Report	2002	DGWR	- In accordance with the amendment to extend the project area at south of Sanur (Kesumasari to Mertasari area) and north of Nusa Dua (Tanjung Benoa), the additional detailed design was carried out.
5	Project Completion Report	2008	DGWR	-This report was to present the overview of Bali Beach Conservation Project (Phase-1) including non-technical part (contract, administration, etc.) following the JICA guideline
6	Project Completion Report (Technical Edition)	2009	Nippon Koei	 Beach conservation project was the first experience in Indonesia and DGWR requested to prepare the additional PCR focused to the technical point of view. Based on this request, the PCR for technical edition was prepared by the consultant (Nippon Koei). The report consisted of four set of volumes as; Volume-I (General Part) Volume-II (Technical Part) Volume-III (OM Manual) Volume-IV (Selected Drawing) All technical information for the Project were included in this report.

(Source: JICA Study Team)

7.3 Review of Natural Conditions

(1) Geographical Conditions

a) General Description of the Study Area

Bali Island is located between Lombok Island and Java Island as shown in Figure 7.3.1. Nusa Penida Island is located at the southeast direction about 10 km away from Bali Island. The existence of this island causes sheltering effect on the offshore wave field on the east coastal area. The bottom slope at the southwest coast is milder than that on the east coast, and the bottom slope becomes milder toward the south. The average bottom slope from the coastline to a depth of 50 m is about 1/180 at Tanah Lot, and 1/220 at Kuta on the southwest coast. On the other hand, on the east coast, the bottom slope at Sanur is about 1/50 and 1/20 at Candidasa.



Figure 7.3.1 Coastal Geography and Seabed Topography

(Source: Sea Chart arranged by JICA Study Team)

Distribution of the coral reefs on the south area of Bali Island is shown in Figure 7.3.2. Coral reefs are mainly distributed surrounding Bukit Island from Kuta on the southwest area to



Sanur on the east area, and Nusa Penida. Further, some coral reefs exist in Padangbai Candidasa on the east coast.

Figure 7.3.2 Distribution of Coral Reefs

(Source: STATUS LINGKUNGAN HIDUP DAERAH PROVINSI BALI TAHUN 2010)

b) East Coastal Area

The beach in the east coastal area is divided into two types with different characteristics. One is sandy beaches from north Sanur up to Kusanba as shown in Figure 7.3.1, which are formed by volcanic sand inflow from the river. The other is coral reef beaches, which exist in Padangbai and Candidasa.

i) Volcanic Sandy Beaches (from North Sanur to Kusamba)

The beaches from North Sanur to Kusamba shown in Figure 7.3.3 are formed by volcanic sand, which is an inflow from nearby rivers with black color. The average bottom slope up to a depth of 100 m in North Sanur (Photo 7.3.1) is about 1/70 and becomes steep going eastward. The Unda River exists at the middle section of the east coast in the study area (Photo 7.3.1). On the west side from the Unda River mouth, the bottom slope becomes 1/40. From the east side of the Unda River to Padangbai through Kusamba, the bottom slope becomes significantly steep with 1/10.



Photo 7.3.1 East Coastal Area (from North Sanur to Padangbai) (Source: Data for Phase-1 Project)



Photo 7.3.2 Padang Galak (North Sanur) and the Unda River Mouth

ii) Coral Reef Beaches (Candidasa and Padangbai)

Candidasa is a coral reef beach with about 5 km alongshore as shown in Figure 7.3.3. The width of coral reefs are 50 m to 100 m on the east side, and 100 m to 200 m on the west side. This width is narrower than that of Sanur, Nusa Dua, and Kuta. The depth over the reef flat was originally about 1.5 m to 2.0 m below the mean sea water level. However, due to large-scale coral mining, which was carried out in the past, some area became as deep as 3.0 m below the mean sea water level. The sand on the beach is mainly coral sand with white color; however volcanic black sand also exists in some areas. The aerial photographs taken from A to B in Figure 7.3.4 are shown in Photo 7.3.3.



Figure 7.3.3 Coral Reef Coast at Candidasa

(Source: QuickBird arranged by JICA Study Team)





Photo 7.3.3 Coral Reef at Candidasa

(Source: Data for Phase-1 Project)

Padangbai is also a coral reef beach with 700 m alongshore. The beach is enclosed by the peninsula, where stable pocket beach with white color sand are formed (Photo 7.3.4).



Photo 7.3.4 Padangbai

c) Southwest Coast

Figure 7.3.4 shows the coastal line on the southwest coast in the study area. The area consists mostly of volcanic sandy beach. However, coral reef exists in Kuta, which is located on the south side of this study area.



Figure 7.3.4 Southwest Coastal Area (from Norh Kuta to Canggu)

(Source: QuickBird arranged by JICA Study Team)

i) Kuta ~ North Kuta

Kuta Beach is divided into two areas with different geographical characteristics as shown in Figure 7.3.6. One is in the south area from runway to 2.5 km north side. This area belongs to the coral reef beach with 0.5 km to 1.3 km width of reef flat. The depth over the coral reef flat is DL 0 to -1.8 m. The remaining north area in Kuta is 1.6 km alongshore. No coral reef exists in this area, and the sandy beach continues northward. Based on the result of the previous survey carried out during the Phase-1 Project, the bottom slopes along the representative four lines are shown in Figure 7.3.6. In south Kuta where coral reef exists, the bottom slope of the outer reef is approximately 1/50. The bottom slope in north Kuta is 1/60 to 1/80 in the shallow water area (depth is until -8 m) and 1/100 to 1/200 in the offshore area (depth is until -12 m). Significant shallow area exists along line C.

The oblique views taken from A to B after Phase-1 Project in Figure 7.3.5 are shown in Photo 7.3.5.



Figure 7.3.5 Kuta Beach

(Source: Data for Phase-1 Poject)



A: Kuta South (Coral Reef Beach)



B: North Kuta (Sandy Beach)





Figure 7.3.6 Bottom Slope along Representative Lines

(Source: Data for Phase-1 Project)

ii) Legian ~ Seminyak ~ Canggu

Legian ~ Seminyak ~ Canggu is located on the north side of Kuta. An existing sandy beach, which is approximately 10 km long, extends continuously from Kuta. However, volcanic rocks appear in some places in Canggu. The aerial photographs taken from C to D in Figure 7.3.7 are shown in Photo 7.3.6.



Figure 7.3.7 Legian ~ Seminyak ~ Canggu

(Source: JICA Study Team)



C: Seminyak

D: Canggu

Photo 7.3.6 Seminyak and Canggu

(Source: Data for Phase-1 Project)

(2) Metrological Conditions

a) Rainfall and Temperature

The climate of Bali Island is divided into two seasons namely, rainy season and dry season as shown in Figure 7.3.8. The rainy season occurs from October to March, and the northwestern monsoon is predominant. The dry season occurs from April to September, and the east monsoon is predominant. Throughout the year, there is no significant change in temperature, which ranges between 24° C and 31° C.



Figure 7.3.8 Monthly Rainfall and Temperature (1961 to 1990)

(Source: Wikipedia, WMO data)

b) Wind

The predominant monthly wind direction and average wind velocity observed in Kuta and Sanur, which are located in the southwest and southeast coast, respectively, of Bali Island, are shown in Table 7.3.1. Meanwhile, the wind roses for rainy and dry seasons are shown in Figure 7.3.9 (1) and (2). In Kuta, the wind from SSE direction is dominant during the dry season from April to September. On the other hand, the wind from W direction is dominant during the rainy season from October to March. In Sanur, the wind from SSE to SE direction is dominant during the rainy season, while the wind from WNW direction is dominant during the rainy season.

Table 7.3.1	Wind Characteristics
-------------	----------------------

Kuta 12/200	02-8/2	011 7a	m-7pm	1								
Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
prev. wind direction	W	W	W	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	W
ave. wind speed(knot	9	8	7	8	7	9	9	10	8	8	8	8
Sanur 5/20	10-8/2	011 7a	m-7pm	1								
Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
prev. wind direction	WNW	WNW	WNW	SSE	SE	SE	SE	SSE	SSE	SSE	SSE	WNW
ave. wind speed(knot	5	5	5	4	5	9	8	9	8	6	5	4

(Source: Wave Site Windfinder.com)





(2) Sanur

Figure 7.3.9 Wind Roses for Two Seasons in Kuta and Sanur

(Source: Wave Site Windfinder.com arranged by JICA Study Team)

(3) Hydraulic Conditions

a) Tide Change

A long term tidal observation has been carried out in Benoa Port located near Serangan Island in the southwest coast. The design tide condition at four sites for Phase-1 Project has been determined as shown in Table 7.3.2.

				(Unit: m)
Tide	Sanur	Nusa Dua	Kuta	Tanah Lot
H.W.L.	+2.6	+2.6	+2.6	+2.6
M.S.L	+1.3	+1.3	+1.3	+1.3
L.W.L	± 0.0	± 0.0	± 0.0	± 0.0

 Table 7.3.2
 Design Tidal Elevation for Phase-1 Project

(Source: Project Completion Report -Technical Edition-)

b) Offshore Wave Characteristics

It was known from the previous report that the direction of offshore was distributed mainly from SSE to ESE. However, there was no permanent station for wave observation in Bali. The distribution of offshore waves has been predicted using numerical computation. On the other hand, the incident waves outside the reef for Phase-1 beaches were observed during the Phase-1 Project period. It is very important to know the characteristics of waves in the study area in order to examine the littoral sand transport. Thus, two kinds of information are shown in this section, such as "numerical analysis for offshore waves" and "incident wave observation in Phase-1 beaches".

i) Offshore Wave Distribution by Numerical Analysis

Numerical computation was carried out to determine the longshore distribution of the offshore waves. Calculation conditions are shown in Table 7.3.3, and the results for the case of T=16s are shown in Figure 7.3.10. From the results, the following tendencies were recognized:

- > The existence of Nusa Penida Island causes a shadow effect on wave filed in the southeast coast, which greatly influenced the distribution of wave height and direction.
- > In the southwest coast, most parts of the study area (from north Kuta to Canggu) are influenced by the diffraction effect on waves due to existence of Bukit Island.

Computation Condition	Parameters/Values
Method	Energy Balance Equation
Number of Grid	North-South: 115 East-West : 214
Grid Width	600 m
Wave Height	1.0 m
Wave Period	12 sec, 16 sec.
Wave Direction	SSW, S, SSE
Spreading Parameter (Smax)	75
Period Division Number	10
Direction Division Number	31

Table 7.3.3 Calculation Conditions

(Source: JICA Study Team)



Figure 7.3.10 Offshore Wave Distribution (Period:16 sec)

(Source: JICA Study Team)

ii) Observed Incident Waves Outside the Coral Reef

During the implementation period of the Phase-1 Project, wave observation was carried out at each project site. The observation period for each site is shown in Table 7.3.4. The incident waves were measured at the outer reef area with a depth of more than 10 m.

Distribution of energy flux in each direction in two different seasons in Tanah Lot, Kuta, and Nusa Dua are shown in Figure 7.3.11. The predominant wave direction in Tanah Lot and Kuta located in the southwest coast is the same as in the WSW direction, regardless of the season. The wave energy flux in Tanah Lot is about 1.5 times higher than that in Kuta. On the other hand, the predominant wave direction in Nusa Dua located in the east coast is from ESE direction, regardless of the season. Meanwhile, its wave energy is smaller than that in Tanah Lot and Kuta.

The joint frequency tables for combined wave height - wave period and wave height - wave direction at Tanah Lot, Nusa Dua and Kuta are shown in Appendix 7.3.1.

Location	Obs. Depth	Wave observation term	Obs. interval
TanahLot		2001/5/14-2004/2/29	2hour
Kuta	-15m	2006/4/19-2008/6/7	2hour
NusaDua	-10.2m	2003/2/1-2004/2/29	2hour
NusaDua	-19.20	2005/5/31-2005/9/22	2hour
		2006/8/24-2006/9/17	15min.
Sanur	-13m	2006/11/16-2007/2/2	2hour
		2008/4/3-2008/7/21	1hour

Table 7.3.4 Situation of Wave Observation

(Source: Data for Phase-1 Project)



Figure 7.3.11 Directional Wave Energy Flux at Three Sites

7.4 Review of Socio-Economic Conditions

(1) Tourism Development in Bali

a) Tourism Contribution on Industry in Bali

Table 7.4.1 and Figure 7.4.1 show the gross regional domestic products (GRDP) at current market price in Bali Province by industrial origin. It showed that the industrial origin of "Trade, Hotel, and Restaurant", which is directly related to tourism industry, shared the highest portion at 30.0% among all other industrial origins in 2009. From this, tourism is the highest contributor to the economy of Bali Island.

Table 7.4.1 GRDP at Current Market Prices in Bali Provinc	e
by Industrial Origin, 2006 – 2009 (Billion Rupiahs)	

Industrial Origin	20	06	20	07	20	08	20	09
Aguriculture, Livestock, Forestry, and Fishery	7,463.26	(19.96%)	8,216.47	(19.41%)	9,152.61	(18.33%)	10,487.15	(18.21%)
Mining and Quarrying	257.16	(0.69%)	281.09	(0.66%)	337.26	(0.68%)	374.96	(0.65%)
Manufacturing Industry	3,254.65	(8.70%)	3,804.93	(8.99%)	4,661.92	(9.34%)	5,272.10	(9.16%)
Electricity, Gas and Water Supply	725.86	(1.94%)	846.07	(2.00%)	1,048.60	(2.10%)	1,152.26	(2.00%)
Construction	1,600.86	(4.28%)	1,877.52	(4.43%)	2,346.55	(4.70%)	2,532.20	(4.40%)
Trade, Hotel, and Restaurant	10,797.66	(28.88%)	12,269.74	(28.98%)	14,458.73	(28.96%)	17,271.57	(30.00%)
Transport and Communication	4,435.85	(11.86%)	5,219.10	(12.33%)	6,449.26	(12.92%)	7,920.90	(13.76%)
Financial, Ownership, and Bank	2,788.35	(7.46%)	3,108.10	(7.34%)	3,803.83	(7.62%)	4,092.59	(7.11%)
Services	6,064.82	(16.22%)	6,713.39	(15.86%)	7,663.84	(15.35%)	8,475.53	(14.72%)
TOTAL	37.388.47	(100.00%)	42.336.41	(100.00%)	49.922.60	(100.00%)	57.579.26	(100.00%)

(Source: BPS-Statistics of Bali Province)



Figure 7.4.1 Percentage Distribution of GDRP of Bali Province at Current Market Prices by Industrial Origin

(Source: BPS-Statistics of Bali Province)

- b) Tourism Development
 - i) Share of Tourist Arrivals in Bali

Figure 7.4.2 shows the number of foreign tourist arrivals in Indonesia and Bali in 1970 and 2010, respectively. The share of Bali increased with 35.6% of occupancy in 2010.



Figure 7.4.2 Share of Tourist Arrivals in Bali

(Source: Bali Government Tourism Office)

ii) Growth of Tourist Arrivals in Bali

Figure 7.4.3 shows the growth of foreign and domestic tourist arrivals in Bali from 2004 to 2010. The number of tourist arrivals in Bali increased in terms of both foreign and domestic tourists.



Figure 7.4.3 Growth of Tourist Arrivals in Bali

(Source: Bali Government Tourism Office)

iii) Ranking of Tourist Arrivals from Each Country

Table 7.4.2 shows the top five ranking tourist arrival rates from each county from 2006 to 2010. Tourists from Japan was ranked 1st until 2008. This was surpassed by Australian tourists who ranked 1st since 2009. The decrease in Japanese tourists in 2009 and 2010 was mainly caused by the closure of the direct flights of Japan Airlines from Japan to Bali. Nevertheless, tourists from Japan and Australia highly contributed to the tourism development in Bali.

Pank	2006		2007		2008		2009		2010	
Капк	Country	(%)								
1	Japan	20.29	Japan	21.12	Japan	18.02	Australia	20.00	Australia	25.99
2	Taiwan	11.27	Australia	12.28	Australia	15.68	Japan	14.33	Japan	9.89
3	Australia	10.49	Taiwan	8.34	South Korea	6.73	China	8.95	China	7.90
4	South Korea	7.13	South Korea	8.08	Malaysia	6.59	Malaysia	5.96	Malaysia	6.23
5	Malaysia	5.77	Malaysia	6.30	China	6.56	South Korea	5.56	South Korea	5.01

(Source: Bali Government Tourism Office)

iv) Number of Accommodations and Restaurants, and Room Occupancy Rates

Table 7.4.3 and Figure 7.4.4 show the number of accommodations and restaurants as well as the room occupancy rates from 2006 to 2010. The number of accommodations did not increase significantly for the last five years. However, room occupancy rates increased from 44% in 2006 to 61% in 2010. The number of restaurants also increased significantly from 2006 to 2008.

Table 7.4.3	Number of Accommodations and Restaurants, and
	Room Occupancy Rates

Item	2006	2007	2008	2009	2010	
	unit	2021	1973	2079	2175	2190
Accomodation	Room	40902	42107	44848	46014	45438
	unit	152	153	155	157	158
(Classified Hotel)	Room	20293	20499	20719	21118	20588
(New Classified Hetel)	unit	943	961	999	1037	1036
(Norr Classified Hotel)	Room	16979	17772	19917	20516	20410
Room Occupancy R	ate (%)	44.46	53.32	62.77	59.41	60.77
Restaurant	unit	1264	1364	1655	1693	1685

(Source: Bali Government Tourism Office)



Figure 7.4.4 Number of Accommodations and Restaurants, and Room Occupancy Rates

(Source: Bali Government Tourism Office)

(2) **Process of Tourism Development and Beach Erosion**

Beaches selected as international resorts in Bali include Sanur, Nusa Dua, Kuta ~ Legian, Seminyak ~ Canggu, Jimbaran, Candidasa, Lovina, etc. Among these, 1) Candidasa, 2) Kuta ~ Legian, and 3) Seminyak ~ Canggu belong to the present study area. Thus, the relation between tourism development and history of beach erosion in the above three beaches are described in this section.

a) Candidasa

i) Tourism Development

Candidasa is one of the famous beach resorts in Karangasem Regency, which is located in the east coast, 40 km away from Ngrurah Rai International Airport. Candidasa is a coral reef beach with 100 m to 200 m width and 4 km length.



Photo 7.4.1 Candidasa Beach

(Source: Nippon Koei)

The tourism development in Candidasa started since 1969, during the commencement of the Five-Year Development Plan (REPELITA). Many hotels and cottages have been constructed in the areas such as Sanur, Kuta, Nusa Dua, and Candidasa beaches, in relation to the development of tourism. However, since no suitable regulations on beach preservation have been made, some hotels and cottages were built close to the shoreline. Especially in Candidasa, serious problems in beach preservation have occurred. In relation to the rapid increase of tourists who want to enjoy the natural and tropical environment at cheap cost, Candidasa Beach has been developed abruptly. Since 1969 to 1974, a large scale coral mining has been undertaken to easily obtain construction materials. During the said years, hotels and villas were built close to the shoreline even though the width of the natural beaches was originally very narrow as shown in Photo 7.4.1.

Almost 50 registered hotels and villas, and 40 restaurants exist along the coastal area in Candidasa as shown in Figure 7.4.5. At present, the development area has extended eastward with the construction of many high grade private villas.



Figure 7.4.5 Use of Coastal Area in Candidasa

(Source: Regional Map by PERIPLUS)

ii) Chronology of Beach Erosion and Coastal Protection Measures

Beach erosion has occurred since the 1970s. As protection to the coastal line, the Ministry of Public Works carried out beach protection measures from 1989 to 1998, with the combination of T-shape groins, offshore breakwaters, and submerged breakwaters as shown in Photo 7.4.2. The total number of such coastal facilities is 25 along the 4 km shoreline. However, the condition of the beach has not improved considering the continuing beach erosion problem. Hotels and villas fronting the beach have continued to construct vertical impermeable concrete seawall to protect their property on the foreshore area, or close to the shoreline, as shown in Photo 7.4.3. The construction of such seawall caused acceleration of further loss of the foreshore area. Consequently, beach erosion has extended eastward as shown in Photo 7.4.4.



Photo 7.4.2 Existing T-shape Groins and Offshore Breakwaters





Photo 7.4.3 Seawall Constructed by Hotels and Villas Close to the Shoreline





Photo 7.4.4 Beach Erosion Extending Eastward (2001)

(Source: Nippon Koei)

In 2006 to 2007, the extension of the existing T-shape groins, and the beach nourishment with volcanic black sand, which was transported from the mountain side, have been carried out between the modified groins at the east area of Candidasa (Figure 7.4.6). However, expected function to protect the sand fill was not achieved. The chronology of beach erosion and coastal protection measures are summarized in Table 7.4.4.



Figure 7.4.6 Modified T-shape Groin and Nourishment with Volcanic Sand

(Source: JICA Study Team)

year	Chronology of beach erosion and its countermeasures			
1969 ~ 1974	Significant coral mining			
1970 ~	Started beach erosion problem			
1989 ~ 1998	Construction of T-shape groins, breakwaters (by Public Works)			
	Beach erosion was continue and expanded to east area			
	Seawall construction individually by Hotel and Villa			
2006 ~ 2007	Modification of T-shape groins and nourishment in limited area (by Karagasam Dinas PU using Central Gov. Budget))			

Table 7.4.4Beach Erosion and Coastal Protection Measures in Candidasa

(Source: Project Completion Report -Technical Edition-)

- b) North Kuta ~ Legian
 - i) Tourism Development

Kuta and Legian, which belong to Badung Regency, are located in the north side of Ngurah Rai International Airport.. The famous beach resorts such as Kuta, Legian, Seminyak, Jimbaran, and Tanjung Benoa were concentrated in Badung Regency. Due to this, Badung has the highest economy among regencies in Bali.

In the beginning of tourism development since the 1960s, north Kuta and Legian beaches were well-known to young generations who enjoy surfing as their sports, and other recreational activities. Significant tourism development has been ongoing since the 1970s after the construction of a runway at Ngurah Rai International Airport. At present, north Kuta to Legian beaches have the highest number of tourists among all tourist places in Bali. A lot of foreign and domestic tourists visit this area for marine activities such as surfing, swimming, sunbathing, walking, and sightseeing. This area is also one of the famous spots for sunset viewing. Many hotels and restaurants exist at the hinterlands as shown in Figure 7.4.7.

ii) Chronology of Beach Erosion and Coastal Protection Measures

In this report, north Kuta was defined from the north side of Kuta reef area (around Kartika Plaza Hotel) to Melasti Street (before Legian Beach Hotel), which is 2.2 km alongshore. Meanwhile, Legian Beach is defined from Melasti Street until Double Six Street, which is 1.5 km. The coral reef, which continues from the runway side, exists at the south of North Kuta. However, the width of the coral reef suddenly decreases and vanishes in front of Kartika Plaza Hotel to the north. From Bali Garden Hotel, which is located at the end of a newly constructed revetment in BBCP Phase-1 to the north side, natural sandy beach exists.

Beach width in front of Kartika Plaza Hotel was originally not so wide. After the construction of a runway in 1968, beach erosion in Kuta has occurred in front of Pertamina Cottage (now Patra Bali Resort & Villa), which further extended to the north side. By 1985, seawall and small groin were constructed in front of Santika and Kartika Hotel (Photo 7.4.5).

During the socialization period for Kuta Project in BBCP Phase-1 in 2003, the existing groins were all demolished by Kuta community due to strong objections against such structures as



Figure 7.4.7 Land Use at North Kuta ~ Legian and Seminyak

(Source: Regional Map by PERIPLUS)

shown in Photo 7.4.5. This people's clamor required the change in the design of coastal facility in Phase-1, from construction of headland to offshore breakwater.

In BBCP Phase-1 Project, the nourishment was carried out from the runway side including this area. However, the outflow of sand fill in the near future was anticipated in this area. Thus, a permeable revetment was also constructed at the location of the walkway prior to nourishment works as shown in Photo 7.4.6. After nourishment, the beach is retreating continuously in front of Kartika Plaza Hotel, and most of the sand fill has already flown out as shown in Photo 7.4.6.

Final Report (Simple Version)



- (1) Seawall and Groins (2000)
- (2) After Demolishing Groin (2006)

Photo 7.4.5 Previous Beach Condition in front of Kartika Plaza Hotel

(Source: Nippon Koei)



(1) Just after Nourishment (2008)

(2) After 2 years (2010)

Photo 7.4.6 Beach Condition in front of Kartika Plaza Hotel after Nourishment

(Source: Nippon Koei)

The chronology of beach erosion and coastal protection measures in north Kuta are summarized in Table 7.4.5.

Table	7.4.5	Beach	Erosion	and	Coastal	Protection	Measures	in	North	Kuta
--------------	-------	-------	---------	-----	---------	------------	----------	----	-------	------

year	year Chronology of beach erosion and its countermeasures			
1968	Completion of Runway Construction			
1970 ~	Started beach erosion problem			
1985	Construction of seawall and small groins in front of Santika Kartika Hotel			
2003	003 Demolish all groins at Kuta by community			
2007 ~ 2008	Construction of revetment and nourishment (by JICA Phase-I)			
2009 ~	Beach retreat in front of Kartika Plaza Hotel (between BWN2 and BWN3)			

(Source: Project Completion Report -Technical Edition-)

From Bali Garden Hotel, which is located at the end of a newly constructed revetment in the north, a coral reef has disappeared and natural sandy beach continues northward. Any kinds of coastal structures such as groins, revetment, and offshore breakwaters do not exist along this beach. The beach width was originally wide and has no erosion problems until 1990. Since the 1990s, the beach has been retreating occasionally especially during the stormy/rainy season. When the big storm (Glenda) attacked Bali in March 2006, the

beach condition worsened as shown in Photo 7.4.7. According to the result of continuous monitoring carried out by the Consultant in BBCP Phase-1, the trend of decrease in beach width was observed since 1996 until 2006, even though significant change of shoreline was only seasonal. Due to this, the Ministry of Public Works decided to extend the area of nourishment until Alam Kul Kul Hotel in BBCP Phase-1 in order to widen the beach up to 10 m width (Original scope in Phase-1 was only until Hard Rock Café). The present beach condition is shown in Photo 7.4.8.



Photo 7.4.7 Before (after Storm Glenda in 2006)

(Source: Nippon Koei)



After BBCP Phase-I (2010) Photo 7.4.8 Change of Condition of North Kuta (Source: Nippon Koei)

- c) Seminyak ~ Canggu
 - i) Tourism Development

Seminyak is located in the north of Legian. Since the 1990s, this area was developed as a residential area for expatriates. Due to concentration of tourism in Kuta and Legian areas, the tourism development has expanded to the north. Consequently, many high class hotels, villas, restaurants, and spas have rapidly developed along the coastal area. The accommodation price around this area is the highest in Bali.

Canggu is located in the north of Kerobokan. The territory is defined from Berawa Village (near Seminyak) until Cemagi Village (near Tanah Lot), which belongs to Badung and Tabanan Regency with 8 km long coastal line. Even though most area is classified as rural, the beach front is actively being developed as tourism area. Luxury hotels, villas, and restaurants have been constructed or were under construction at said location.

ii) Beach Erosion

Seminyak ~ Canggu consists of volcanic black sandy beach with wide beach width. According to the interview survey and visual check, the beach around this area appeared to be eroded. During high tide condition, the waves reach up to the revetment in front of a hotel. Beach scarps at roots of trees were observed, and beach width seemed to be narrowing at some areas. The detailed analysis for such shoreline change will be examined later using aerial and satellite photos.

(3) Future Development and Strategic Plan in Bali

The future development and strategic plan in Bali Island related to the land and infrastructure development was presented in the spatial plan of Bali Province Regulation No.16 in 2009. On the other hand, the south area of Bali, which includes Denpasar City, Badung, Gianyar, and Tabanan regencies (which is called the Sarbagita Urban Area) was defined as the national strategic area in 2008 under a presidential regulation. In 2011, urban spatial plan for the Sarbagita Urban Area was issued under the Presidential Regulation of the Republic of Indonesia, No.45, 2011. Based on such two regulations, the spatial development plan in Bali is presented.

Figure 7.4.8 shows the spatial development plan for infrastructure network, which will enhance the tourism industry, and the area defined in the coastal zone.



Figure 7.4.8 Spatial Plan

(Source: Bali Province Regulation No.16 in 2009 arranged by JICA Study Team)

a) Main Road Network Plan

The toll and arterial road network plan in the south area, which is related to the study area, is as follows. Among these networks, T1 and T2 are expected to contribute to tourism development especially in the west coast area, while T3 is expected to contribute in the east coast area.

<Tall road network>

T1: Kuta ~ Tanah Lot ~ Soka

T2: Canggu ~ Beringkit ~ Batuan ~ Purnama

T3: Topati ~ Kusamba ~ Padangbai

T4: Serangan ~ Benoa ~ Ngurah Rai International Airport ~ Nusa Dua ~ Tanjung Benoa

T5: Serangan ~ Tohpati

T6: Kuta ~ Ngurah Rai International Airport

T7: Kuta ~ Denpasar ~ Tohpati

<Arterial road network plan>

A1: Tabanan ~ Mengwitani ~ Denpasar ~ Tohpati ~ Simpang Sidan

A2: Simpang Pesanggaran ~ Ngurah Rai International Airport

b) Sea Transportation Plan

As for the sea transport plan, the following development plan is presented.

S1: International cruise and yacht harbor at Tanah Ampo

S2: Domestic ferry port from Amed to Lembar (Lombok)

S3: Domestic ferry port from Gunaksa to Nusa Penida

The construction of international cruise and yacht harbor in Tanah Ampo (S1) has almost been completed. Some international sea lines will be opened in 2013. This new harbor is expected to contribute to tourism development especially in the Candidasa tourism area.

c) Tourism area

More than 50% of the coastal area in Bali is defined as tourism area as shown in Figure 7.4.8.

d) Beach conservation area

Most of the coastal area in south Bali is defined as beach conservation area due to the existence of coral reefs and mangrove forests as shown in Figure 7.4.8.

7.5 Review of External Conditions Related to Beach Erosion

The sand, which form the beaches covered in the study area, mainly consists of two kinds:

- > Volcanic sand, which is supplied from upstream (river) and sea cliff; and
- > Organic sand (coral, foraminifera, shell, etc.).

The external conditions, which will cause negative impacts to the beach in the study area, are thought as follows.

- > Decrease of (volcanic) sand supply from river
- > Volcanic sand and gravel mining from river mouth and coastal area
- Coral mining on the coral reef flat

(1) Decrease of Sand Inflow from River

At east coast area from north Sanur to Candidasa, most beaches were formed by black volcanic sand, except the two beaches namely, Padangbai and Candidasa. West coast areas from Seminyak to Canggu were also formed by black volcanic sand. Several rivers flow out to the east and west coast, such as Unda, Ayung, Sangsang, Petanu at the east coast, and Penet at the west coast as shown in Figure 7.5.1.



Figure 7.5.1 Location and Name of Rivers

(Source: JICA Study Team)

Rank	Sediment Yield	Catchment Area	Location of River Mouth	
INALIK	(ton/year)	Area	Km2	Eccation of River Moduli
1	3,412,029.81	Bumbung; Timbul; Musiaman	146.36	Kubu
2	786,431.31	Ayung	300.85	Denpasar
3	725,705.38	Pale; Sayang. dll	322.60	Kubu
4	464,090.76	Unda	224.79	Klungkung
5	391,007.77	Daya	114.87	
6	382,934.33	Balian	154.93	5km west side Soka Beach
7	375,753.86	Selahu	78.82	Kubu
8	338,221.88	Saba	32.60	Seririt
9	304,215.34	Batuniti	67.18	Tulamben
10	252,239.52	Penet	189.49	2km "SE" side Tanah Lot

Table 7 5 1	Ranking of Rivers in	Terms of Quantit	v of Sediment Vield
Table 7.3.1	Kanking of Kivers in	It ms of Quantit	y of Scullicht Liciu

(Source: BWS-BP arranged by JICA Study Team)

Based on the river data (from BWS-BP), the top 10 ranking rivers in terms of sediment yield is presented in Table 7.5.1. Here, sediment yield means the potential of sediment inflow from surrounding catchment area into the river. Actual condition of sand supply from the river depends on the geographical characteristics of the river and catchment area, as well as condition of sediment trap due to construction of weir dam, and mining activities in the river. Hence, it is difficult to evaluate the quantity of sand supply from the river. However, sediment yield will be used as one of indices to evaluate the contribution of sand supply from river to coastal area.

At the east coast of the study area, Ayung and Unda rivers significantly contributed to the supply of sand on the coast. On the other hand, Penet River is expected to contribute in the south coast of the study area. Table 7.5.2 shows the record related to the construction of check (Sabo) dams and weirs in the representative three rivers shown in Photo 7.5.1. Figure 7.5.2 shows the number of constructed check (Sabo) dams in Bali Island. Active construction of check dam was observed from 1990 to 1995.

The beach erosion surrounding the river mouth might be arrested due to the construction of the check dam.



(1) Check (Sabo) Dam

b) Dam (2) Weir for Irrigation Photo 7.5.1 Check Dam and Weir (Unda River) (Source: JICA Study Team)

No.	River	Position of Estuary	Structure	Туре	Year
1	Ayung River	Deden medele Servin	Peraupan Weir	Irrigation weir	
		Padanggalak, Sahur	Oongan Weir	Irrigation weir	
2	Unda River		Check Dam Akah	Check Dam/Sabo Dam	1992
		Jumpai/Gunaksa,	Unda Irrigation Weir	Irrigation weir	
		Klungkung Regency	Check Dam Tangkas I	Check Dam/Sabo Dam	1986
			Check Dam Tangkas II	Check Dam/Sabo Dam	2004
3	Penet		Kacangan Weir	Irrigation weir	
			Puitan I Weir	Irrigation weir	
		3.5 km west side from	Penarungan Weir	Irrigation weir	
		Batu Mejan Temple	Munggu Weir	Irrigation weir	
			Luwus Carangsari Weir	Irrigation weir	
			Check Dam Penet	Check Dam/Long storage	2008

Table 7.5.2 I	Record of Constructed	Check Dams ((Sabo Dam) and Weirs
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(Source: BWS-BP arranged by JICA Study Team)



Figure 7.5.2 Number for Constructed Check Dams in Bali Island

(Source: BWS-BP arranged by JICA Study Team)

(2) Sand and Gravel Mining from River Mouth and Coastal Area

As presented in section (1), the Unda River has high potential for sand supply in the study area of the west coast. Significant sand and gravel mining were undertaken at the upstream and river mouth of the Unda River. According to the collected information, active sand mining at the river mouth of the Unda River was undertaken since 2000. Although this activity has been already prohibited since 2007, illegal mining still continues as shown in Photo 7.5.2.

Activities for mining gravel stones were also conducted at some beaches in the east coast. Photo 7.5.3 shows the mining activity in Tegal Besar Beaches, which is located 6.5 km south from the Unda River mouth. As no record on sand and gravel mining is obtained, it is difficult to know its impact to beach erosion. However, several ten thousand cubic meters per year of sand seem to have been obtained from mining annually from the Unda River mouth before such activities were prohibited. This quantity is the same level of the quantity of littoral transport in the east coast area.



Photo 7.5.2 Sand Mining at the River Mouth (Unda River)



Photo 7.5.3 Gravel Mining from the Beach (Tegal Besar Beach) (Source: JICA Study Team)

(3) Coral Mining on the Coral Reef Flat

The mining of coral rock on the reef was undertaken for many years from 1960s to 1970s in several coral reef beaches, in order to construct houses, block fences, and produce quicklime. Large scale coral mining was carried out in Sanur, Nusa Dua, Kuta and Candidasa beaches. The large amount of coral blocks have been removed from the coral reef flat, which might have affected the change in reef profile. The mining of coral rocks induces 1) increase of wave action inside of the reef due to deepening of reef flat with approximately 1m, 2) decrease of sand sources on coral reef beaches, and 3) sand trap at mining pocket area. Thus, the coral mining could be the primary factor that caused beach erosion on coral reef beaches.

The mining area in Sanur, Nusa Dua and Candidasa is presented in the doctoral thesis of Dr. Syamsudin in 1993, as shown in Figure 7.5.3.



(3) Candidasa



(Source: Doctoral Thesis of Syamsudin (1993))

In Sanur Beach, the main areas identified as coral mining areas included the north portion (in front of Alit Hotel), middle portion (Sindu), and the south portion (Kesumasari). Here, the water deepened to over 0.5 m due to coral mining. According to the information from the previous report (Syamsudin, 1993), the coral mining areas were 75,000 m², 200,000 m², and 600,000 m² in the north, middle and south areas, respectively.

In Nusa Dua Beach, the total area of coral mining was estimated to be 200,000 m².

In Candidasa Beach, coral mining was actively carried out from 1969 to 1974 at roughly 3 km alongshore as shown in Photo 7.5.4. The elevation of the coral reef after coral mining was about 1 m below of LWL. The mining area was estimated to be about 200,000 m^2 .



Photo 7.5.4 Trace of Coral Mining (Candidasa) (Source: Data for BBCP Phase-1 Project)

In Kuta Beach, coral mining was also probably undertaken before the construction of runway (before 1968). However, remarkable traces of coral mining on the reef flat were not observed as compared to Sanur, Nusa Dua, and Candidasa beaches.

Coral mining activities have already been prohibited since the 1980s, under a regulation. However, small-scale coral mining activities have continued until the 2000s at several coral reef beaches such as Candidasa, and Serangan Island as shown in Photo 7.5.5.



Photo 7.5.5 Coral Mining (at Serangan Island in 2002) (Source: Data for BBCP Phase-1 Project)
Chapter 8 Review of Current Situation on Beach Management and Maintenance

8.1 Beach Maintenance and Monitoring by Government Institutions Related to Beach Management

Table 8.1.1 shows the present situation of beach management at beaches targeted in the Phase-2 area. Beach monitoring has never been conducted in Candidasa and Sanur North–Padang Galak. In other beaches, beach monitoring was conducted only once until now. It is difficult to analyze and evaluate shoreline change and tendency of erosion since the monitoring data has not been gathered at the abovementioned beaches. Maintenance work has been carried out at five beaches, that is, three beaches in the east coast (Candidasa, Lebih, and Sanur North-Padang Galak) and two beaches in the southwest coast (Seminyak and Canggu).

		Subjected beaches	General			Evaluation for presence of beach management activilies			Evaluation for presence of management system					
Study Area	No.		Administrative	Regency / City	Length of Beach	Beach	Maintenance for beach and	Construction for Coastal	Beach Management	Policy of Beach	Budget for	Beach Manac Maintenance	gement and	Operation & Maintenance
			district		(km)	Monitoring	facilities	Protection Facilities	Structure and Organization	Management	Central	Province	Regency/City	Manual
	E1	Candidasa	Manggis District	Karangasem	6.00	Never	By Public works of Karangasem	from 2007 until 2010 by Karangasem	Not yet establish, still under	-	Rp. 4,750 Mill	-	Rp. 56,000 Mill	-
	E2	Kusamba	Dawan District	Klungkung	3.00	1 time, 2010 (by BWS-BP)	-	-	-	-	-	-	-	-
East Coast	E3	Klotok	Dawan District	Klungkung	1.00	1 time, 2010 (by BWS-BP)	-	-	-	-	-	-	-	-
	E4	Tegal Besar	Dawan District	Klungkung	4.00	1 time, 2010 (by BWS-BP)	-	-	-	-	-	-	-	-
	E5	Siyut	Gianyar District	Gianyar	1.00	1 time, 2010 (by BWS-BP)	-	-	-	-	-	-	-	-
	E6	Lebih	Gianyar District	Gianyar	1.30	1 time, 2010 (by BWS-BP)	BWS-BP	2007 and 2011	-	-	Rp. 39,243 Mill	-	-	-
	E7	Masceti	Gianyar District	Gianyar	1.00	1 time, 2010 (by BWS-BP)	-	-	-	-	-	-	-	-
	E8	Saba, Purnama	Sukawati District	Gianyar	1.50	1 time, 2010 (by BWS-BP)	-	-	-	-	-	-	-	-
	E9	Pabean	Sukawati District	Gianyar	1.00	1 time, 2010 (by BWS-BP)	-	-	-	-	-	-	-	-
	E10	Sanur North - Padang Galak	South Denpasar District	Denpasar	1.60	-	BWS-BP	2007, 2008 and 2011	-	-	Rp. 35,172 Mill	-	-	-
	W1	Kuta North	Kuta District	Badung	1.30	1 time, 2011	-	-	-	-	-	-	-	-
West	W2	Legian	Kuta District	Badung	1.60	1 time, 2011	-	-	-	-	-	-	-	-
Coast	W3	Seminyak	Kuta District	Badung	2.00	1 time, 2011	BWS-BP	-	-	-	-	-	-	-
	W4	Canggu	South Kuta District	Badung	3.20	1 time, 2011	BWS-BP	-	-	-	Rp. 4,123 Mill	-	-	-

Table 8.1.1 Summary of Beach Management at the Subject Beaches for Phase-2 Area

The structure, organization and policy, and the operation and maintenance manual required for suitable beach management were not prepared by related government institutions. As a result, monitoring and maintenance works from a strategic viewpoint have not been implemented both by the central government and the local government. It is necessary to establish a beach management system as reference experience in the Phase-1 project. The enhancement of beach management system for these beaches is proposed in Section 12.3, Study of Implementation Plan for Soft Components.

8.2 Beach Violation due to Intrusion of Property on Beaches

One of the important viewpoints on beach management is the proper use of beach area. These include regulation and permission matters for construction of building and structures such as seawall and revetment by the owner of property and building.

Areas that have been developed and that are under development were observed to have several structures such as seawalls, fences, revetments, etc., and buildings which are positioned close to the sea waterline. Some of these structures and buildings were damaged by wave action which accelerated the scouring of the front of the structures.

To conserve the beach area, the distance of the property from the waterline has been defined in the presidential, provincial, and regency regulations as a 'beach conservation area'. A fix distance from the waterline is defined as the length of the 'beach conservation area' measured from the HHWS line. The meaning of "beach conservation area" is a conservation area along the coast which has function to preserve the natural and religious characteristics of the beach, the safety of the building, and the availability of public space. According to the provincial regulation (Spatial Plan of Bali Province, No.16/2009), it is prohibited to construct any kind of structures inside the "beach conservation area", except the construction of structures which will support beach recreation activities, beach protection, fishery, and port activities.

Several definitions for "beach conservation area" are presented in each regulation as shown in Table 8.2.1. However, the following problems are also pointed out.

- The definition of the distance for coastal areas is different among the different levels, i.e., presidential, provincial, and regency.
- Even if the definition of the distance for coastal area exists, this distance did not meet the actual condition, especially in areas that are already developed and eroded beaches.
- The local government (regency) is responsible in giving permission for construction of building and coastal structures such as seawalls and revetments. However, it seems that no attention is being provided to regulate the distance of the structure from the beach. Also, it is not clear how to measure certain distance from the waterline and how to determine the waterline position.

No.	Regulation	Distance of 'Beach Conservation Area'	Application Area
1.	Presidential Degree No. 45/2011 : Spatial Plan of Sarbagita	100 m from HHWL	Coastline in Denpasar, Badung, Gianyar, Tabanan
2.	Bali Province Regulation No. 16/2009 : Spatial Plan of Bali Province	100 m from HHWL	All coastline in the Bali Island
3.	Badung Regent Degree No. 638/2003: Spatial Plan of Kuta District	25 m from HHWL	Seminyak, Legian, Kuta, Tuban and Kedonganan Beach
4.	Badung Regent Degree No.	100 m from HHWL	Canggu Beach
	637/2003: Spatial Plan of North Kuta District	50 m from HHWL	Kerobokan/Petitenget Beach
5.	Badung Regent Degree No. 639/2003: Spatial Plan of South	50 m from HHWL	Jimbaran, Pecatu, Ungasan and Kutuh Beach
	Kuta District	30 m from HHWL	Nusa Dua (Benoa Village) Beach
		25 m from HHWL	Tanjung Benoa Beach
6.	Denpasar City Regulation No. 10/1999: Spatial Plan of Denpasar City	100 m from HHWL	Denpasar City
7.	Karangasem Regency Regulation No. 11/2000: Spatial Plan of Karangasem Regency	Building structure: 25 m from shoreline Fence structure: 10 m from shoreline	Padangbai (exclude port facility), Candidasa, Seraya, Bunutan, Amed Beach
		Building structure: 50 m from shoreline Fence structure: 10 m from	Tianyar and other beaches not specified above.
		shoreline	

Table 8.2.1 Regulations to Define the "Beach Conservation Area"

(Source: Spatial Plan of Presidential Degree- Bali Province and each district)

Lack of checking the land boundary stated in the land certificate as compared with the actual condition (e.g., boundaries of land stated in the certificate are already lost due to soil erosion).

Today, the active expansion of tourism development was undertaken, especially in the eastern part of Candidasa and Seminyak to Canggu. New villas and hotels were constructed or are under construction. Photo 8.2.1 shows an example of newly constructed seawalls and buildings in the east coast study area. The position of the seawall/revetment was extended up to the shore side. Sometimes, the seawall/revetment was constructed on the beach slope. This is one of the big issues on beach management in the preservation of the beach area.



Photo 8.2.1 Newly Extended Property by a Private Villa (East Side of Candidasa)



Photo 8.2.2 Seawall Built on the Foreshore (Pabean)

In the west coast study area, especially in Seminyak to Canggu, the development of its coastal areas is on-going in many places. Some of the facilities for their property such as fences, revetments, swimming pools, and buildings are located close to the shore as shown in Photo 8.2.3. It seems that their property intrudes the "beach conservation area". The location of facilities that might have intruded the beach was checked by site surveying as shown in Figure 8.2.1. According to the recent newspaper (*Warta Bali*, November 3, 2011), DPRD of Badung (legislative of Badung Regency) carried out the site investigation concerning the demarcation and beach violation of beach area at Batu Belig Beach, Kerobokan, and North Kuta. The investigation was done at two hotels and five restaurants which were suspected to have seized the beach demarcation.





New buildings at the foreshore area On-going large-scale land development Photo 8.2.3 Beach Violation in Canggu



Figure 8.2.1 Location of Property which is Located Close to the Shore

8.3 Beach Cleaning by Communities, Hotels, and Beach Users

Beach cleaning is being conducted intensely by traditional villages, hotels, fisherman groups, and other beach users without renumeration. This may be because of the number of visitors at the candidate sites are smaller than the beaches of Phase-I, trash on the beach are seldom seen and all the beaches are in good condition. Results of the social survey on beach cleaning are summarized in Table 8.3.1.

Area	Town	Frequency of Beach Cleaning	Distance	Organizations/Persons Involved
Canggu	Canggu	4 persons 2 hrs/day 7 times/week	50 m in front of Puri Saron Hotel and Spa	Traditional village (Hotels pay local authority to clean the beach)
		-	0.2 km	Fisherman association, without any payment
	Brawa	10 persons 4 hrs/day 7 times/week	-	Traditional villages Budget: 56 (million Rp/yr)
		25-30 persons 5 hrs/day twice a month	0.2 km	Fisherman association, without payment
Seminyak	Kerobokan	10 persons 8 hrs/day 7 times/week	2 km	DKP Badung Regency Budget: 12 (million Rp/yr)
	Seminyak		2 km	Hotel employees
Legian		15 persons 7 times/week	1.8 km	Blue Ocean-Kamasutra Beach Management, hotels, traditional villages, sometimes school students Budget: Legian beach management: 162 (Rp million/yr) Traditional Village: 200 (Rp million/yr)
East coast	Candidasa	200 persons 1.5-2 hrs/day Twice a yr as necessary	1.5 km	Community (IBB), hotel association, fisherman
	Lebih	4 persons 4 hrs/day 7 times/week	1 km	Fisherman groups, traditional villages government, student group, NGOs, Lebih Green Village
	Sanur (North)	150-200 persons 2 hrs/day Once a week	4 km	Youth organizations, school students
		39 persons 1 hr/day Once a week	0.5 km	Fisherman's members and sub-villages, youth organization

Table 0 2 1	Cleaning		·	Dhage 2)	landidata	Decelor
Table 0.3.1	Cleaning	Activities	ш	Phase 4	4 U	andidate	Deaches

8.4 Involvement from NGOs, Private Companies, and Other Sectors

Since the last progress report study, there have been little results or clear indications on the involvement of NGOs, private companies, and other sectors near the candidate beaches for Phase II except for the Bali Beach Clean Up (BBCU) program sponsored by Coca Cola Amatil and Quicksilver. Further studies of potential collaborators for PR and CSR will pave the way to identify clearer the situations along the beaches.

Chapter 9 Selection of Three Candidate Sites

9.1 Overview on the Selection of Candidate Site for Phase-2 Project

According to the minutes of meeting on the mission of this preparatory survey, which was agreed among MPW, BAPPENAS, and JICA, three candidate sites shall be selected by employing an appropriate evaluation criteria and checklist items.

(1) **Premise Condition**

According to the agreement between GOI and JICA, it is required that "the candidate beach will contribute further development to the world tourism in Bali".

(2) Subject Beach

Firstly, the subject beaches will be identified from the study area. Balai has already carried out a preliminary survey to check the condition of the entire coastal area with respect to coastal erosion in Bali Island including the study area. Using the said preliminary survey, 13 beaches were identified as subject beaches as shown in Table 9.1.1. The location for each beach is presented in Figure 9.1.1.

Study Area	No	Subjected Beaches
	E1	Candidasa
	E2	Kusamba
	E3	Klotok
	E4	Tegal Besar
South-East	E5	Siyut
Coast	E6	Lebih
	E7	Masceti
	E8	Saba, Purnama
	E9	Pabean
	E10	North Sanur ~ Padang Galak
South Wast	W1	North Kuta (End of nourishment at Phase-1(Alam Kul-kul) ~ Legian
Coast	W2	Seminyak
Coast	W3	Canggu

Table 9.1.1Subject Beaches



Figure 9.1.1 Location of Subject Beaches

(3) **Procedure for Selection**

Figure 9.1.2 shows the basic procedure for the selection of candidate site for Phase-2 Project.

- At first, the subject beach shall be evaluated based on the two main points of view, i.e., economic contribution as world tourism and beach condition (degree of beach erosion and obstacle to beach activities);
- The preliminary selected beaches will come from the subject beaches who met the above two requirements. This means that even if the beach is not under serious condition of beach erosion but its potential as world tourist area might be low or its vice versa, it will not be selected as candidate site for Phase-2 Project;
- The selected beaches that met the above two criteria will undergo another set of three-point evaluation on the following areas; a) socio-environment, b) coastal environment, and c) realization of beach management; and
- If there will be no issues or negative impact on the above areas to the preliminary selected beaches, these beaches will finally become the candidate beaches for Phase-2 Project.

Table 9.1.2 shows the checklist items for each evaluation criteria. For the main two criteria on the selection of preliminary candidate beaches, such as a) economic contribution as world tourism and b) degree of beach erosion and obstacle to beach activities, the evaluation result are shown in Table 9.1.3 adopting the scoring for each checklist item.





Table 9.1.2	Checklist 1	Items for	Each l	Evaluation	Criteria

Evaluation Criteria	No	Check Item	Refer to				
	a-1	a-1 Identification of world-famous tourism area (Information from tourism statistic data and site visit)					
a) Economical Contribution as world tourism	a-2	^{a-2} Land use at coastal area (Number of existing Hotel & restaurant, important facilities)					
	a-3	Contribution of development Plan on tourism (Spatial Plan in Bali Province))	9.2 (3)				
	b-1	Degree of beach erosion (Long term shoreline change)	9.3 (1)				
b) Beach Condition	b-2	Obstruction on beach activities and utilization (Purpose of beach use and required width)	9.3 (2)				
	b-3	Obstruction on land facilities (Wave intrusion, overtopping to the property)	9.3 (2)				
a) Sacia Environment	c-1	Request of beach conservation from hotels and communities	9.5 (1)				
c) Socio-Environment	c-2	Relation between hotels and communities	9.5 (2)				
d) Coastal Environment	d-1	Impact to coastal environment (coral, fish, fauna & flora, water quality)	9.6 (1)				
,	d-2	Restriction on regulation, rule for coastal environment	9.6 (2)				
e) Realization of Beach	e-1	Management system (government)	9.7 (1)				
Management	e-2	Self-management by stakeholders	9.7 (2)				
	Conclusion for Evaluation						

(4) Summary of the Evaluation Result

Table 9.1.3 shows the evaluation result of the preliminary selection of candidate beaches for Phase-2 Project using the two main criteria. Based on the results, Candidasa got the highest score, followed by North Kuta Legian (2nd), and Seminyak (2nd), which were selected as first priority of candidate beaches for Phase-2 Project. As to the second priority, Canggu and Lebih were selected. North Sanur Padang Galak was selected as third priority. Table 9.1.4 shows the final evaluation result for the selected five beaches by checking three aspects. No negative issue was expected for the selected candidate beaches.

			a) Economica	al Condition as W	orld Tourism	b) Degree of E Obstacle to B	Beach Erosion & each Activities			
Study Area		Subjected	a-1	a-2	a-3	b-1	b-2		Evaluation	
	No	Beaches	Identification of world-famous tourism area	Land use along coast	Development Plan & its contribution	Degree of Beach Erosion	Obstruction on beach activities, ladn facilities	Total Score	(Priority as Phase-2)	
		Refer to	9.2 (1)	9.2 (2)	9.2 (3)	9.3 (1)	9.3 (2)			
	E1	Candidasa	4	4	4	5	5	22	1	
	E2	Kusamba	1	2	1	1	0	5		
South	E3	Klotok	1	1	2	5	1	10		
	E4	Tegal Besar	1	2	1	5	1	10		
	E5	Siyut	1	2	2	5	1	11		
East Coast	E6	Lebih	3	2	2	5	3	15	3	
	E7	Masceti	1	1	2	2	1	7		
	E8	Saba, Purnama	1	1	2	3	1	8		
	E9	Pabean	1	1	2	5	1	10		
	E10	North Sanur ~ Padang Galak	3	2	2	5	1	13	5	
South	W1	North Kuta ~ Legian	5	5	2	3	3	18	2	
West	W2	Seminyak	5	5	2	3	3	18	2	
Coast	W3	Canggu	4	5	2	2	2	15	3	

 Table 9.1.3
 Evaluation Results (Preliminary)

(Source: JICA Study Team)

Table 9.1.4 Evaluation Results (Final)

			c) Social E	Environment	d) Coastal	Environment	e) Beach M	Aanagement	
		Calastad	c-1	c-2	d-1	d-2	e-1	e-2	
Priority	No	Beach	Request for Project	Relation between hotel & community	Impact to Coastal Environment	Restriction on regulation, rule	Management system	Self- management by stakeholders	Final Result
		Refer to	9.5 (1)	9.5 (2)	9.6(1)	9.6 (2)	9.7 (1)	9.7 (2)	
	E1	Candidasa	High	No problem	Necessity of careful attention	No	Ready	Medium	Selected
1st	W1	North Kuta ~Legian	High	No problem	Not impacted	No	Ready	High	Selected
	W2	Seminyak	High	No problem	Not impacted	No	Ready	High	Selected
2nd	W3	Canggu	High	-	Not impacted	No	Ready	Medium	
210	E6	Lebih	High	-	Not impacted	No	Low	Medium	
3rd	E10	North Sanur~ Padang Galak	Medium	-	Not impacted	No	Medium	Medium	

9.2 Evaluation on the Socio-economic Condition

(1) (a-1) Identification of World Tourist Area

World-famous tourism beach was identified among the subject beaches based on general information obtained from tourism statistics data, guide book, and web site. Site investigation was also carried out to check the present condition of each area.

Evaluation was carried out by adopting the scoring from 1 to 5. Here, each score was taken based on the following criteria shown in Table 9.2.1.

Score	Criteria
5	International tourism area (highest tourism area in Bali)
4	International tourism area (2nd highest tourism area in Bali)
3	Domestic tourism area (with future tourism development plan)
2	Domestic tourism area
1	Others

	Table 9.2.1	Criteria	for	Scoring
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(Source: JICA Study Team)

The evaluation result for the identification of world tourist area is shown in Table 9.2.2.

Area	No	Subjected Beaches	Description	Score
	E1	Candidasa	Highest international tourism area at east coast area	4
	E2	Kusamba	Out of tourism area	1
	E3	Klotok	Out of tourism area	1
	E4	Tegal Besar	Out of tourism area	1
	E5	Siyut	Out of tourism area	1
South East	E6	Lebih	Domestic tourism area but there is future tourism	3
Coast	F7	Masceti	Out of tourism area	1
	E8	Saba, Purnama	Out of tourism area	1
	E9	Pabean	Out of tourism area	1
	E10	Sanur North ~ Padang Galak	Domestic tourism area, but foreign tourist also sometimes visit	3
South West	W1	North Kuta ~ Legian	Highest international tourism area in Bali	5
Coast	W2	Seminyak	Highest international tourism area in Bali	5
	W3	Canggu	Developing international tourism area	4

 Table 9.2.2
 Evaluation Results for the Identification of World Tourist Area

(Source: JICA Study Team)

(2) (a-2) Land Use along the Coast

To know the contribution on tourism in current condition, the land use along the coast in the study area was examined. For this purpose, the number of hotels and restaurants were checked at the coastal area with the distance of up to 2km from the coast.

a) Number of hotels and rooms in the study area

Table 9.2.3 shows the number of hotels and rooms at the study area ranked by the number of room accomodations in the hotels. In this table, representative beach areas in the whole Bali Province are included for comparison.

From this table, southwest coast area, which includes North Kuta, Legian, Seminyak to Batu Mejan (Canggu), was ranked to be having the highest international tourism position. While in the east and north coast areas, Candidasa and Lovina were ranked having the highest international tourism position. The beach area of Phase-1 Project, such as Sanur and Nusa Dua beaches (highlighted by gray color) were also ranked having the highest position.

b) Number of restaurants and seat at the study area

Table 9.2.4 shows the number of restaurants and seat at each area. The tendency was nearly the same as that for the number of hotels and rooms as shown in Table 9.2.3.

From this table, southwest coast area from North Kuta to Batu Mejan (Canggu) was ranked at higher position. Phase-1 beaches, such as Sanur and Nusa Dua, which were highlighted by gray color, ranked second. Lovina beach in the north coast and Candidasa in east coast were also ranked at higher position in whole Bali Province.

-					NY 1 100 177 1			
				ed Hotel	Non-classified Hotel		Total	
Rank	Regency/City	Representative Resort Beach Area	Num. of	Num. of	Num. of	Num. of	Num. of	Num. of
			Hotel	Room	Hotel	Room	Hotel	Room
1	BADUNG	Kuta(Phase-1 Project)	18	3,253	120	3,315	138	6,568
2	BADUNG	Nusa Dua Beach (Phase-1 Project)	22	5,170	11	250	33	5,420
3	BADUNG	Seminyak - Petitenget (Kerobokan) - Batu Mejan (Canggu)	17	1,941	100	2,269	134	4,846
4	BADUNG	Kuta North - Legian	17	2,275	110	2,568	127	4,843
5	DENPASAR	Sanur Beach (Phase-1Project)	20	2,882	49	1,014	69	3,896
6	BULELENG	Lovina Beach	6	295	51	802	57	1,097
7	BADUNG	Jimbaran	7	896	7	155	14	1,051
8	KARANGASEM	Candidasa	5	208	43	792	48	1,000
9	KLUNGKUNG	Nusa Lembongan Area	2	36	26	269	28	305
10	TABANAN	Tanah Lot Area (Phase I)	1	278	3	21	4	299
11	DENPASAR	Sanur North - Padang Galak	1	100	2	41	3	141
12	KARANGASEM	Tulamben Beach	0	0	7	114	7	114
13	JEMBRANA	Menjangan (West Bali National Forest)	2	71	0	0	2	71
14	KLUNGKUNG	Tegal Besar - Klotok	0	0	1	5	1	5
-	KARANGASEM	Ujung Beach	0	0	0	0	0	0
-	KLUNGKUNG	Kusamba - Pesinggahan	0	0	0	0	0	0
-	KLUNGKUNG	Klotok - Kusamba	0	0	0	0	0	0
-	GIANYAR	Lebih - Siyut	0	0	0	0	0	0
	GIANYAR	Saba - Masceti	0	0	0	0	0	0
-	GIANYAR	Gumicik - Pabean - Purnama	0	0	0	0	0	0
	TABANAN	Soka Beach	0	0	0	0	0	0

 Table 9.2.3
 Beach Area Ranked by Number of Rooms and Hotels

(Source: Direktori 2010, Bali Government Tourism Office)

Rank	Regency/City	Representative Resort Beach Area	Number of Restaurant	Number of Seat
1	BADUNG	Kuta (Phase-1 Project)	203	12,048
2	BADUNG	Kuta North - Legian	131	8,650
3	BADUNG	Seminyak - Petitenget (Kerobokan) - Batu Mejan (Canggu)	133	7,359
4	DENPASAR	Sanur Beach (Phase I Project)	91	4,602
5	BADUNG	Nusa Dua Beach (Phase-1 Project)	53	3,580
6	BULELENG	Lovina Beach	23	1,263
7	KARANGASEM	Candidasa	35	1,112
8	BADUNG	Jimbaran	24	998
9	KLUNGKUNG	Nusa Lembongan Area	21	725
10	GIANYAR	Lebih - Siyut	21	657
11	KLUNGKUNG	Kusamba - Pesinggahan	4	176
12	KARANGASEM	Tulamben Beach	4	78
13	TABANAN	Tanah Lot Area (Phase I)	6	-
_	KARANGASEM	Ujung Beach	0	0
-	KLUNGKUNG	Klotok - Kusamba	0	0
-	KLUNGKUNG	Tegal Besar - Klotok	0	0
-	GIANYAR	Saba - Masceti	0	0
-	GIANYAR	Gumicik - Pabean - Purnama	0	0
	DENPASAR	Sanur North - Padang Galak	0	0
-	TABANAN	Soka Beach	0	0
	JEMBRANA	Menjangan (West Bali National Forest)	0	0

Table 9.2.4	Beach Area	Ranked by	Number	of Seating	Capacity	and Restaurants

(Source: Direktori 2010, Bali Government Tourism Office)

Evaluation was carried out by adopting the scoring from 1 to 5. Here, each score was taken based on the following criteria shown in Table 9.2.5.

Table 9.2.5	Criteria for Scoring
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Score	Criteria
5	within top 5 for both
4	within top 10 for both
3	within top 15 for both
2	within top 15 for either
1	out of rank

(Source: JICA Study Team)

The evaluation result for land use along the coast is shown in Table 9.2.6.

Study Area	No	Subjected Beaches	Description	Score
	E1	Candidasa	Hotel (rank 8), Restaurant (rank 7)	4
	E2	Kusamba	Hotel (out of rank), Restaurant (rank 11)	2
	E3	Klotok	Hotel (out of rank), Restaurant (out of rank)	1
	E4	Tegal Besar	Hotel (rank 14), Restaurant (out of rank)	2
South Fact	E5	Siyut	Hotel (out of rank), Restaurant (rank 10)	2
Coast	E6	Lebih	ebih Hotel (out of rank), Restaurant (rank 10)	
Coasi	E7	Masceti	out of ranking	
	E8	Saba, Purnama	out of ranking	1
	E9	Pabean	out of ranking	1
	E10	Sanur North ~ Padang Galak	Hotel (rank 11), Restaurant (out of rank)	2
South West	W1	North Kuta ~ Legian	Hotel (rank 1), Restaurant (rank 1)	5
Coast	W2	Seminyak	Hotel (rank 3), Restaurant (rank 3)	5
	W3	Canggu	Hotel (rank 3), Restaurant (rank 3)	5

 Table 9.2.6
 Evaluation Results for Land Use along the Coast

(3) (a-3) Contribution of the Tourism Development Plan

The existing and future development plan of Bali Province was presented in the spatial plan issued in 2009. Based on this information, the potential contribution on tourism of the spatial development plan at each area was examined

According to the spatial plan, most of the study area belonged to the tourist area except for Kusamba, Klotok, and Tegal Besar located at the southeast coast area. For the infrastructure development plan, toll road development will contribute directly to increase the number of visitors at the study area, this criterion has higher priority than others. Furthermore, international cruise port in Tanah Ampo is expected to contribute to increase the number of visitors especially in Candidasa. The scoring was made to summarize each contribution items. Table 9.2.7 shows the summarized evaluation result on the contribution of the Tourism Development Plan.

Study			Infrastructure Development						
		Subjected Beaches	Toll Road		Sea Transport Access			Tourism	
Area	No		Subjected Beaches	Sanur to Padangbai	Kuta to Soka	International cruise port	Ferry (Amed to Lember)	Ferry (Gunaksa to Nusa Penida)	area
	E1	Candidasa	1		1	1		1	4
	E2	Kusamba	1						1
	E3	Klotok	1				1		2
	E4	Tegal Besar	1						1
South	E5	Siyut	1					1	2
East	E6	Lebih	1					1	2
Coast	E7	Masceti	1					1	2
	E8	Saba, Purnama	1					1	2
	E9	Pabean	1					1	2
	E10	Sanur North ~ Padang Galak	1					1	2
South	W1	North Kuta ~ Legian		1				1	2
Coast	W2	Seminyak		1				1	2
Coast	W3	Canggu		1				1	2

 Table 9.2.7
 Evaluation Results on the Contribution of Tourism Development Plan

(Source: Bali Province Regulation No.16/2009 arranged by the JICA Study Team)

9.3 Evaluation of Beach Condition

(1) (b-1) Degree of Beach Erosion

The beach recession occurring for a long time was examined by the use of mapping analysis based on aerial and satellite photographs. The vertical aerial photographs which were taken in 1981 (scale S=1/50,000), 1982 (S=1/15,000), and 1993 (S=1/50,000) were collected in this study, and the satellite photographs (Quick Bird) taken in 2011were obtained as of the latest condition. Of these, the positions of shoreline between 1981 and 2011 (30 years) were compared. The change of shoreline position due to tide condition was considered taking into account the time when the photos were taken and slope of the beach.

a) Southeast Coast Area (from north Sanur to Padangbai)

Figure 9.3.1 shows the comparison of shoreline between 1981 and 2011, from north Sanur to Padangbai. For conducting detailed comparison, the area was divided into five sub-areas. The comparison of shoreline for each sub area is shown in Appendix 9.3.1. Figure 9.3.2 shows the result of the change of shoreline obtained from the mapping analysis.







Figure 9.3.1 Aerial and Satellite Imagery between 1981 and 2011 (East Coast)





Figure 9.3.2 Shoreline Change between 1981 and 2011 (Souteast Coast)

- Beach erosion was observed in most of the study area. The most significant beach recession was observed at X=9~12.5 km (West side from the Unda River mouth) with 240 m width of the recession. The shoreline at east side (from the Unda River to Padangbai) was not so significant.
- The beach recession at X=20~26 km was about 20 m to 40 m (less than 50 m). According to the satellite photograph, hard soil and rock layer were partially observed behind the sandy beach.
- From X=27 km to west side, the shoreline has gradually retreated toward the Ayung River mouth, and the width of the recession reaches approximately 100 m.
- > The area for erosion was estimated at about S =2.04 million m^2 based on the mapping analysis. Assuming 6~7 m as the height of sand movement, the sand loss in this area was estimated roughly at 12~14 million m^3 for 28 years.
- b) Candidasa

Figure 9.3.3 shows the comparison of shoreline between 1981 and 2011 in Candidasa. The details are shown in the Appendix 9.3.1. Figure 9.3.4 shows the change of shoreline.



Figure 9.3.3 Aerial and Satellite Imagery between 1981 and 2011 (Candidasa)



Figure 9.3.4 Shoreline Change between 1981 and 2011 (Candidasa)

- > The beach recession at Area E (X = 1 km to 3.5 km) was observed roughly at 20 m to 40 m.
- Several revetments were constructed along the coastal line, and the position of the revetment was 20 m to 30 m land side from the shoreline position in 1981.

- The beach recession at Area F (X = 4 km to 6 km) was more significant than that at Area E and was observed roughly at 40 m to 60 m.
- > Originally, the beach width in Candidasa was narrow with 20 m width more or less.
- c) Southwest Coast (from North Kuta to Canggu)

Figure 9.3.5 shows the comparison of shoreline between 1981 and 2011 from North Kuta to Canggu. The details are shown in Appendix 9.3.1. Figure 9.3.6 shows the results of the change of shoreline.

- ➢ Beach recession was observed in most of the study area, but the change of beach recession was less than 20 m and smaller than that in the east coast area.
- > The beach recession at X = 3 km to 8 km (Legian ~ Seminyak area) was observed roughly to be more or less than 10 m. Significant local beach retreat at X=7.3 km was due to change of small river mouth at this area.
- ➤ The beach from X=8 km to north side seems stable. Such condition might have been preserved due to the existence of beach rock at some areas.



Figure 9.3.5 Aerial and Satellite Imagery between 1981 and 2010 (Southwest Coast) (Source: JICA Study Team)



Figure 9.3.6 Shoreline Change between 1981 and 2010

- Beach recession was not observed in Area C (Canggu area) except at X=11.3 km. The large scale beach rock exists at X=11.3 km. Due to this, the beach at south side was accumulated with approximately 30 m while the beach at north side has retreated.
- > The area for erosion was estimated about S =24,000 m² based on this mapping analysis. Assuming 10 m as the height of sand movement, sand loss in this area was estimated roughly at 240,000 m³ for 28 years (9000 m³/year in average). This sand loss might have been caused by outflow to the north.
- It was suggested that the sediment balance was maintained before the 1970s. At that time, sand from the south area (coral reef area) flow out to the north side, and sediment balance was maintained. After causing beach erosion mainly in the south area (coral reef area) due mainly to the construction of runway, the sand supply from the south side has stopped. This might induce sediment unbalance in this area and cause beach erosion.

Evaluation was carried out by adopting the scoring from 1 to 5. Here, each score was taken based on the following criteria as shown in Table 9.3.1.

The evaluation result for the degree of beach erosion is shown in Table 9.3.2.

Score	Criteria
5	Beach retreat more than 50m for 30 years
4	Beach retreat from 20m to 50m for 30 years
3	Beach retreat from 10m to 20m for 30 years
2	Beach retreat from 0m to 10m for 30 years
1	No beach retreat

Table 9.3.1Criteria for Scoring

Study Area	No	Subjected Beaches	Description	Score
	E1	Candidasa	20 to 30m retreat at east side, 40 to 60m at west side	5
	E2	Kusamba	No retreat	1
	E3	Klotok	150 to 200m retreat	5
South East Coast	E4	E4 Tegal Besar 100 to 150m retreat		5
	E5	Siyut	100 to 150m retreat	5
	E6	Lebih	100m retreat	5
	E7	Masceti	5 to 10m retreat	2
	E8	Saba, Purnama	10 to 20m retreat	3
	E9	Pabean	50 to 80m retreat	5
	E10	Sanur North	70 to 100m retreat	
	EIU	~ Padang Galak		
	W 71	North Kuta	54 10 4 4	
West Coast	VV I	~ Legian	5 to 1211 letteat	5
West Coast	W2	Seminyak	5 to 15m retreat	3
	W3	Canggu	0 to 10m retreat	2

(Source: JICA Study Team)

(2) (b-2) Obstruction of Beach Activities, Utilization, and Land Facilities

It is required to check the beach condition based on beach utilization and protection. Even if beach recession occurs, the necessity to conduct beach conservation measures might be low in case of no obstruction on beach utilization and protection.

As to the point of beach utilization, the possibility of obstructing beach activities related to tourism such as sunbathing, walking, swimming, fishing, and religious activities for Balinese residents, was checked.

As to the point of protection, the present condition of land facilities and the possibility of obstruction due to beach recession and wave intrusion into land side and facilities were checked based on the site investigation and interview survey.

Figures 9.3.7(1/5) to 9.3.7(5/5) show the present condition for beach use and the facilities at hinter area, and anticipated obstacles for each subjected beach.

Actually, it was difficult to set the criteria for scoring. As one method, the scoring was made by counting the number of comments on obstacles as shown in Table 9.3.3.

Study Area	No	Subjected Beaches	Main Purpose of Beach Use	Obstruction on beach activities and utilization	Obstruction on land facilities	Score
	E1	Candidasa	Tourism area for foreigner and domestic	 Difficulty to beach access Difficulty of walking along the beach No space for beach activities 	 Wave over topping into hotel property Loss of property 	5
	E2	Kusamba	Fishery and sea transport	no problem	no problem	0
	E3	Klotok	Religious area		Wave intrusion into temple	1
	E4	Tegal Besar			Wave intrusion into property	1
South	E5	Siyut			Wave intrusion into property	1
East Coast	E6	Lebih	Religious and recreation area	Insufficient space for beach activities	-Wave run up in front of some facilities -Possibility for damage of facility	3
	E7	Masceti	Religious and recreation area		Wave intrusion into temple	1
	E8	Saba, Purnama	Religious and recreation area		Wave intrusion into property	1
	E9	Pabean	Recreation area		Wave intrusion into property	1
	E10	Sanur North ~ Padang Galak	Tourism recreation area for domestic, religious and recreation area		Wave intrusion into property	1
	W1	North Kuta ~ Legian	Tourism area for foreigner and domestic	- Insufficient of beach space for activities during high tide	-Wave run up in front of some facilities -Possibility for damage of facility	3
South West Coast	W2	Seminyak	Tourism area for foreigner	- Insufficient of beach space for activities during high tide	-Wave run up in front of some facilities -Possibility for damage of facility	3
	W3	Canggu	Tourism and residential area for foreigner, religious area		-Wave run up in front of some facilities -Possibility for damage of facility	2

Table 9.3.3 Evaluation for Obstruction on Beach Use and Land Facilities



Figure 9.3.7 Present Condition on Beach Use and Facilities, and Anticipated Obstacles (1/5)



Figure 9.3.7 Present Condition on Beach Use and Facilities, and Anticipated Obstacles (2/5)

Final Report (Simple Version)



Figure 9.3.7 Present Condition on Beach Use and Facilities, and Anticipated Obstacles (3/5)

Final Report (Simple Version)



Figure 9.3.7 Present Condition on Beach Use and Facilities, and Anticipated Obstacles (4/5)



Figure 9.3.7 Present Condition on Beach Use and Facilities, and Anticipated Obstacles (5/5)

9.4 **Preliminary Selection**

As shown in Table 9.1.3, the results are as follows:

Selected Beaches

1st priority: Candidasa (22 points), North Kuta~Legian, and Seminyak (18 points)

2nd priority: Canggu (15 points) and Lebih (15 points)

3rd priority: North Sanur Padang Galak (13 points)

In this selection, Lebih (2nd priority) and Padang Galak (3rd priority) were categorized as domestic tourist areas. As presented in Chapter 13, the contribution on tourism of these target beaches greatly depends on the number of hotels and restaurants for foreign tourists at the coastal hinter area and number of visitors. Furthermore, the difference on the expenditure of foreign tourist is three times more than the domestic tourists. About the beach erosion condition, Lubih is one of the most serious beaches with beach erosion problem. However, there is no existing hotel in Lubih and the contribution to tourism especially with regards to the number of foreign tourists is very limited. With a serious beach erosion problem, the total score for the selection of candidate beach became lower than the foreign tourist area.

Other local beaches at east side were not selected for the Phase-1 Project, especially taking into consideration the "world tourism contribution".

Selected three beaches ranking as first priority were further checked by applying the three criteria, which are a) socio-environment, b) coastal environment, and c) realization of beach management as already shown in Figure 9.1.2. As comparison, the results for the 1st to 3rd priority beaches will be presented in each table.

9.5 Consideration on Social-Environment

(1) (c-1) Request for beach conservation from hotels and communities

A series of interviews with the personnel responsible for the subject beaches were conducted. Their responses on the necessity of beach conservation measures are shown in Table 9.5.1. The request for necessity of beach conservation was observed high for most beaches, especially for the 1st priority beaches.

Priority	No	Selected Beach	Interviewer	Request for Beach Conservation	Evaluation				
			The Head of Samuh Traditional Sub-Village	Immediately					
			The Head of Sengkidu Traditional Village	Immediately					
	E1	Candidasa	The Head of Hotel Association	Immediately	High				
			Candidasa Fisherman Group	Immediately					
			Subagan Traditional Village Teacher	Immediately					
1st			The Head of Traditional village	Immediately					
	W1	North Kuta	The Head of Legian beach management	Immediately	High				
		~ Legian	Hotel Bali Mandira	It might be necessary in future	8				
	wo	Saminyalı	The Head of Seminyak Traditional village	Immediately	High				
	W Z	Seminyak	The Head of Seminyak Beach Management	Immediately	підії				
			The Head of Traditional village	Immediately					
			The Head of Fisherman Association	It might be neceesary in future					
	W3	Canggu	The Head of Hotel and Restaurant Executive Club	Case to case	High				
2nd			The Head of Traditional village (Brawa)	Immediately					
			The Head of Fisherman Association (Brawa)	Immediately					
	F6	Lebih	The Head of Lebih Fisherman Groups	Immediately	High				
	ĽŰ	Leoin	The Head of Lebih Traditional Village	Immediately	Ingn				
			The Head of Kesiman Traditional Village	It might be					
3rd	E10	North Sanur ~		neceesary in future	Medium				
						Padang Galak	The Head of Padanggalak Fisherman Group	necessary in future	

 Table 9.5.1
 Interview Results on the Necessity of Coastal Protection Measures

(Source: JICA Study Team)

(2) (c-2) Relationship between Hotels and Communities

The present condition of the relationship between hotels and communities, who are the main stakeholders, is based on the obtained information at each site as summarized in Table 9.5.2. Basically, active cooperation between hotels and communities concerning beach maintenance and management was not observed because there is no existing management system at each site. The only cooperation observed is the beach cleaning activities being done by the hotels and the communities. Furthermore, there was no observed discord among the stakeholders at least for the 1st and 2nd priority sites.

Priority	No	Selected Beach	Present Condition	Evaluation	
1st			Community and Hotels do the beach cleaning together		
	E1	Candidasa	Coordination meeting is sometimes held between village and hotels as required	No problem	
	W1	North Kuta	Community and Hotels do the beach cleaning in cooperation		
		~ Legian with private sector and NGO		No problem	
	W2	Seminyak	Community and Hotels coordinate for beach cleaning		
		Canggu	Coordination meeting is sometimes held between village and		
	W3		Canggu hotels as required		
2nd			Hotels pay local authority to clean the beach		
	E6	Lebih No coordination (due to no hotel exists)		-	
3rd	F10	North Sanur~	No coordination (due to no hotel exists)	_	
	E10	Padang Galak	To coordination (due to no noter exists)		

9.6 Consideration on Coastal Environment

(1) (d-1) Impact to Coastal Environment

a) Summary

Table 9.6.1 shows a summary of the environmental conditions of candidate beaches. The most vulnerable environment was observed to be Candidasa. Candidasa is a coral reef beach and many live corals, sea grasses, and several species of fish exist in the area. Other beaches have relatively general sandy beaches facing the open sea.

Priority	No	Selected Beach	Type of Beach	Coral Habitat	Sea Grasses	Water Quality	Target fish species for fishery	Restriction on Environmental Regulation	Evaluation
1st	E1	Candidasa	Coral Reef Beach	Exiting	Exiting	Good	Mackerel, Snapper, Grouper, Albacore Tuna	No	Necessity of careful attention
	W1	North Kuta ~ Legian	Sandy Beach	-	-	Moderate	Lobster	No	Not impacted
	W2	Seminyak	Sandy Beach	-	-	Moderate	Lobster	No	Not impacted
2nd	W3	Canggu	Sandy Beach	-	-	Moderate	Lobster	No	Not impacted
	E6	Lebih	Sandy Beach	-	-	Moderate	Mackerel, Snapper, Grouper, Albacore Tuna, Lobster	No	Not impacted
3rd	E10	North Sanur~ Padang Galak	ur~ Sandy ılak Beach Moderate -		-	No	Not impacted		

Table 9.6.1 Summary on the Impact to Coastal Environment

(Source: JICA Study Team)

b) Impact to Existing Corals

Among the candidate beaches, only Candidasa was categorized as coral reef beach. There is an existing coral habitat both inside and outside the coral reef, but the main habitat area is located at the outer reef slope area with shallow water. A 162.2 ha of healthy coral reefs is situated in front of the beach-eroded area (Figure 9.6.1). Inside the coral reef, the branching type of coral is the primary specie. This type of coral lived mainly in the surrounding offshore breakwater (Photo 9.6.1). The detail is presented and discussed in Chapter 13.



Figure 9.6.1 Coral Reef Surrounding Candidasa

(Source: Environmental Status of Bali Province 2010)



(1) Branching Corals around Existing Breakwaters

(2) Corals at the Outer Reef Slope

Photo 9.6.1 Lived Corals in Candidasa

(Source: JICA Study Team)

The location for the construction of coastal facilities and planned sand nourishment is just in front of the beach. This may not interfere with the corals directly because the coral habitat area is mainly located out of the coral reef. However, the indirect impact of the construction activities, such as turbidity and damage by big vessels, may be anticipated.

c) Impact to Existing Marine Fauna and Flora

Sea Grass Ecosystem

Offshore environment of Candidasa offers a living ground for sea grasses. The area is about 20 ha (Environmental Status of Bali Province 2010, I-138). Sea grass is known for being a nursery for micro-organisms and as food sources for turtles and dugong. The massive growth is seen in the western area of Candidasa.

Commercial Fish Species

Sandy seabed at the offshore area of eastern coast is being used as a productive commercial fishing (lobster) ground of fishermen. Disturbance of the seabed by dredging may affect the fish catch. A more precise survey on the fishing area and season should be surveyed, and agreement with fishermen will be necessary.

Priority	No Selected Beach		Target fish species for fishery	Fishing area (Distance from coast)	
1st	E1	Candidasa	Mackerel, Snapper, Grouper, Albacore Tuna	5 - 25 km	
	W1	North Kuta ~ Legian	Lobster	1 - 10 km	
	W2	Seminyak	Lobster	1 - 10 km	
2nd	W3	Canggu	Lobster	1 - 10 km	
	E6	Lebih	Mackerel, Snapper, Grouper, Albacore Tuna, Lobster	25 km area	
3rd	E10	North Sanur~ Padang Galak	-	-	

Table 9.6.2	Commercial	Fishing	(Species	and Area)
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(Source: Interview Survey from the Fisherman's Association)

d) Impact to the Water Quality

Impact to the water quality by implementation of beach conservation work and sand mining in the offshore area are not expected, except in Candidasa where water circulation is not active. It is noted that protection works in Candidasa require high attention.

Priority	No	Beach	Present Condition	Physical Characteristics of the Shore	Impact for Nourishment	Impact for Offshore Sand Mining
1st	E1	Candi Dasa	Good	-Inside the coral reef -Partial stagnation of water due to existing groins and breakwaters	Some impact is expected due to turbidity and decrease of water exchange	Some impact is expected to corals due to turbidity during mining
	W1	North Kuta ~ Legian	Moderate	Open shore	No impact is expected	No impact is expected
	W2	Seminyak	Moderate	Open shore	No impact is expected	No impact is expected
and	W3	Canggu	Moderate	Open shore with partial rock cliff	No impact is expected	No impact is expected
2na	E6	Lebih	Moderate	Open shore	No impact is expected	No impact is expected
3rd	E10	Sanur North ~ Padanggalak	Moderate	Open shore	No impact is expected	No impact is expected

 Table 9.6.3
 Occurrence of Degradation of Water Quality

(Source: JICA Study Team)

(2) (d-2) Restriction, Regulation, and Rules for Coastal Environment

The 1st priority candidate site, namely, Candidasa, North Kuta to Legian, and Seminyak were defined as "tourist area" in the spatial plan in 2009 issued by Bali Province. Further, these areas were defined as "coastal conservation area". Most of the coral reef beaches, offshore islands, and estuary were categorized as "coastal conservation area". According to the explanation in the spatial plan, no construction of industrial facility is allowed in the area. Furthermore, maintenance and preservation of the nature is required. However, the spatial plan did not mention any restrictions related to beach conservation project in these areas.

9.7 Evaluation on Realization of Beach Management

(1) (e-1) Beach Management System (Government Side)

The beach management system has not been established yet in Indonesia. As a result of this study, the Team Coordination for Beach Management System (TKMPP) will be established to discuss and decide the necessary beach maintenance and management for the Phase-1 beaches. After deciding the new beach conservation measure, the related section of the regency who will be in charge of beach maintenance and management will join the said organization. Thus, the evaluation was made to examine the possibility for the realization of future management based on the current condition of related regency.

The evaluation results are shown in Table 9.7.1.

Table 9.7.1	Evaluation Results on the Realization of Beach Management by the
	Government

Driority	No	Selected	Regency	Present Conditions Future Possibility				
rnony	NU	Beach	Regency	r tesent Conditions, ruture r ossiolinty	(Possibility for Realization)			
1st	E1	Candidasa	Karangasem	-Candidasa is one of the world tourist beaches in Bali. The Karangasem Regency is receptive to learn about beach maintenance works for the Phase-1 Project Beaches. With this, the common information on beach maintenance and management can be shared and maintained between BWS-BP and Karangasem Regency. -Karangasem Regency is an observer of the working group of this study. Meeting are held to discuss the establishment of beach management in Bali. After the establishment of the Team Coordination for Beach Management System (TKMPP) and if Candidasa become the project site, Karangasem Regency will become one of the main players. -BWS-BP and Karangasem Regency have experiences on the maintenance and implementation for beach conservation and coastal protection in Candidasa Beach. Karangasem Regency understand the importance and difficulty of beach conservation and maintenance based on its past experience. However, they have never conducted any beach monitoring due to lack of engineering skills and survey equipment. A capacity building will be required through OJT during project implementation in Candidasa Beach.	Ready			
	W1	North Kuta ~ Legian		-Most of the world tourism beaches (e.g. Kuta and Nusa Dua in Phase-1 Project, Legian,Seminyak, Canggu, etc.) belong to Badung Regency, and their income is extremely high compared to other regencies.				
	W2	Seminyak		-Based on the above condition, Badung Regency has already well understood the importance and necessity of beach maintenance and management				
2nd	W3 Canggu		Badung	-Badung Regency is a member of Working Group Meeting in this study to discuss the establishment of beach management in Bali. After the establishment of the Team Coordination for Beach Management System (TKMPP), they will become a leading players among other related local government. - BWS-BP has an experience on the maintenance and implementation for coastal protection in Canggu area. Badung Regency also get interested coastal protection and conservation through requirements from stakeholders.	Ready			
	E6	Lebih	Gianyar	 The beaches in Gianyar Regency are basically only local beaches and there was no world tourism beaches. BWSBP has experience of maintenance and implementation for coastal protection at Lebih area. However, Gianyar regency has never conducted monitoring and maintenance for coastal protection and conservation due to lack of human resources and equipment. 	Low			
3rd	E10	Sanur North ~ Padang Galak	Denpasar City	-Sanur, which is one of world tourism beaches, belongs to the territory of Denpasar City. On the other hand, some of illegal use on projected sandy beach were observed. '-BWSBP has experience of maintenance and implementation for coastal protection at Sanur North.	Medium			

(2) (e-2) Self-management Being Done by the Stakeholders

Table 9.7.2 shows the present condition of beach management, which has been carried out by stakeholders. The main self-management activity being done by stakeholders is beach cleaning. At north Kuta to Seminyak, some of public facilities such as public toilet, bay watch, etc., which were constructed under Phase-1 Project, are being maintained by the communities after the project completion.

Basically, beach cleaning is well managed by stakeholders at most of the selected beaches. On the other hand, there are no other management items or activities expected to be individually managed by stakeholders, such as beach monitoring, self-control of beach utilization, etc.

However, based on the current condition, related stakeholders, which are mainly hotels and communities, have the potential to do self-management.

Priority	No	Beach	Management Item	Present Condition	Evaluation (Possibility)
	E1	Candidasa	Beach Cleaning	Communities and hotel associations managed well their responsible territories.	Medium
lst		North Kuta	Beach Cleaning	Communities and hotel and restaurant executive clubs managed the beach area in cooperation with the private sector and NGOs	High
	W1	~ Legian	Maintenance of Public Facilities	Some of public facilities (e.g., public toilet, bay watch set in Phase-1 Project) are maintained by communities after the Phase-1 Project.	
	W2	Seminyak	Beach cleaning	Communities and Hotel Association are well managed at their territory by their responsibility.	
			Maintenance of Public Facilities	Some of public facilitied (e.g. Public Toilet, Bay watch, which were set in Phase-1 Project) was maintained by communities after Phase-1 Project	High
and	W3	Canggu	Beach cleaning	Communities and Hotels are well managed at their territory by their responsibility	Medium
2nd	E6	Lebih	Beach cleaning	Fisherman groups managed the limited area (around fish market and restaurant on the beach)	Medium
3rd	E10	Sanur North ~ Padanggalak	Beach cleaning	Communities managed their territories.	Medium

 Table 9.7.2
 Present Beach Maintenance Activities Being Done by Stakeholders

9.8 Final Selection of Candidate Site

The summary of the evaluation results on the "social environment", "coastal environment", and "beach maintenance" for preliminary selected beaches is shown in Table 9.8.1.

The three beaches (Candidasa, North Kuta ~ Legian, and Seminyak) which were selected as 1^{st} priority in the preliminary selection encountered no obstacle on the above mentioned three checking points. Therefore, these three beaches were finally selected as proposed candidate beaches.

In this survey, coral habitat located both inside and outside of the coral reef were observed in good condition furthermore, water quality is still maintained in Candidasa. This is one of the advantages in tourism which the south resort area, such as Sanur, Nusa Dua, and Kuta does not possess. Thus, great attention on coastal environment is required during the project implementation in Candidasa.

Table 9.8.1 Summary of the Evaluation Results on the Social Environment,
Coastal Environment, and Beach Management

		Selected No Beach	c) Social H	Environment	d) Coastal	Environment	e) Beach M		
			c-1	c-2	d-1	d-2	e-1	e-2	
Priority	No		Request for Project	Relation between hotel & community	Impact to Coastal Environment	Restriction, Regulation and Rules	Management system	Self- management by stakeholders	Final Result
		Refer to	9.5 (1)	9.5 (2)	9.6 (1)	9.6 (2)	9.7 (1)	9.7 (2)	
	E1	Candidasa	High	No problem	Need careful attention	No	Ready	Medium	Selected
1st	W1	North Kuta ~Legian	High	No problem	Not impacted	No	Ready	High	Selected
	W2	Seminyak	High	No problem	Not impacted	No	Ready	High	Selected
and	W3	Canggu	High	-	Not impacted	No	Ready	Medium	
2110	E6	Lebih	High	-	Not impacted	No	Low	Medium	
3rd	E10	North Sanur~ Padang Galak	Medium	-	Not impacted	No	Medium	Medium	

(Source: JICA Study Team)

The selected two beaches in the southwest coast, which is W1 (North Kuta ~ Legian) and W2 (Seminyak), is located along the continuous stretch of sandy beach. From the technical point of view, it is practical to combine W1 and W2 into one package. Thus, the candidate sites are defined as the two main areas presented below:

Site-1 (East Coast): Candidasa (5 km more or less)

Site-2 (South West Coast): North Kuta ~ Legian ~ Seminyak (3 km more or less)