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และการกัดเซาะชายฝั่งของประเทศไทย พ.ศ. 2561

THE 2018 MARINE AND COASTAL RESOURCES
AND COASTAL EROSION SITUATIONS OF THAILAND

บทสรุปสำหรับผู้บริหาร

EXECUTIVE SUMMARY

กรมทรัพยากรทางทะเลและชายฝั่ง
กระทรวงทรัพยากรธรรมชาติและสิ่งแวดล้อม
Department of Marine and Coastal Resources
Ministry of Natural Resources and Environment

The present report on **"The 2018 Marine and Coastal Resources and Coastal Erosion Situations of Thailand"** has been prepared in accordance with **the Promotion of Marine and Coastal Resources Management Act 2015**. Its main objective is to inform stakeholders at all levels about the most updated situations of marine and coastal resources and coastal erosion of the country in order for further analyzing, prioritizing, and managing of such situations.

1 Situations and their Changing Drivers

The local situations and changing drivers are due to our nation-expansion on economy, trades, investment, imports and exports, and tourism. As well, the government economic stimulus policies, population increasing, the entering into aging society, and migrants and foreign workers play also important roles of these changes, and continuously. Especially, expansion of the tourism and exports have resulted in coastal zone encroachment, over-consuming of natural resources, finally, disparity in accessibility to such resources.

The Thai Government has realized on importance of the marine and coastal resources management. They have been, therefore, included within several national plans, such as; **the 20-Year National Strategy (2017 – 2036)**, **the 12th National Economic and Social Development Plan (2017 – 2021)**, **and the 11 National Reform Plans**. Several related plans have been implemented within and under strong supports of the Promotion of Marine and Coastal Resources Management Act 2015.

In addition, the importance of marine and coastal resources problems has been internationally realized and cooperated to overcome via several international conventions and agreements, such as: **The Sustainable Development Goals (SDGs)**, **the Ocean Economy**, **and the Framework Agreement of the ASEAN Community**, for instances. As being a very positive result, Thailand needs to adapt our marine and coastal resources management schemes in order to be in line with such international ones of which will benefit our resources in the future.

Our overview problems on the utilization of marine and coastal areas and resources seem to be more serious. The major issues to be awarded of are the Illegally Unreported and Unregulated Fishing (IUU), marine transportation, maritime merchant, marine and coastal industries, marine tourism, and coastal urban areas. Increasing of those activities shall affect, directly, the marine and coastal resources, biodiversity, and marine environment.

2 Overview of Regional-Country Situations

2.1 Marine and Coastal Resources

2.1.1 Mangrove and Beach Forests

In the year 2018, mangrove forest area of totally 2.86 million rais has been found along coastal zones of 24 provinces. Among this, the pristine mangrove forest has been reported to be 1,534,585 rais and the retaken area has been 8,811 rais of which, together with other area types, a total of 5,111 rais have been completely mangrove afforested. The country mangrove forest area has been increasing and, as well, in the better status. Vice versa, the beach forest, excluding those within responsibility of the Department of National Park, Wildlife, and Plant Conservation, has been decreasing to be 21,745 rais from its previous record in the year 2014 of 25,844 rais.

It is cleared to conclude that the mangrove and beach forests located close to the major industrial zones, tourist spots, and expanding communities will be directly affected and resulted in degradation of the followings: ecology and natural resources, biodiversity, coastal and marine plants and animals, fishery, including coastal erosion due to stronger wave and wind.

2.1.2 Seagrass

Following the 2018 A.D. records, a total seagrass area of 159,828 rais has been located in 19 coastal provinces. It has been 7.91 percent increased from the previous record (2015) of 147,184 rais and, generally, with healthy to very healthy conditions, especially in Trat and Chonburi provinces. However, some degradation of seagrass and its ecology has been found within or close to the following vicinities: maritime routes, industrial zones, tourist spots, and large coastal communities. Such situations have been found in Surat Thani, Ranong, Phang-nga, Krabi, Trang, and Satun provinces.

2.1.3 Coral Reef

A total coral reef area of 149,025 rais has been recorded and reported for the year 2018 to scatter in 17 coastal provinces. It has been 0.05 percent increased from the previous record (2015) of 148,954 rais. The coral reef has been reported to be from very damaged to very healthy conditions. The damaged zones have been always found to be resulted from human activities, such as: tourism, maritime channel-dredging, ports and jetties construction, vessels transportation and docking, fishing in the coral reef vicinity, marine debris, and abandoned fishing nets. These damaged zones have been found in Chonburi, Prachuap Khiri Khan, Surat Thani, Phang-nga, Phuket, Krabi, and Satun provinces. Additionally, several coral reef areas have been degraded from bleaching phenomena due to climate changes; sea-water warming; changing in direction, intensity, and violence of wave and current; and other natural disasters.

2.1.4 Rare and Endangered Marine Species

The rare-endangered marine species in Thailand have been classified into 3 groups: sea turtle, dugong, dolphin and whale. Records during the year 2008 – 2018 have revealed yearly increasing tendency of sea turtle nesting numbers and appearance numbers of sea turtle, dugong, dolphin and whale. In the recent 2017, records have shown discoveries of 329 sea turtle nestings, 356 sea turtles, 221 dugongs, 65 Bryde's whales, and 1,687dolphins. On the other hand, a total of 411 times stranding aground of those species have also been recorded, as: 149 sea turtles, 15 dugongs, and 247 dolphins and whales. Threats to those species have been considered to be from both human activities and natural disasters which disturbed their habitats, food sources, and nesting grounds. Likewise, their increasing death rates have been also due to swallowing plastic waste, fishing equipments, tourists, climate changes, and natural disasters.

2.1.5 Artificial Reef

Records of the year 2018 have shown yearly increasing in artificial reef fixing, their utilization, and inspection of the fixed areas. During the year 2013 – 2017, **the Department of Marine and Coastal Resources** have completely fixed 54,640 units of artificial reef covering a total area of 123,000 square meters. Some remarkably positive impacts of these activities have been clearly seen, as: vividly increasing in ecosystem diversity, marine animal productions, and fishery and tourism incomes. On the other hand, unintended negative impacts have been occasionally found due to inappropriated and over placement of which, later, have become maritime route obstruction and marine waste.

2.2 Marine and Coastal Environment

2.2.1 Marine Debris

Thailand and several ASEAN Countries have been considered to be the world top – tiers in producing marine debris. Therefore, decreasing marine has been accounted to be our special task and, as well as, to cooperate with other countries which we have obligation on the Marine and Coatal Enviroment both bilateral and multilateral scales. As being a Chairman of ASEAN Countries in 2019, Thailand has initiated to organize and host the Special ASEAN Ministerial Meeting on Marine Debris.

Besides, in the year 2018, the Department of Marine and Coastal Resources has defined the major measures on the marine debris management, such as : collection of the abandoned marine debris on the marine eco-system, as beach, coral-reef, and managrove areas; debris management campaign, non-smoking beaches, installation of the waste-trap bonys at the major river-mouths and canals, survey and evaluation of influence of marine debris to the ecosystem and the rare and endangered marine species, and research on micro-plastic. The Department of Marine and Coastal Resources has very high confidence that all of these measures will result in significantly better change in marine debris conditions of the Thailand and the region, as a whole.

2.2.2 Coastal Water Quality, Red Tide, and Oil leak

Records of coastal water monitoring of both the Gulf of Thailand and the Andaman Sea between the year 2013 - 2017 have shown good quality in most observed locations and made a total of 61 percent and the rest of 35, 3, and 1 percent have been classified to be fair, poor, and very poor quality, respectively. Red tide phenomena have been decreasing in both frequency and occurring duration. They have been found only 3 - 4 times per year in average and mostly in the eastern Gulf of Thailand. Lastly, numbers of oil leak have been decreased and none of oil leak has been found in the year 2018.

2.2.3 Other Related Situations

However, some negative changes of the marine environment have been also found. It has been worth to note for increasing in spread out of poisonous jelly fish, including their injuries and deaths. As well, invasion of the alien species, climate changes, and natural disasters have their tendency to increase.

In conclusion, the condition of marine and coastal environment is presently better. This has been owing to policies of the Department of Marine and Coastal Resources which have emphasized on

solving of the marine and coastal environment problems, especially in the major tourist zones where all activities and their influences concerned the marine and coastal resources and their eco-systems. With reference to Section 17 for Section 3 and Section 27 of the Act on the Promotion of Marine and Coastal Resources Management, B.E.2558, the Department of Marine and Coastal Resources has issued the measures to protect marine and coastal resources of Ko Tao and Ko Pha-ngan of Pha-ngan District and Ko Samui of Samui District of Surat Thani Province since August 17th, 2018. The measures have been effective from the date of December 1st, 2018 for suspending all actions or activities which might create serious damage to the marine and coastal resources. This is aimed to reserve, to solve, or to minimize such damage.

2.3 Coastal Erosion

Thailand has a total coastline of 3,151.13 kilometers long. Records of the years 2018 have reported a total coastal erosion of 704.44 kilometers long of which included the mitigated areas of totally 558.71 kilometers long. The rest of 145.73 kilometers have been grouped to be the severe erosion 42.17, moderate erosion 7.64, and less erosion 95.62 kilometers long.

Several government sectors, private sectors, and local communities have tried to overcome this coastal erosion. However, it has not yet been successed as expected. This has been considered to be due to several involving factors of which causing inequilibrium of sediment transportation and deposition along the coast. For sustainable solving of this problem, a proper-integrated measure has to be set and implemented covering all relevant factors as physical and biological features of the coast and proper technology. This measure has to serve 4 major purposes; to set equilibrium of the coast, to protect the coastal erosion, to overcome the coastal erosion, and to rehabilitate the coastal equilibrium. In conclusion, 3 measures have been initiated, as follow:

- the white measure : to set the retreating zone
- the green measure : to replant the mangrove and beach forests, to rehabilitate the beach, and to fix the sediment traps for replanting the mangrove forest.
- the grey measure : to construct breakwater, groin, jetty, and seawall.

3 Provincial Situations

Situations of marine and coastal resources and coastal erosion of all 24 coastal provinces have been found to be in line with those of the country ones. However, this has been depended upon individual resource-base and utilization activities of each province. The major problems which every province has prioritized together are degradation of marine ecology and coastal erosion. Marine debris has resulted in regional-negative impacts from local community levels to regionally degraded marine and coastal resources. Likewise, coastal erosion has caused large-scale environmental and socio-economic problems along the eastern Gulf of Thailand : Chonburi province, for an instance and along the lower Gulf of Thailand as: Nakhon Si Tammara and Songkhla provinces. The following table has concluded such situations and their recommendations.

Province	Prioritized Problems	Suggestions
Trat	4. Threats to the rare and endangered marine species 5. Mangrove forest encroachment 6. Marine environment	3. Define the mutual-benefit utilization of marine resources between the stakeholders 4. Define the proper measures for controlling marine debris
Chanthaburi	4. Threats to the rare and endangered marine species 5. Marine environment 6. Mangrove forest encroachment	3. Define protection areas for the rare and endangered species around the Chantaburi river-mouth zone 4. Define the proper measures for controlling marine debris
Rayong	4. Marine environment 5. Mangrove forest encroachment 6. Degradation of coral reef	3. Define the measures for waste-water solution 4. Define the measures for the diving tourists
Chonburi	5. Degradation of coastal and marine natural resources 6. Marine environment 7. Coastal erosion 8. Mangrove forest encroachment	4. Define the measures for the diving tourists 5. Define the measures for waste-water solution 6. Define the proper measures for controlling marine debris
Chachoengsao	4. Decreasing of mangrove forest and Coastal erosion 5. Marine environment 6. Threats to the rare and endangered marine species	4. Study for reducing wave intensity and its consequentially coastal erosion effects 5. Define protection areas for the rare and endangered species around the Bangphakong river-mouth zone 6. Define the proper measures for controlling marine debris

Province	Prioritized Problems	Suggestions
Samut Prakan	4. Decreasing of mangrove forest and Coastal erosion 5. Marine environment 6. Threats to the rare and endangered marine species	4. Study for reducing wave intensity and its consequentially coastal erosion effects 5. Define protection areas for the rare and endangered species 6. Define the proper measures for controlling marine debris
Bangkok	3. Marine environment 4. Threats to the rare and endangered marine species	3. Define the proper measures for controlling marine debris 4. Define the measures for waste-water solution
Samut Sakhom	4. Marine environment 5. Decreasing of mangrove forest and Coastal erosion 6. Threats to the rare and endangered marine species	4. Define the measures for waste-water solution 5. Promotion on community public relations and awareness 6. Study for reducing wave intensity and its consequentially coastal erosion effects
Samut Songkhram	4. Marine environment 5. Decreasing of mangrove forest and Coastal erosion 6. Threats to the rare and endangered marine species	4. Define the measures for waste-water solution 5. Promotion on community public relations and awareness 6. Study for reducing wave intensity and its consequentially coastal erosion effects
Phetchaburi	5. Coastal erosion 6. Mangrove forest encroachment 7. Marine environment 8. Threats to the rare and endangered marine species	4. Study for reducing wave intensity and its consequentially coastal erosion effects 5. Define the measures for waste-water solution 6. Define the measures for the tourists of the rare and endangered marine species
Prachuap Khiri Khan	5. Degradation of coral reef 6. Decreasing of mangrove forest 7. Marine environment 8. Spreading of poisonous jellyfish	4. Define the measures for the diving tourists 5. Define the mutual-benefit utilization of marine resources between the stakeholders 6. Define the patrolling measures for the poisonous jellyfish
Chumphon	4. Degradation of coral reef 5. Decreasing of mangrove forest 6. Marine environment	3. Define the measures for the diving tourists 4. Define the mutual-benefit utilization of marine resources between the stakeholders

Province	Prioritized Problems	Suggestions
Surat Thani	5. Decreasing of mangrove forest 6. Degradation of coral reef 7. Marine environment 8. Spreading of poisonous jellyfish	5. Define the integrated marine and coastal management plans 6. Define the measures for the diving tourists 7. Define the mutual-benefit utilization of marine resources between the stakeholders 8. Define the patrolling measures for the poisonous jellyfish
Nakhon Si Thammarat	4. Coastal erosion 5. Decreasing of mangrove forest 6. Degradation of coral reef	4. Study for reducing wave intensity and its consequentially coastal erosion effects 5. Define the integrated marine and coastal management plans 6. Define the measures for the diving tourists and the tourists of the rare and endangered marine species
Phattalung	4. Degradation of coastal and marine natural resources in Songkhla Lake 5. Decreasing of mangrove forest	3. Define the conservation measures for the Irrawaddy Dolphins in the Songkhla Lake 4. Define the conservation and rehabilitation measures for marine and coastal resources in the Songkhla Lake and its adjacent areas
Songkhla	3. Coastal erosion 4. Decreasing of mangrove forest 6. Threats to the rare and endangered marine species	3. Study for reducing wave intensity and its consequentially coastal erosion effects 4. Define the conservation and rehabilitation measures for marine and coastal resources in the Songkhla Lake and its adjacent areas
Pattani	3. Coastal erosion 7. Decreasing of coastal area	3. Study for reducing wave intensity and its consequentially coastal erosion effects 4. Encouraging the continuous reclaimation policy on coastal areas
Narathiwat	2. Coastal erosion	3. Study for reducing wave intensity and its consequentially coastal erosion effects 4. Define the conservation and rehabilitation measures for marine and coastal resources
Ranong	3. Degradation of coral reef 4. Mangrove forest encroachment	3. Define the measures for the diving tourists 4. Encouraging the continuous reclaimation policy on mangrove forest areas

Province	Prioritized Problems	Suggestions
Phang-nga	4. Degradation of coral reef in Khai Nok Island 5. Mangrove forest encroachment 6. Coastal erosion	3. Define the measures for the diving tourists 4. Define the conservation and rehabilitation measures for marine and coastal resources
Phuket	5. Degradation of coral reef 6. Mangrove forest encroachment 7. Marine environment 8. Threats to the rare and endangered marine species	3. Define the measures for the diving tourists 4. Define the mutual-benefit utilization of marine resources between the stakeholders
Krabi	4. Mangrove forest encroachment 5. Degradation of coral reef 6. Marine environment	3. Define the measures for the diving tourists 4. Define the mutual-benefit utilization of marine resources between the stakeholders
Trang	4. Threats to the rare and endangered marine species 5. Mangrove forest encroachment 6. Marine environment	3. Define the patrolling measures for the rare and endangered marine species and safety zone of the dugongs 4. Define the mutual-benefit utilization of marine resources between the stakeholders
Satun	5. Degradation of coral reef 6. Mangrove forest encroachment 7. Threats to the rare and endangered marine species 8. Marine environment	4. Define the measures for the diving tourists 5. Encouraging the continuous reclamation policy on mangrove forest areas 6. Define the mutual-benefit utilization of marine resources between the stakeholders

4 Expectation on Future Situations

4.1 Short-term Period

For a short-term period of 1-2 years, situations of the mangrove and beach forests, seagrass, and coastal erosion have been expected to be better. This has been owing to increasing in integrated management measures of the government sectors. Several sectors have turned to strongly support people, community, and local participation and collaboration. Especially, the measure that has been emphasizing on the management for thorough and equal sharing of the natural resources.

On the other hand, situations of coral reef, rare-endangered species, and marine and coastal environment have been considered to be worse and degraded. They still have not yet been solved within this short period due to deficiency in realization and understanding of the problems of all concerning sectors including other uncontrollable-natural factors.

4.2 Long-term Period

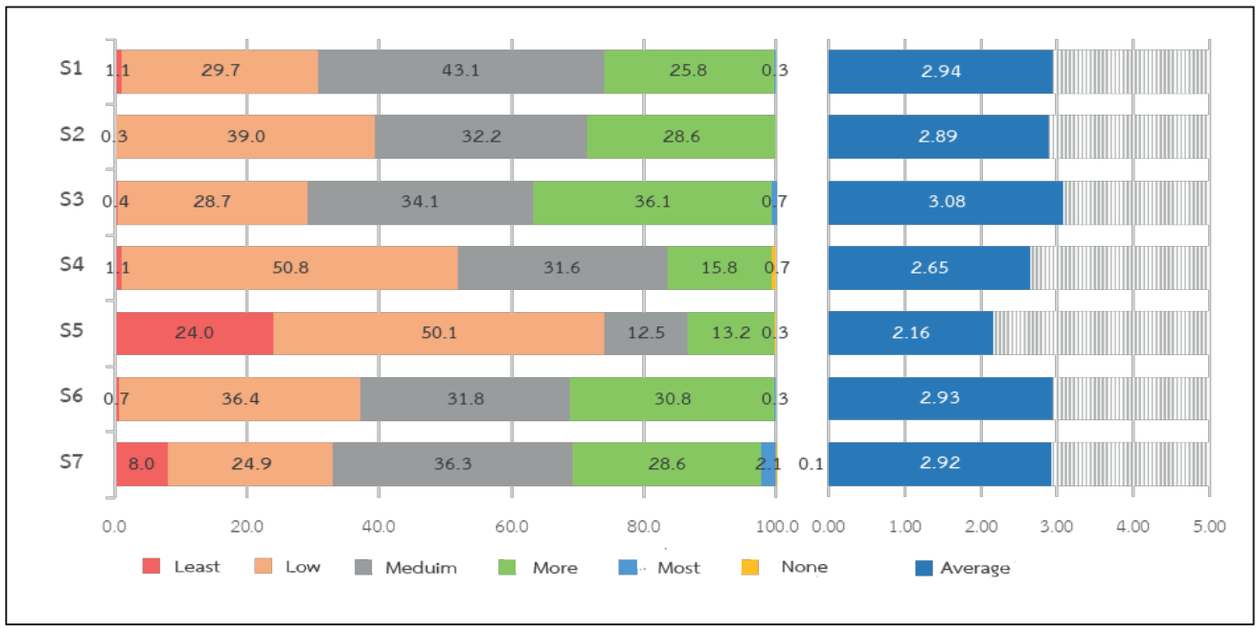
For a long-term period of more than 3 years, the better situations of all marine and coastal resources can be achieved by improving their management measures to be more efficiency and fair, such as: improving laws and their reinforcement for a better compromising with all relevant pressures, creating awareness of the people, and upgrading the Local Administration Organization for being capable to be the major area-base managing mechanism.

4.3 Problems Prioritization

With reference to the collection and analyzation of the marine and coastal resources and coastal erosion situations from the 720 questionnaires given out in 24 coastal provinces each of 30 ones and the areas observation and discussion at all 10 Marine and Coastal Resources Offices, the problems have been prioritized following levels of violence, the urgent and necessity in solving, their influences to the national economy, society, and environment. As a result, the marine and coastal resources of deteriorating tendency and the relevant agencies in solving are followings :

4.3.1 Coral Reef Degradation

The continuous degradation and damaging of coral reef have been considered for urgent solving proceedures because they might cause direct impacts to the whole marine ecosystems and resources, including damaging of marine resources and biodiversity, decreasing of the major economic marine animals, marine and coastal resources base. Consequently, this would bring in the over exploitation of nature resources and contradiction on competition and accessibility for natural resources.



Remarks : S1 Mangrove situation S2 Seagrass Situation S3 Coral reef Situation S4 Rare and Endangered Marine Species Situation
S5 Artificial Reef Situation S6 Marine Environment Situation S7 Coastal Erosion Situation
**** Mangrove, Marine Environment, and Coastal Erosion Situation have a very close average. Considered an urgent situation at the same level.*

In order for sustainable overcoming of such problems, the integrated measures have been suggested including situations following-up and managing, laws enforcement, supporting all relevant research studies, and creating campaign on conserving and rehabilitating of coral reef.

The critical coral reef zones to be considered are those in Surat Thani, Phang-nga, and Trat provinces.

4.3.2 Mangrove Forest

Decreasing of the mangrove forest area causes direct effects to the marine and coastal ecosystem and natural resources. Their consequences will be decresing in ecosystem diversity, changing in environmental structures of both marine plants and animals, such as: decreasing in the hatchery-based marine larviculture area, their habitats, food sources and, eventually, amount of marine animals. Degraded mangrove forest is also a major factor of coastal erosion. Hence, decreasing of the mangrove forest will bring in serious-negative impacts to the coastal communities, fishery and tourism industries, and socio-economy of the country, as a whole.

Again, integrated management measures under close collaboration of the relevant government sectors, communities, and local people are recommended to be carried out together with protecting and patrolling measures, especially, laws reinforcement, and area-base conservative measures.

The critical zones of mangrove forests degradation are those in Tart, Chanthaburi, Rayong, Phetchaburi, Chumphon, Surat Thani, Nakhon Si Thammarat, Ranong, Phuket, Phang-nga, Krabi, Trang and Satun provinces.

4.3.3 Management of Coastal Water Quality and Marine Debris

Degradation of the coastal water quality has been reported to be due to discharge of waste and untreated waste-water from communities, factories, industrial sources, and tourist areas. Besides, marine debris plays also important roles to the coastal water quality and marine environment. Inefficient management of such problems shall result in degradation of the marine environment of which, consequently, will give negative effects to the marine and costal ecosystem and their natural resources, human and other livings health, tourism, and socia-economy of the country.

Increasing in the nation population with higher GDP and numbers of tourists are the major factors for the increasing amounts of waste-water, garbage, and toxic waste. Meanwhile, proper waste-water and garbage treatment plants are still inadequate. Therefore, huge amounts of such untreated waste-water and garbage have been abandoned in the open environment. Eventually, they have been leached and transported into the seas via rivers and canals.

In order to cope with such particular problems, the integrated management measures have to be introduced, such as: minimizing amounts of waste by changing community's behaviors on littering and garbage classification, emphasizing on setting the proper treatment plants for both waste-water and garbage, and, lastly, health protection measures for human and other livings.

The most critical areas to be considered are Chonburi, Rayong, Samut Prakarn, Samut Sakorn, Samut Songkram, Phetchaburi, Prachuab Khririkhan, Surat Thani, and Phuket provinces.

4.3.4 Coastal Erosion and Coastal Zone Management

Coastal erosion has been considered for urgent solving proceeduress. Especially, it has been occurred in the Gulf of Thailand more than in the Andaman Sea. The major causes of coastal erosion are construction of solid structures into the sea and beach, destruction of natural coastal protection, consequences of coastal protection structures including any inapproprited ones, and natural phenomena.

Since coastal development has been incharged by several concerned sectors, therefore, the integrated measures and collaboration of those sectors have been suggested to overcome this coastal erosion problem.

The critical areas to be considered for the urgent curing measures are the coasts of Phetchaburi, Nakorn Sri Thammarat, Songkhla, and Pattani provinces.

5 Policy Recommendations

Compilation of the marine and coastal situations and their future expectations have led to their policy recommendations. The operation plans shall be divided to be the urgent plan (1-2 years) and the long-term plan (3 years and over), as follows.

The urgent plan (1-2 years)

1) **Situation management and follow-up:** Preparation of the data-base of all natural resources in order to use for their management and follow-up purposes, including to define any proper measures and work plans to be the collaboratively integrated operation plans. This has been aimed to drive the marine and coastal resources conservation and rehabilitation tasks to their concrete goals and with continuous success in all levels.

2) **Participation and awareness:** Continuous promotion on understanding, awareness, and realization on importance of marine and coastal resources to the people, community's networks, and private sectors. The aims are to achieve in all awareness in the importance of taking care and conservation of marine and coastal resources for their sustainable utilization and better living quality of the relevant communities.

3) **Laws and regulations:** Improving and reinforce all laws and regulations concerning marine-coastal resources, their environment, and coastal erosion for absolute implementation in order for their equilibrium and sustainable management, utilization, maintenance, rehabilitation, and conservation.

The long-term plan (3 years and over)

4) **Conservation and rehabilitation:** To be carried out in parallel with the situation management and follow-up (item 1) by promoting and supporting the use of socio-economic mechanisms for creating motivation in conservation and rehabilitation of the marine and coastal resources and environment.

5) **Research and innovation:** Support and promote the development of khowledges and innovation to address the management, follow-up, conservation, and rehabilitation of the marine and coastal resources and coastal erosion for their equilibrium and sustainable utilization.

In addition, the Department of Marine and Coastal Resources Should expedite the project in the urgent plan, as following.

1) Project to increase the efficiency of conservation, restoration and protection of marine, coastal and mangrove forest resources and fishery resource management, such as integrated mangrove forest protection, restoring mangrove forest areas and prevention and suppression of the action plan to solve the problem of illegal fishing, etc.

2) The project to improve the land map and forest database in the mangrove forest conservation area, such as making maps and markers showing the line of mangrove forest conservation areas, defining and preparing information (draft), announcement of marine and coastal resource protection areas, etc.

3) Sea and coastal waste management project, such as defining plans and measures for controlling waste collection caused by systematic, campaigning and public relations activities to know the quantity and the waste situation both on land and sea to create mutual awareness, etc.

4) Integrated project to manage, prevent and solve coastal erosion problems.

5) Integrated coral and seagrass resource rehabilitation project in all sectors.

6) Land inspection project for land allocation for communities and permission services in mangrove forest areas.

7) Research project to develop knowledge in marine and coastal resource management.

8) A project to study the increase of production value, resources and the potential to contain pollutants in mangrove forests and the beach forest.

9) Marine and coastal resource management project to support climate change.