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# Policy Review: Opportunities for Enhancing Coastal Community Resilience and Climate Change Adaptation in Indonesia

COASTAL RESOURCES CENTER

**October 2012**

# Policy Review:
# Opportunities for Enhancing Coastal Community Resilience and Climate Change Adaptation in Indonesia

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Contents

# Executive Summary

As a nation with many thousands of small islands, fragile coral reef marine ecosystems, and the largest coastal area in the world, Indonesia is extremely vulnerable to climate change. This report provides a review of opportunities to mainstream climate change considerations into the existing coastal zone governance structures, legislation, polices, plans and strategies. There is already an abundance of legislation, planning, and policy pathways for climate change mainstreaming. These include legislation at national, provincial and district/city planning agency levels for the management of coastal areas and small islands, disaster mitigation and building the capacity of coastal communities to reinforce their resilience against natural disasters.

A *National Action Plan for Climate Change Mitigation and Adaptation* was developed in 2007. Consequently, the National Development Planning Board (BAPPENAS) developed an *Indonesian Climate Change Sectoral Roadmap* that includes detailed guidelines for mainstreaming climate change considerations in key sectors, including the coastal zone. The Ministry of Marine Affairs and Fisheries (KKP) has also developed a climate change adaptation strategy with short-term, mid-term, and long-term (to 2030) actions.

The principal climate change mainstreaming legislative mechanism for introducing adaptation actions in the coastal zone is the Integrated Coastal Management (ICM) Act of 2007 (Law No. 27/2007 on Coastal Zone and Small Island Management). This Act created a hierarchical (national/sub-national) planning process for coastal and marine management. The process, with guidance from BAPPEDA (the Provincial and Regency Planning Agency), involves assembling at both the provincial and district/city level: 1) a strategic plan for the coastal zone and small islands, 2) a zoning plan, 3) a management plan, and 4) an action plan. These plans should be developed to conform with the National Long Term Development Plan and the National Spatial Plan, and they must be agreed to at the Regency, Provincial, and National level. At the national level, the Ministry of Marine Affairs and Fisheries (KKP) should establish a Ministerial Accreditation Team. In order to make the plans legally binding, each plan is adopted through enactment of a local ordinance (PERDA) at the provincial, regency or city level.

Anther avenue for addressing coastal climate change issues is through the Law of the Republic of Indonesia on Disaster Management (No. 24/2007); Article 41 of the ICM Act, which established “Mitra Bahari” (Sea Partnership, resembling the U.S. Sea Grant model) to conduct research, extension and outreach in coastal and marine place-based issues. Further avenues are provided through the Indonesian Association of Coastal Management Experts (HAPPI) and the functional roles of NGO’s in the ICM Act and disaster mitigation efforts.

In the 5 years since the 2007 ICM Act was passed, there have been relatively few plans accredited and given legally binding status. Thirty (30) Strategic Plans and Zoning Plans at the Provincial level have been completed, and 61 at the Regency/city level. Of these, only four at the Provincial level have been granted PERDA status, and nine at the Regency/city level have been

granted PERDA status. Viewed from the national perspective, this means that a very small percentage of the country's provinces and regencies have approved coastal Strategic Plans or Zoning Plans, and a smaller percentage have been formally adopted by PERDA. Despite this overall small number of adopted plans, all but one (East Lombok) site in the IMACS project have Strategic Plans, and 5 of 7 have Disaster Mitigation Policies.

Lengthy hierarchical procedures and accreditation processes, legal approvals, and the need for four interlocking plans that must be developed in sequential order inhibit the efficiency and timeliness of coastal and marine actions and coastal climate change adaptation. As the principal governance mechanism for coastal zone management, this represents a major hurdle for proactive climate change planning and action in the short term.

**Summary of Key Findings**

- There are a number of pathways for how climate change issues and adaptation measures could and should be integrated into the myriad of plans that are mandated in existing law and policies for the coastal, marine, fisheries and disaster management sectors at various levels of government. However, it is unclear how much of this required planning and mainstreaming of climate change issues and adaptation strategies have occurred. This review discovered that very few local governments have completed any of the mandated coastal plans (strategic, zoning, management and action plans), and even fewer have mainstreamed climate change into these mechanisms.
- There does not seem to be a need for more policies or legislation mandating more planning but a harder look needs to be taken at how to get the planning done more efficiently, how to mainstream climate change issues, and then how to help facilitate implementation.
- Initial coastal vulnerability assessments have been heavy on biophysical assessments and light on consideration of social and governance dimensions. It is unclear how they are then being used to mainstream adaptation strategies. There seems to be a gap between the information gathered and applying the information toward molding adaptation strategies.

Based on the findings of the report, a number of follow-up analyses and activities are recommended:

1) There is a need to assess the extent to which the Climate Change Sectoral Roadmap's technical guidelines for mainstreaming climate change into the coastal zone have been effective in yielding coastal and small island Strategic Plans and to assess the adequacy of the technical guidelines in general. The technical guidelines should be updated if necessary.
2) Strategic and Zoning Plans should be reviewed to determine to what extent they are being effectively implemented.
3) A workshop should be convened to review and determine why so few of the four main coastal and small island plans required by the ICM Act in each district and province have been completed and even fewer given binding legal status. This review should further consider the structure of incentives for local governments to conduct planning and move on to implementation. An agenda of problem solving actions should be developed in such a workshop.
4) There is a need to assess the typical adaptation needs in Indonesian coastal zones as a whole, and construct a guide or matrix that identifies the most efficient legislative and planning mechanisms in order to speed the process of coastal adaptation planning and action. Such a guide can be used to help facilitate local government planning in coastal climate change mainstreaming.
5) KKP may wish to consider prioritizing the provision of technical assistance and financial resources for coastal and small island management planning to those provinces and associated districts and cities considered most vulnerable. The ICCSR Marine and Fisheries Sector Report defined vulnerability for this sector based on four main factors - physical/environmental, social, economic and ecological - and mapped many of these parameters. This vulnerability framework could be used to develop a composite vulnerability index that could also be mapped and used as the basis for setting future planning priorities.

The processes involved in planning and implementing programs for climate change adaptation and disaster mitigation are cumbersome and complicated, and the capacity and manpower to develop decent plans are lacking. In addition to building the capacity and increasing manpower, there is also a need to simplify the processes involved in such programming.

# Acronyms

| | |
|---|---|
| BAPPENAS | National Development Planning Board |
| BNPB | National Agency for Disaster Mitigation |
| HAPPI | Indonesian Association of Coastal Management Experts |
| KKP | Ministry of Marine Affairs and Fisheries |
| RAN- MAPI | National Action Plan for Mitigation and Adaptation to Climate Change |
| RAPWP3K | Action Plan for Management of the Coastal Zone and Small Islands |
| RPJM | National Long Term Development Plan |
| RPW3K | Management Plan for the Coastal Zone and Small Islands |
| RSWP3K | Strategic Plan for the Coastal Zone and Small Islands |
| RZWP3K | Zoning Plan for Coastal Zone and Small Islands |

# 1. Introduction

Climate change is predicted to affect the lives of people in the coastal zone and on small islands around the world. Sea level rise is causing inundation, increased flooding intensity, coastal erosion, seawater intrusion and modification of ecological processes in the coastal zone. Impacts on the physical-biological aspects of coastal ecosystems threaten not only the natural and man-made coastal infrastructure but also the livelihoods and socio-economic activities of the coastal societies.

Critical coastal and marine resources, such as mangroves, sea grass beds, coral reefs, estuaries and small islands are threatened by climate change yet serve invaluable ecological and economic functions in coastal communities. For instance, increasing sea surface temperature (SST) and mortality of reefs from coral bleaching threaten fish resources living in reef ecosystems. Coastal and small island communities of Indonesia are dependent on marine resources for food security and livelihoods.

Indonesia is certainly vulnerable to the impacts of climate change. This report provides a review of opportunities to mainstream climate change considerations and adaptation actions into existing governance structures, legislation, polices, plans and strategies.

There is already an abundance of legislation, planning, and policy pathways for climate change mainstreaming and adaptation. These include legislation at the national, provincial and regency/city planning agency level for the management of coastal areas and small islands, disaster mitigation and building the capacity of coastal communities to be more resilience in facing natural disasters. [1]

[1] Legislation reviewed in this report includes: Law No. 17/2007 on Long Term Development Plan; Law No. 24/2007 on Disaster Management; Law No. 27/2007 on Management of Coastal Zone and Small Islands; Government Regulation (PP) No. 21/2008 on Disaster Mitigation Practices; PP No. 64/2010 on Disaster Mitigation in Coastal Zone and Small Islands; and, Presidential Decree No. 46/2008 on National Council for Climate Change.

# 2. Legislation for Coastal Zone and Small Islands Management

## 2.1. Indonesian Law on the Management of Coastal Zone and Small Islands

### 2.1.1. Coastal and Small Islands Planning Required by Coastal Provinces and Regencies

The Law No 27/2007 regarding coastal zone and small islands management is a major piece of national legislation for regulating development activities in the coastal zone, and therefore has the potential to be a key entry point for mainstreaming climate change adaptation in the coastal zone.

The legislation created a sequential and linked four-tier hierarchical structure: (1) a Strategic Plan for the Coastal Zone and Small Islands (RSWP3K), (2) a Zoning Plan for Coastal Zone and Small Islands (RZWP3K), (3) a Management Plan for the Coastal Zone and Small Islands (RPWP3K), and (4) an Action Plan for Management of the Coastal Zone and Small Islands (RAPWP3K). Both the provincial and regency level governments should complete all four plans. The Ministry of Marine Affairs and Fisheries developed Technical Guidelines for the first two planning processes: the Strategic Plan and the Zoning Plan. All four of the planning documents should be mutually supportive and should be organized in accordance with the national Long Term Development Plan (RPJM). The specific objectives and scope of planning for each is summarized below (Table 1).

Table 1. List of planning documents for coastal area and small islands management

| No. | Plan | Scope of planning | Duration of planning |
|---|---|---|---|
| 1. | RSWP3K | RSWP3K features cross-sectoral development planning for a particular region, by means of establishing development objectives, aims, and strategies, as well as determining links to national development plans. | 20 year plan that and can be reviewed every 5 years |
| 2. | RZWP3K | RZWP3K defines guiding principles and spatial boundaries for the utilization of resources within a particular region. The document declares which development activities are allowed, permitted with license, and prohibited in the region. | 20 year plan that can be reviewed every 5 years |
| 3. | RPWP3K | RPWP3K provides a policy agenda, technical procedures, and responsibilities for decision-making and coordination among government institutions for resource use and/or development activities in a specific zone of a region. | 5 year plan that can be reviewed annually |
| 4. | RAPWP3K | RAPWP3K defines management objectives, goals, budgets, and schedules for one or more years. The document serves as a guideline for government institutions and stakeholders to carry out their programs related to coastal and small island resource management. | 1 to 3 year plan |

While every level (province/regency/city) should have all of the four planning documents, given funding limitations local governments may develop any of the four documents that best fit their priorities. At present, local governments and the Ministry of Marine Affairs and Fisheries have been focusing on the first two plans, the Strategic Plan and the Zoning Plan. In order to make the planning documents legally binding, each plan should be acknowledged and issued as a Regional Regulation (PERDA).

As of September 2012, less than 10 percent of all provinces and regencies have strategic and zoning plans adopted by PERDA. However, almost half of all provinces have drafted strategic and zoning plans awaiting adoption, but much fewer regencies have prepared these documents. (see Table 2). Two provinces with Regional Regulations (PERDA) for Zoning Plans include the Province of Yogyakarta and East Java, and the regencies/cities of Pekalongan in Central Java, Gresik (East Java), Makassar (South Sulawesi), and Ternate (North Maluku). By the end of 2012 the regency of Sumbawa in West Nusa Tenggara and the regency of Buleleng in Bali will issue their PERDA on RZWP3K.

Notably, most of the areas that are most vulnerable to climate change as described in the 2009 Indonesia Climate Change Sectoral Roadmap (ICCSR), including the North coast of Java, East coast of Sumatra, South Kalimantan and Papua, do not have the required coastal area and small islands management plans and associated PERDA.

Table 2. Current status of coastal zone and small islands management plans

| Government Level | Regional Law (PERDA) Enacted | | | | Regional Law (PERDA) **NOT** Enacted | | | |
|---|---|---|---|---|---|---|---|---|
| | RSWP3K | | RZWP3K | | RSWP3K | | RZWP3K | |
| | No | % of total | No | % of total | No | % of total | No | % of total |
| Province | 2 | 6% | 2 | 6 % | 14 | 42 % | 16 | 49 % |
| Regency/City | 4 | 1.2 % | 5 | 1.5 % | 8 | 2.5 % | 53 | 16.4% |

### 2.1.2. Local Plan Accreditation

Terms and conditions related to accreditation of Plans are regulated under Article 27 Law No. 40/2007. Accreditation is directed by coastal communities, provincial and/or regency/city governments, or legal bodies. Accredited Plans are eligible for incentives. Incentives are in the form of support programs and/or technical assistance. Technical assistance includes providing human resources, equipment, capacity building, communications, and community advocacy. Ministerial Decree (PERMEN) by the Minister of Marine Affairs and Fisheries No. 8/Men/2008 provides more details regarding the accreditation process (see Table 3).

Table 3. Accreditation program as stated in the Ministerial Decree of Marine Affairs and Fisheries No. 8/Men/2008K

| Level | Organizing body | Scope of program | Accreditation mechanism | Monitoring |
|---|---|---|---|---|
| National | The Ministry of Marine Affairs and Fisheries. Ministry will establish the Ministerial Accreditation Team | Coastal habitat rehabilitation, conservation, reclamation, disaster mitigation, and economic development. | • The Coastal community, provincial government, district/city government, or other legal institution/agency submits a proposal for program accreditation to the Minister through the Ministerial Accreditation Team.<br>• The Accreditation Team will evaluate the proposal and grant approval. | Monitoring will be conducted by the Directorate-General appointed by the Minister. |
| Provincial | The Governor will establish the Provincial Accreditation Team. | Coastal habitat rehabilitation, conservation, reclamation, disaster mitigation, and economic development. | • The Coastal community, district/city government, or other legal institution/agency submits a proposal for program accreditation to the Governor through the Provincial Accreditation Team.<br>• The Accreditation Team will evaluate the proposal and grant approval. | Monitoring will be conducted by the Provincial Bureau appointed by the Governor. |
| Regency/City | The Regent/Mayor will establish the Regency/City Accreditation Team. | Coastal habitat rehabilitation, conservation, reclamation, disaster mitigation, and economic development. | • The Coastal community or other legal institution/agency submits a proposal for program accreditation to the Regent/Mayor through the Regency/City Accreditation Team.<br>• The Accreditation Team will evaluate the proposal and grant approval. | Monitoring will be conducted by the Regency/City Bureau appointed by the Regent/Mayor |

### 2.1.3. Coastal Buffer Zone

Coastal buffer zones are regulated by Article 31 of the ICM Act No. 27/2007. Article 31establishes a buffer zone 100m inland from the high tide line on the beach. Establishment of a coastline or beach border must consider (a) protection against the potential earthquakes and/or tsunamis, (b) protection against coastal erosion, (c) protection of infrastructure against storms, floods, and other natural disasters, (d) protection of critical coastal ecosystems, such as wetlands, mangroves, coral reefs, seagrass beds, sand dunes, estuaries, and deltas; (e) public access arrangements, and (f) arrangements for drainage and sewage pipes. The coastline or beach buffer zones provide a major opportunity for incorporating adaptation measures into the CZM planning process, including adaptation measures such as required development setbacks, no-build zones, and certain limitations on construction - in the buffer zone.

### 2.1.4. Sea Partnership (*Mitra Bahari)* Program

*Mitra Bahari* is a network of Coastal Zone and Small Islands management stakeholders with particular interest in building the capacity of human resources and institutions, dissemination of educational programs, counseling, mentoring, training, research, and development of policy recommendations. Technical implementation of this program is governed by a Decree issued by the Minister of Marine Affairs and Fisheries (PERMEN) No. 14/Men/2009 re. *Mitra Bahari* features a forum of coordination between the central government, local governments, universities, non-governmental organizations, professional organizations, community leaders, and the business community. At the national level, the *Mitra Bahari* Program is directed by the Minister of Marine Affairs and Fisheries, at Provincial level by the Governor, and at the Regency/city level by the Head of the Regency or Mayor.

As a national program, with a focus on the coastal zone, *Mitra Bahari* is another entry point for coastal climate change adaptation education, planning, research, and communication.

# 3. National and Local Climate Change Plans, Policies and Strategies

## 3.1 National Action Plan for Climate Change Mitigation (2007)

The National Action Plan for Climate Change Mitigation and Adaptation (RAN MAPI) provides guidelines for agencies and institutions to carry out coordinated efforts in climate change mitigation and adaptation. The National Action Plan has implementation timeframe that involves four phases. The first from 2007-2009 (Immediate), the second from 2009-2012 (Short-term), the third from 2012-2025 (Medium-term) and the fourth from 2025 to 2050 (Long-term).

## 3.2 Indonesia Climate Change Sectoral Roadmap

Through the Ministry of National Development Planning (BAPPENAS), The Indonesian Government has developed a national document entitled Indonesia Climate Change Sectoral Roadmap (ICCSR). The ICCSR provides recommendations in relation to climate change to the National Medium Term (up to 2014) and Long Term Development Plans (until 2030). It addresses how to cope with climate change challenges in the sectors of forestry, energy, industry, agriculture, transportation, coastal zones, water resources, waste, and health. It identifies opportunities and challenges within each sector for coordinated planning between ministries and agencies.

Various coastal and marine issues are incorporated into the Roadmap. The following figure (Figure 1) presents the climate change adaptation and mitigation roadmap plan for the coastal zone and small islands. Building on the roadmap, the Ministry of Marine Affairs and Fisheries has developed a four-pronged climate change adaptation strategy:

- *Strategy-1:* Collecting and collation of data, developing an information system, and research in relation to climate change.
- *Strategy-2:* Integrating climate change adaptation and mitigation issues into planning and management of coastal zone and small island natural resources and ecosystems.
- *Strategy-3:* Developing and/or adjusting marine and fisheries regulations with regard to climate related changes in coastal zone and small islands
- *Strategy-4:* Implementing climate change adaptation and mitigation in coastal and marine areas.

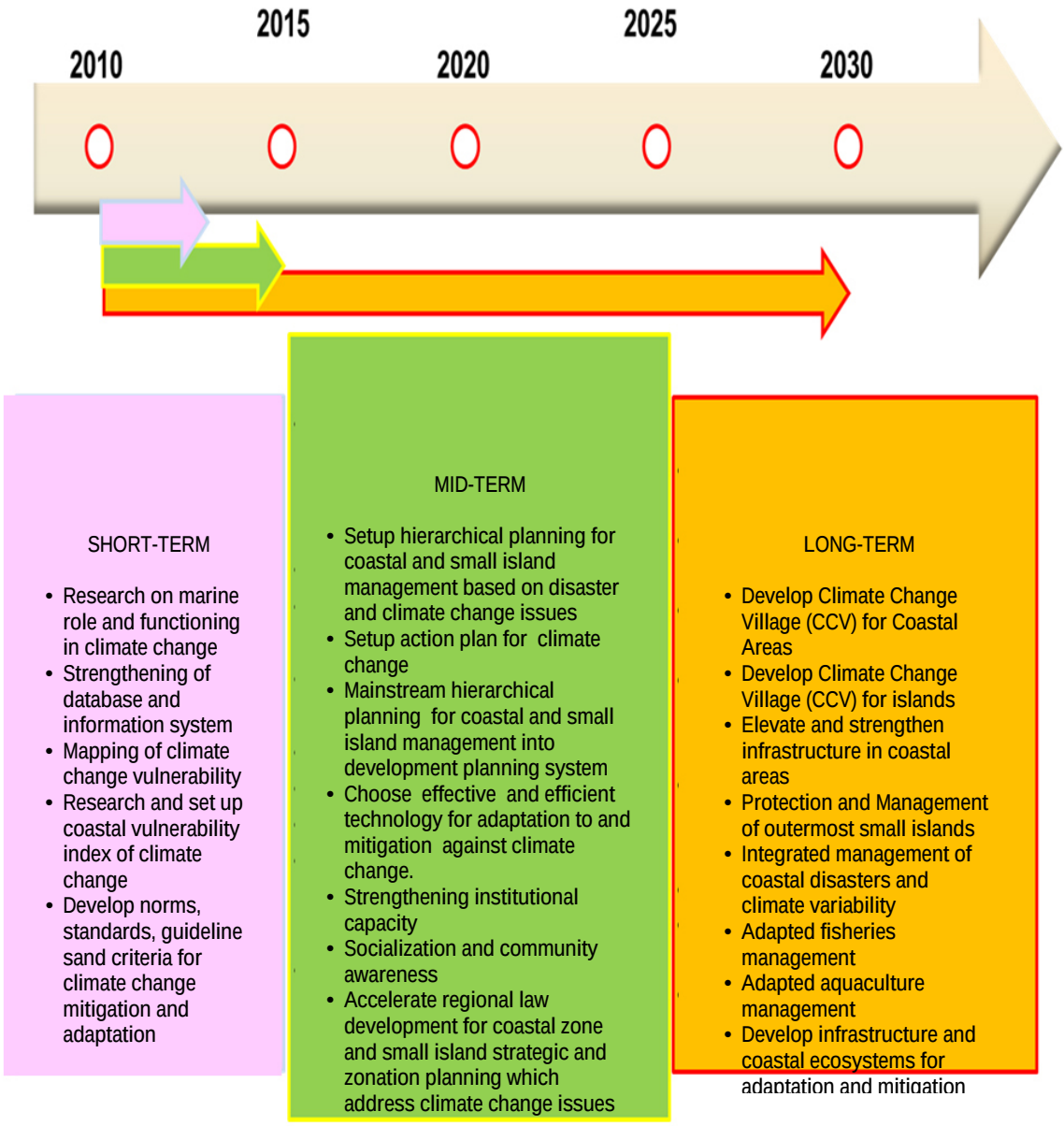


Figure 1. Planning Summary for Climate Change Adaptation and Mitigation

Schematic positioning of the Roadmap in the development planning system at both national and regional levels is shown in Figure 2. Implementation of the Roadmap realized in the national and local spatial plans (Rencana Tata Ruang Nasional and Rencana Tata Ruang Daerah), Regional Strategic Maritime and Fisheries Plan (RSWKP), Regional Maritime Affairs and Fisheries Zoning Plan (RZWKP), and the Regional Marine and Fisheries Management Plan (RPWKP).

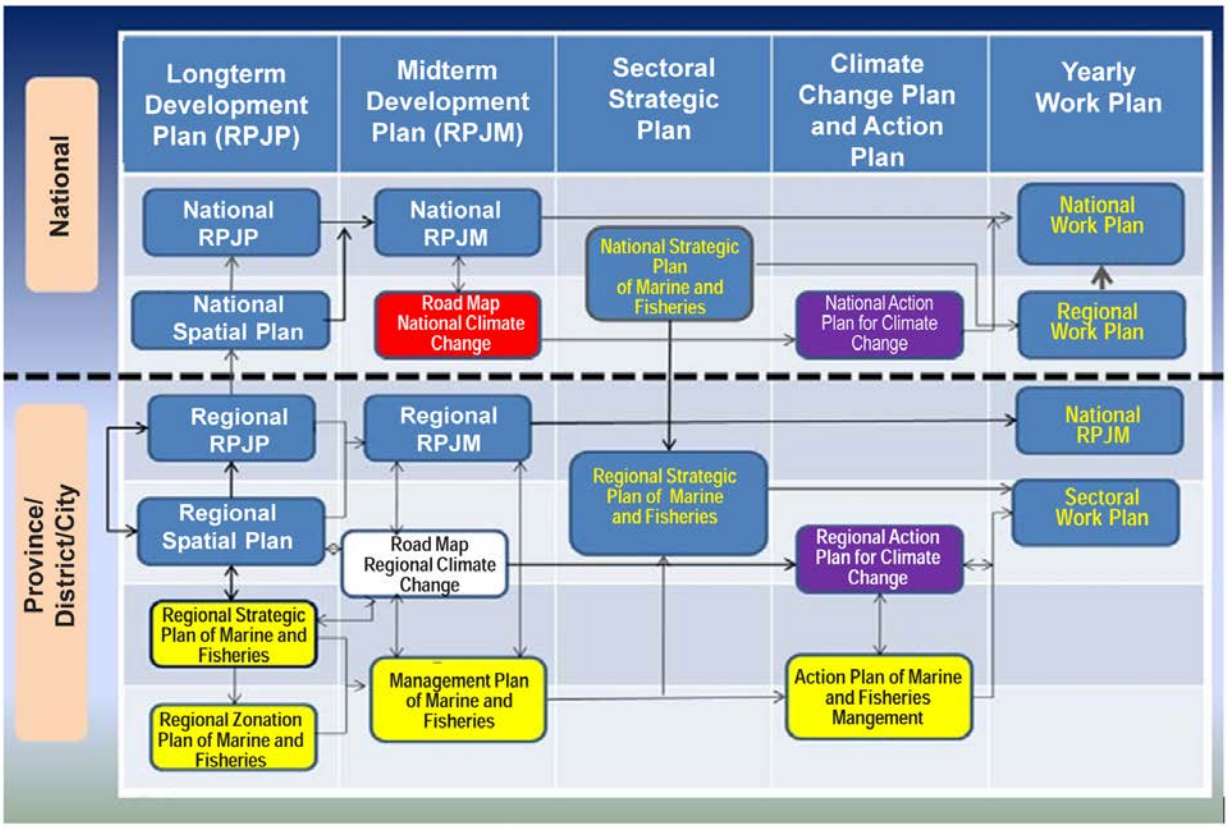


Figure 2: Schematic arrangement of Climate Change Roadmap (RPI) in the development planning system of marine and fisheries sector at the national and local levels (BAPPENAS, 2010)

## 3.3 Climate Change Adaptation Planning in West Nusa Tenggara and Southeast Sulawesi

### 3.3.1. Coastal and Small Island Management Plans

West Nusa Tenggara Province has enacted Regional Law No. 2/2008 for Coastal Zone and Small Islands Management, and completed a Strategic Plan and Zoning Plan for coastal zone and small islands management.

Prior to the Coastal Management Law No. 27/2007, Southeast Sulawesi developed a Strategic Plan for the Coastal and Small Island management 2004-2013. The goals of the Plan were:

- to disseminate the Regional Development Policy Plan for marine and fishery affairs within the Southeast Sulawesi province.

- to provide justification for the development of a Management Plan (Action Plan) and Zonation Plan for Coastal Zone and Small Islands in the Southeast province which would guide all stakeholders in their activities. .

### 3.3.2. Vulnerability Assessment and Adaptation Plan

In 2009, the State Ministry for the Environment in collaboration with GTZ and WWF conducted a Climate Change Risk and Adaptation Study on Lombok Island, West Nusa Tenggara. This project aimed at (1) developing a conceptual model or logical framework, including details on technical assessment and data selection, also methods for assessing vulnerability and hazards in coastal zone in relation to climate change; (2) identifying climate change related risks in the coastal and marine sectors and susceptible factors related with identified risks; (3) determining the level of vulnerability and risks in coastal and marine sectors in Lombok Island due to climate change at the Sub-regency level; (4) determining the level of vulnerability and risk in relation to sea level rise, ENSO, and tidal storms in every Sub-regency in Lombok; and (5) identify compulsory adaptation strategies in order to minimize vulnerability and risk level due to climate change.

Lombok's vulnerability assessment considered population density, the level of welfare of the population, the rate and type of land use, elevation, slope and infrastructure. The vulnerability analysis was conducted by two scenarios; the first scenario, without considering the welfare of the population and the second scenario taking into account the population welfare. The results of the vulnerability analysis on Lombok Island are presented in tables 4 and 5.

Table 4. Distributional extent of coastal vulnerability level on Lombok Island ignoring community welfare variable

| No | Vulnerability Level | Area (ha) |
|---|---|---|
| 1 | Low vulnerability | 67,002 |
| 2 | Moderately vulnerable | 68,512 |
| 3 | Vulnerable | 85,752 |
| 4 | High vulnerable | 37,476 |

Table 5. Distributional extent of coastal vulnerability on Lombok Island taking into account community welfare

| No | Vulnerability Level | Area (ha) |
|---|---|---|
| 1 | Low vulnerability | 204,017 |
| 2 | Moderately vulnerable | 96,366 |
| 3 | Vulnerable | 107,699 |
| 4 | High vulnerability | 38,715 |
| 5. | Very high vulnerable | 9,418 |

# 4. Disaster Management

## 4.1 National Level Regulations

At the national level, there are several regulations that serve as legal umbrellas in developing mitigation plans against natural disasters. Those regulations range from legally binding laws to operational ministerial decree or government regulations. They are presented in Table 6.

Table 6. National legislation in relation to disaster mitigation planning

| No. | Regulation type | Connection to disaster mitigation planning | Notes |
|---|---|---|---|
| 1. | Law of the Republic of Indonesia No. 27/2007 | Articles 56 - 59 of the Law outline the mitigation plans for disasters in coastal areas and the involvement of coastal residents. | Operational procedures for mitigation as stated in the Article of the Law will be further elaborated in the Indonesian Government Regulation. |
| 2. | Law of the Republic of Indonesia No. 24/2007 | The Law serves as the basis for disaster risk reduction and outlines the specific functions of local and national government institutions and international organization in in all kinds of disaster mitigation. | The Law outlines the principles and objectives, responsibilities and authority of institutions/agencies involved; the civil rights obligations; the role of private and international organizations; the dissemination of disaster mitigation efforts; the management of disaster funding and aids, as well as the supervisory responsibilities in disaster management. |
| 3. | Indonesian Government Regulation No. 64/2010 on Disaster Mitigation for Coastal Areas and Small Islands (PP No. 64 Tahun 2010) | PP No. 64/2010 serves as further elaboration of Article 59 of Law No 27/2007. | The regulation describes in detail the technical aspects of disaster mitigation in coastal areas and small islands. The regulation covers the types of potential disasters, disaster risk levels, and potential impact areas. It addresses disaster mitigation in coastal area and small islands management planning and mitigation efforts in disasters in coastal area and small islands; It outlines national and regional government responsibilities in monitoring and evaluation, and the financial mechanisms in disaster mitigation programs. |
| 4. | Regulation of Head Agency for | The regulation provides a guideline for developing | The regulation provides guidance for regional governments in disaster identification and |

| No. | Regulation type | Connection to disaster mitigation planning | Notes |
|---|---|---|---|
| | National Disaster Mitigation No. 4/2008. | disaster mitigation plans, and serves as a basis for Provincial and Regency/City disaster management. | vulnerability assessments, analysis of potential disaster impacts, countermeasures, disaster preparedness and response mechanisms, systematic plans for disaster managementand regional action plans |

Implementation of the Regulation is not responsibility of an institution or agency. Instead, each regional and local government (province/regency/city) or sectoral agency should refer to the regulation whenever they initiate a disaster mitigation plan.

The Government of Indonesia issued Presidential Decree No. 8/2008 concerning the National Agency for Disaster Mitigation (BNPB). BNPB is institutionally placed directly under the office of the President. The duties of BNPB as articulated in Article 2 of the decree are:

a. To provide guidance and technical direction for disaster management efforts that include disaster prevention, emergency response, rehabilitation and reconstruction in a fair and equitable manner
b. To establish standardization and basic requirements for the implementation of disaster mitigation efforts in compliance with the law and other regulations
c. To deliver information regarding dissemination of disaster mitigation to the community
d. To report disaster mitigation activities to the President on a monthly basis during normal conditions and at all necessary times during disaster emergency conditions
e. To ensure responsible use of donations and aid both from national and international agencies
f. To deliver financial report of the use of funds originating from the State Budget
g. To carry out supplementary obligations in accordance with all relevant laws and regulations
h. To develop guidelines for the establishment of the Regional Agency for Disaster Mitigation

Below, each of the four laws and regulations seen in the Table 6 is described in more detail.

1). Law of the Republic of Indonesia No. 24/2007 on Disaster Management

Law No. 24/2007 aims at providing protection to coastal communities and livelihoods, including disaster protection, within the framework of ensuring the welfare of the people. The purpose of the disaster response is clearly described in Section 4, namely: (a) to provide protection against disaster threats; (b) to align disaster response effort with existing legislation; (c) to ensure well-

planned, integrated, coordinated, and comprehensive disaster mitigation efforts; (d) to respect the local culture; (e) to encourage the involvement and cooperation between the public and private sectors; (f) to encourage the spirit of solidarity, and philanthropy, and (g) to support security efforts at all levels of society.

This law also assigns responsibility and gives authority to the regional government for local disaster relief efforts. Local and regional responsibilities are outlined in Article 8, namely (a) to guarantee the residents of disaster-affected communities and refugees their rights in accordance with minimum service standards, (b) to protect the community against disaster impacts; (c) to reduce the risks associated with disasters and include such measures in the existing development programs, and (d) to allocate disaster relief funds from the Regional Budget (APBD) in an adequate manner.

Article 9 stipulates the authority of regional governments over disaster management including (a) the development of disaster management policy in line with regional development policy, (b) the development of planning that includes elements of disaster management policy, (c) to establish cooperative agreements with neighboring provinces, regencies/cities in case of disaster, (d) to regulate the use of technology which poses a potential risk of disaster, (e) to formulate policy to maintain control over natural resource and prevent over-exploitation of resources, and (f) to oversee the collection and distribution of aid and other good at the provincial and regency/city levels.

2). Law of the Republic of Indonesia No. 27/2007 on Coastal Zone and Small Islands Management

Articles 56 to 58 of Law No. 27/2007 stipulates that the national and regional governments should incorporate and implement appropriate disaster mitigation into their coastal and small island management plans. Implementation of disaster mitigation should take into consideration (a) the socio-economy on culture of the community; (b) environmental conservation (c) the benefits and the effectiveness of the plan and (d) the size of the region. Participation in disaster mitigation efforts is mandatory for all and at all levels. 3). Indonesian Government Regulation No. 64/2010 on Disaster Mitigation for Coastal Zone and Small Islands.

Government Regulation No. 64/2010, serves to elaborate the technical implementation of Article 59 Section (4) of Law No. 27/2007. Section 2 describes the scope of this Regulation, which includes of (a) the disaster types, risk levels, and disaster areas, (b) mitigation activities, (c) the incorporation of disaster mitigation into the development planning of coastal zone and small islands; (d) mitigation efforts connected to activities potentially causing damage to coastal zone and small islands; (e) the responsibility of central and local governments, and related communities; (f) monitoring and evaluation of activities; and (g) management of funds.

Meanwhile, Article 3 describes the potential triggers/factors and types of disasters affecting coastal zones and small islands. National and local government responsibilities in integrated plans for disaster preparedness and mitigation in coastal zone and small islands is presented in Article 6. Article 7 provides a basis for incorporating disaster mitigation of coastal zone and small islands into the strategic, zonation, implementation and financial planning.

4). Regulation from the Head Agency for National Disaster Mitigation No. 4/2008 on Guidelines for Developing Disaster Mitigation Plans.

The Regulation issued by the National Agency for Disaster Mitigation provides guidance for the national and regional government authorities responsibilities in disaster mitigation. This regulation includes mitigation planning and also focuses on disaster response.. Disaster mitigation efforts include the establishment of a number of activities ranging from issuance of development policy regarding potential risk for disaster to disaster prevention efforts, emergency response and rehabilitation. The organization of disaster management activities is comprised of three stages, namely:

a. Pre-disaster, including identification of normal pre-disaster situation and identification of the potential for disaster
b. Emergency Response in the event of disaster
c. Post-disaster recovery and rehabilitation.


Figure 3. Implementation Stages of Disaster Management

## 4.2 Disaster Management on a Regional Level

Examples of regional regulations related to disaster management plans in the region are as follows:

A. Province of West Nusa Tenggara (NTB)

The West Nusa Tenggara Provincial Regulation (PERDA) No 3/2010 on the Spatial Plan for West Nusa Tenggara Province 2009 – 2029 presents strategies for natural disaster mitigation, including the following:

- arrangement of areas susceptible to natural disasters
- planning of management actions for areas susceptible to natural disasters
- utilization of vulnerable areas based on the principles of environmental conservation and in line with existing regulations.
- prohibiting aquaculture activities that will damage the environment in areas vulnerable to disaster
- Utilization of environmentally friendly technology to minimize destructive impacts in vulnerable areas
- utilizing early response system technology to warn communities in the event of disaster
- increase understanding and awareness among government, private sectors, and communities concerning the risk of disasterand the anticipated efforts to prevent and respond to natural disasters.

Article 31 mentions several types of vulnerable areas, such as areas susceptible to volcanic eruptions, flooding, tsunamis, hurricanes, tidal waves, droughts, landslides, coastal erosion, and earthquakes.

Provincial Regulation of West Nusa Tenggara No. 2/2008 (PERDA No. 2/2008) on the Coastal and Small Island Management included several provisions related to disaster mitigation, Article 28 states:

- The Regional Government will set coastal boundaries as far as 30 to 250 meters beyond the highest tide line n dependent upon several characteristics: topography, biological and physical features, coastal oceanography, and economic and cultural needs.
- Establishing coastal boundary lines also be will take into consideration several factors: a) vulnerability to natural disaster including earthquakes and/or tsunamis, erosion and abrasion, storms, floods; b) existing coastal ecosystems, and; c) need for public access, drainage and sewage pipes.

Related to disaster mitigation Article 46 and Article 47 described the technical aspects of mitigation, namely:

a. Disaster mitigation in the coastal zone includes prevention, mitigation, and recovery efforts.

b. Regional government are required to include disaster mitigation in the development of integrated coastal zone and small islands management plans and planning for resource utilization.

c. Disaster mitigation planning must involve the community and other stakeholders.

d. Implementation of coastal disaster mitigation should take into account social, economic, and cultural aspects of the communities; environmental conservation; usefulness and effectiveness, as well as the total extent of the area.

e. In an emergency condition, the governor is authorized to take emergency measures for disaster prevention and mitigation.

Article 47 concerns the establishment of areas susceptible to natural disasters and states:

a. The Regional Government will identify establish coastal zone areas and small islands that are in prone to disasterand will plan the primary role in disaster mitigation planning.
b. Individuals and regional governments should intervene and prevent activities that potentially cause damages to the coastal zone and small islands.
c. Implementation of disaster mitigation as described in Section (2) should be realized through the building of physical structure and potentially to natural design.
d. The Regional Government will set priorities for program implementation as described in Section (3) in regions that have been designated as prone to disaster.

The Provincial Government of West Nusa Tenggara has established an agency for disaster mitigation. The agency was established by the Provincial Regulation of West Nusa Tenggara No. 3/2009 regarding the Disaster Management Implementing Agency. The agency will coordinate various disaster management programs in the West Nusa Tenggara Province.

The Governor of West Nusa Tenggara (Decree No. 219/2007) also established a Task Force for mainstreaming climate change in the West Nusa Tenggara Province. The Task Force functions to encourage mainstreaming the impacts of climate change in all levels of government, the private sector and the communities and to develop adaptation and mitigation strategies in accordance with regional characteristics. The Task Force reports on the performance of its duties and its results to the governor of West Nusa Tenggara. The Task Force establishes the involvement of the community. Participation of community members on the Task Force is guaranteed by the law encourages them to participate in evaluation and monitoring activities. The Regional

Government should also seek alternative source funding in addition to that provided through the regional budget (APBD).

The PERDA regulations suggest the broad scope of activities involved in disaster management and also encourage community and stakeholder participation. Further capacity building programs for coastal communities still need to be considered and both planning and research need to take into account the adaptive capacity of communities in disaster situation and in response to climate change. Action plans need to be developed and incorporated into RAPWP3K documents.

B. Province of Southeast Sulawesi (Sultra)

The Southeast Sulawesi Province is yet to enact a Regional Regulation (PERDA) on coastal and small island management and does not have yet a regulation on coastal and small islands spatial planning. On the other hand, this province has already passed regulations concerning strategic and the zonation plans. Prior to the law No 27/2007 the Southeast province established a regional regulation on coastal and marine management, law No 27/2007. Related to disaster management, this province passed a regional regulation No 3/2009 regarding the Establishment of a Regional Disaster Management Agency. C. IMACS Sites

Most districts with IMACS project sites are already equipped with regulation and planning documents for coastal and small island management.. In addition, there are already several environmental studies and policies regarding natural disaster mitigation. Several districts had already established planning documents and legislation related to marine and coastal management, prior to the enactment of Law No 27/2007.The existing coastal resource management programs helped to facilitate the development of further document plans and already incorporated many relevant aspects of coastal and small island management. Table 7 provides a summary of the management plans, regulations, vulnerability studies and mitigation policies in IMACS project sites.

Table 7. Status of management plans, regulations vulnerability assessments and policies in IMACS project sites

| IMACS Site | Coastal and small island plan | Regional Regulation | Coastal vulnerability study | Disaster mitigation policy |
|---|---|---|---|---|
| Province of West Nusa Tenggara (NTB) | A | A | A * IMACS is now working with DKP District to assess village level vulnerability in10 villages by mid-2013 | A |
| West Lombok | A | N (still in the public consultation process supported by IMACS) | A * | A |
| East Lombok | N | N | A * | N |
| North Lombok | A | A | A * | A |
| Central Lombok | A | N (Requested to IMACs to support the PERDA development) | A * | N |
| Sumbawa Island | A | A | A | A |
| Province of Southeast Sulawesi | A | N | N | A |
| Kendari | A | A | N | A |
| Bau-Bau | N | N | N | N |
| South Konawe | A | N | N | N |
| Wakatobi Islands | A | A | N | N |

Note: A = Available; N= Not available; * = For Lombok island conducted by Ministry of environment and GTZ.

# 5. Vulnerability Assessments and Adaptation Measures

## 5.1 Coastal Vulnerability and Adaptation at the National Level

Vulnerability assessments for coastal areas have been conducted by the Ministry of Environment (KLH), Ministry of Marine Affairs and Fisheries (KKP), and other research institutions. In 2009, the Ministry of Environment prepared a vulnerability assessment of Lombok Island, including inundation simulations. Several vulnerability assessments for small islands were conducted by Ditjen KP3K-KKP (2009) and Tahir (2010) to assess the potential for disappearance of small islands due to climate change.

In 2010, the Agency for Marine and Fisheries Research (KKP), of the Ministry of Marine Affairs and Fisheries (KKP-BRKP, 2010) conducted a national coastal vulnerability assessment. The results of the study identified several areas that were highly vulnerable to arise in sea level including the northern coasts of West Java, Lampung, most of the east coast of South Sumatra, several sites on the west coast of Sumatra, the north coast of Central Java (including Pekalongan), coastal areas of West and Central Kalimantan, and South Sulawesi. Overall distribution of the coastal vulnerability level in Indonesia can be seen in Figure 4.

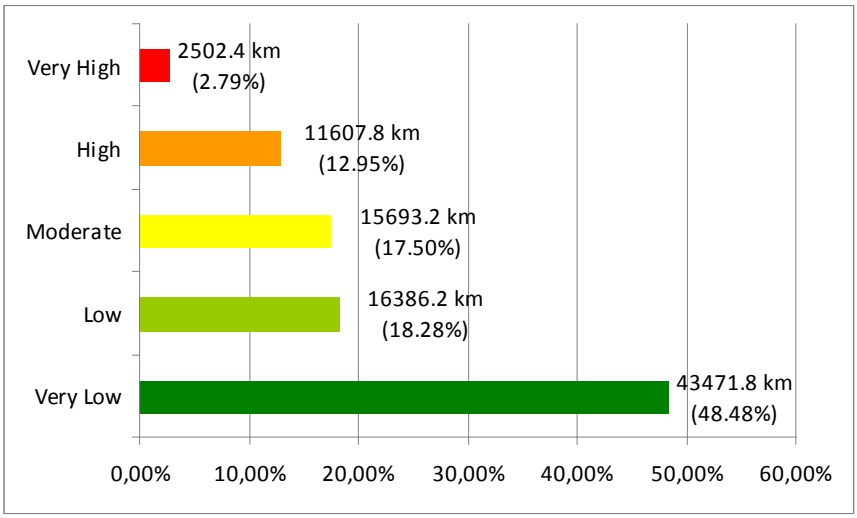


Figure 4. Distribution of coastal vulnerability level in Indonesia

Figure 4, shows the total length of the Indonesian coastal zone and its potential vulnerability to sea level rise. Approximately 2502.4 kilometers, about 2.79% of the total shoreline, is considered very high vulnerable and 11,607.8 kilometers or 12.95% of the total coastline is highly vulnerable. Policy makers and stakeholders should take serious measures to protect the 14,110.2 kilometers or approximately 15.74%) of the coastline which is highly or very highly vulnerable.

Appropriate coastal planning and coastal spatial planning need to be put in place as a precaution and in anticipation of possible loss due to climate change and natural disasters.

The Ministry of Marine Affairs and Fisheries developed two types of climate change adaptation programs: structural and non-structural. Structural adaptation is further divided into natural and artificial protections.

1. *Structural adaptation (physical)*
   - Natural structural adaptation involves increasing and improving the strength of the coastal and small island ecosystems: mangroves, seagrasses, coral reefs and other coastal ecosystems through conservation and rehabilitation efforts.
   - Artificial adaptation includes breakwaters, sea walls, levees, shelters, stilts houses, and artificial reefs. Figure 5 presents examples of eco-friendly houses for coastal areas and small islands.


Figure 5. Examples of disaster-friendly houses (KKP, 2008)

One of the initiatives of the Ministry of Marine Affairs and Fisheries is the development of disaster-friendly house constructions. The program is on-going and will be expanded.

*2. Non-structural adaptation (Non-physical)*
Non-structural adaptation, as developed by the Ministry of Marine Affairs and Fisheries includes:

- Development of disaster vulnerability maps
- Development of the legal framework to accommodate climate change related issues
- Relocation of coastal communities living in high-risk areas
- Spatial planning through the development of Coastal and Small Island Zonation Plans
- Development of public information systems and dissemination programs
- Disaster mitigation and simulation training programs

## 5.2 Coastal Vulnerability Assessment in 5 Major Cities of Java

Coastal vulnerability assessment studies in 5 major cities on Java (Tangerang, Bekasi, Jakarta, Pekalongan, and Surabaya) were conducted by the Ministry of Marine Affairs and Fisheries in 2010.

1. *Coastal Vulnerability Study for Jakarta*

The results of the Jakarta coastal vulnerability assessment are presented in Figure 6. The results of the study revealed several highly vulnerable areas, including Tanjung Priok and Koja, while Penjaringan, Pademangan, and Cilincing were categorized as areas vulnerable to climate change.

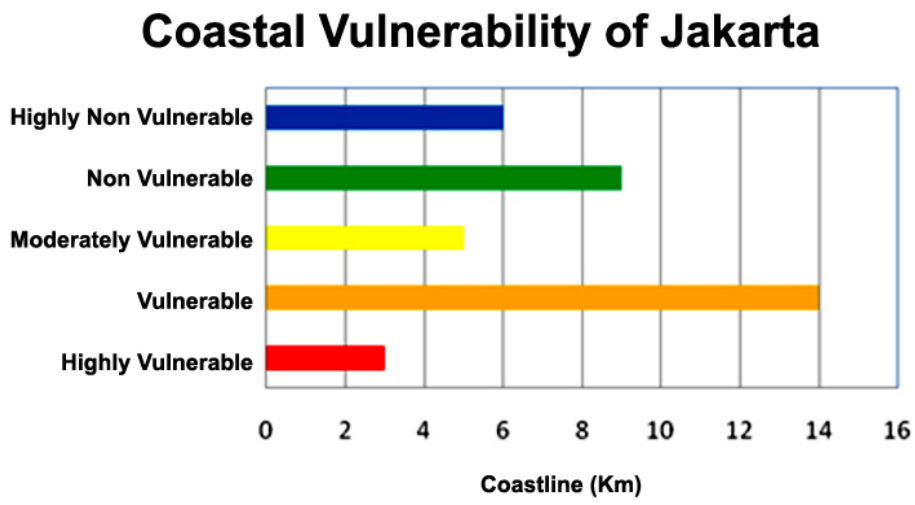


Figure 6. Level of coastal vulnerability in Jakarta

Figure 6 shows the length of the coast line in Jakarta which is highly vulnerability to climate change is about 3 kilometers (8.11%), with 14 kilometers (37.84%) identified as vulnerable.

2. *Coastal Vulnerability Study for Tangerang*

The vulnerability assessment in Tangerang shows that area with high vulnerability to climate change is located in Kosambi Sub-district, while Mauk, Pakuhaji, and Teluknaga Sub-districts are considered vulnerable. Figure 7 presents the distribution of coastal vulnerability levels in Tangerang. In general, the level of vulnerability in Tangerang is dominated by coastal area which is vulnerable or highly vulnerable (35.29%). The length of highly vulnerable coastline is about 3 kilometers (5.88%) and about 17 km (33.33%) is considered vulnerable.

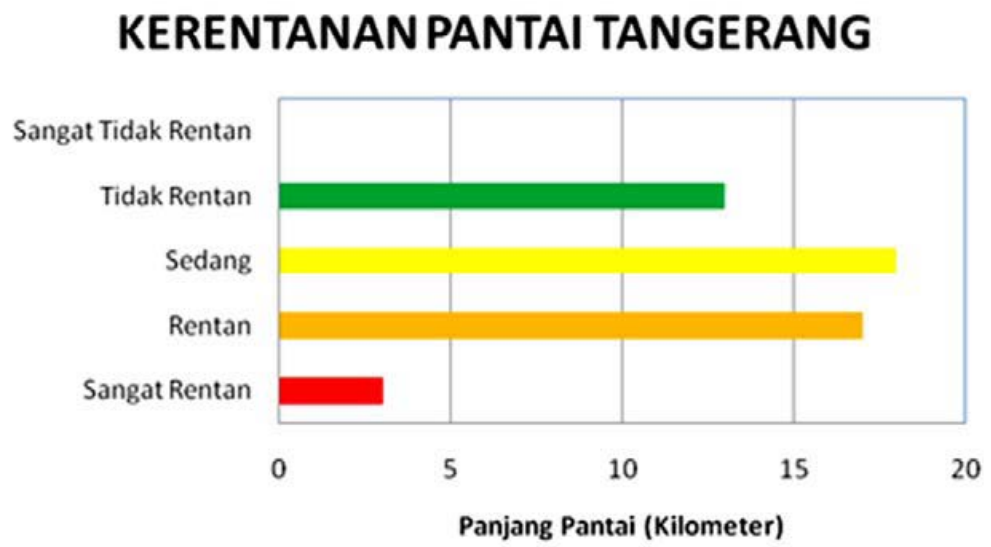


Figure 7. Level of coastal vulnerability in Tangerang

3. *Coastal Vulnerability Study for Bekasi*

The vulnerability assessment in Bekasi illustrated that areas with very high vulnerability level are located in Tarumajaya, Babelan and Muara Gembong Sub-Districts, while Pakisjaya was identified as vulnerable. Overall distribution of coastal vulnerability levels in Bekasi can be seen in Figure 8.


Figure 8. Level of coastal vulnerability in Bekasi

Figure 8 shows the coastal area most vulnerable to climate change is 4 kms (8.70%), while the coastline classified vulnerable is about 16 km (34.78%)

4. *Coastal Vulnerability Study for Pekalongan*

The coastal area of Pekalongan with with highest vulnerability to climate change is Batang, while the Sub-districts of Ulujami, Sragi, Wiradesa, Tirto, and North Pekalongan are considered vulnerable. Distribution of the coastal vulnerability in Pekalongan can be seen in Figure 9 below.

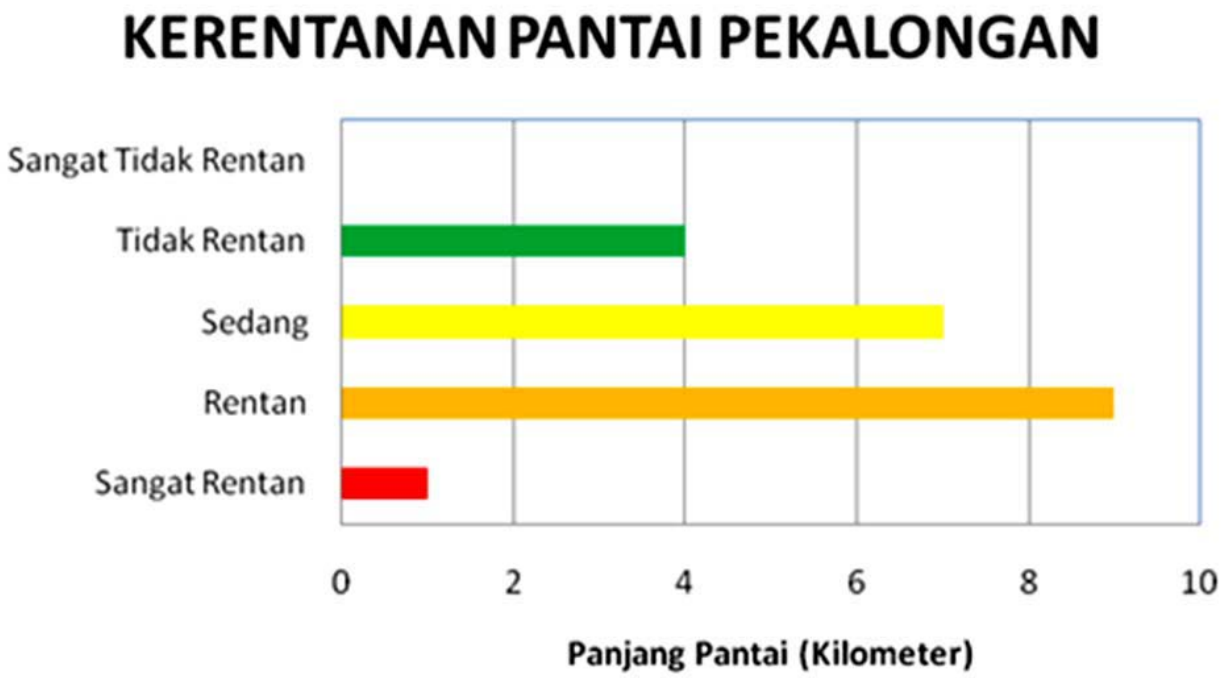


Figure 9. Level of coastal vulnerability in Pekalongan

Figure 9 shows that the coastal zone length considered highly vulnerable to climate change is within 1 kilometer radius (4.76%) and vulnerable coastal areas are up to 9 km (42.86%) in length.

5. *Coastal Vulnerability Study for Surabaya*

For Surabaya, the coastal areas with very high vulnerability to climate change are Gresik, Kebomas, and some areas of Benowo, Bulak, Sukolilo, and Rungkut. The Sub-districts of Asemrowo and Mulyorejo are considered vulnerable to climate change. The distribution of coastal vulnerability levels in Surabaya is presented in Figure 10.


Figure 10. Level of coastal vulnerability in Surabaya

Based on Figure10, the coastal vulnerable area was stretch along 16 km coastline (35.56%) and coastline with very low vulnerability is along 15 km (33.33%). The length of the coastal zone that is highly vulnerable to climate change is approximately 7 kilometers (15:56%).

The status of the vulnerability of coastline in the coastal cities of Tangerang, Jakarta, Bekasi, Pekalongan and Surabaya is presented in Figure 11. The total length of coastline considered highly vulnerable is about 18 km, while the total length of coastline included in the vulnerable category to climate change is 61 km.

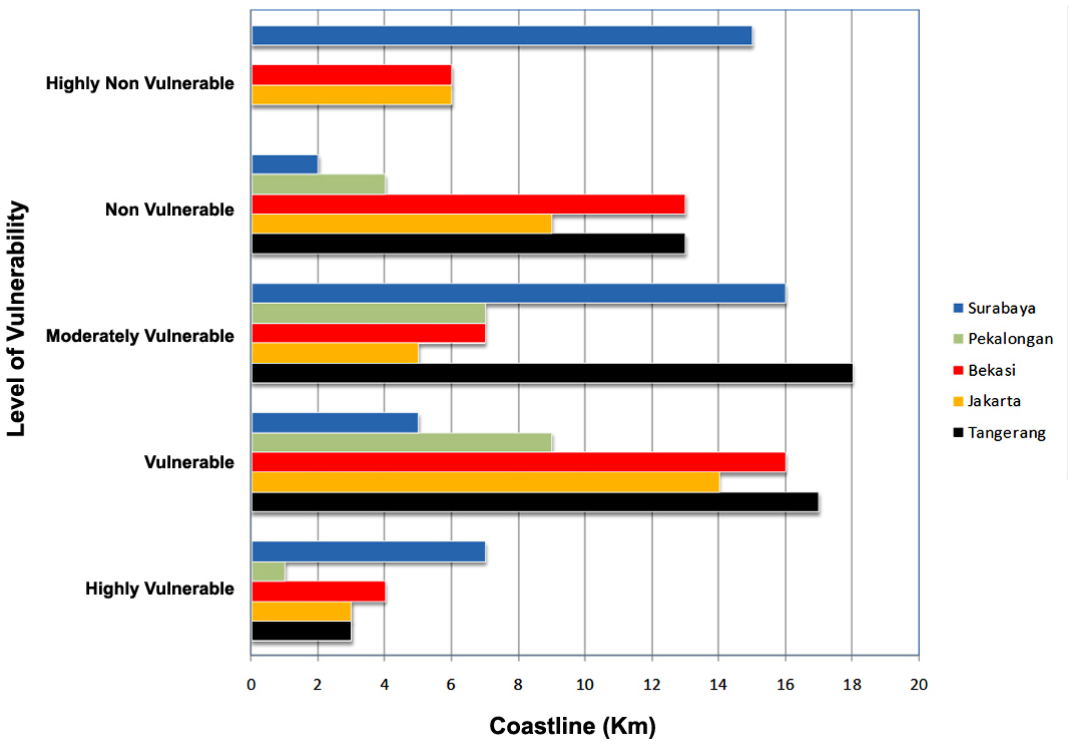


Figure 11. Levels of coastal vulnerability level using local vulnerability index ranking

## 5.3 Vulnerability Assessments of Small Islands

Several climate change vulnerability assessment were also conducted to measure the vulnerability of small islands. The studies were conducted in Kepulauan Seribu (Jakarta), Pangkajene Islands, and Saonek Island (Raja Ampat), Barrang Lompo Island (Makassar), and Kasu Island of Batam.

*1. Administrative District of Kepulauan Seribu (Jakarta)*
In 2008, the Directorate General for Marine, Coastal Areas and Small Islands collected data on small island vulnerability index on several islands of Kepulauan Seribu. The vulnerability assessment was looked at eight major parameters. (1) geomorphological formation of the islands, (2) vegetation cover, (3) live coral cover, (4) coastal typology, (5) the rate of sea level rise, (6) significant wave height, (7) mean tidal range, and (8) population density. The results of the study revealed that several islands have moderate to high levels of vulnerability.

The study proposed that adaptation strategy be developed by improving the critical functions of small island ecosystems. Suggested improvements included increasing the vegetation cover to augment groundwater supply and prevent erosion, increasing live coral cover to promote reef accretion and coral cay existence, and ensuring that fishery and tourism activities are sustainable and eco-friendly.

*2. Pangkajene Islands (South Sulawesi) (KP3K, 2009)*

A Vulnerability assessment for small islands has also been carried out by the Ministry of Marine Affairs and Fisheries in the District of Pangkajene Islands (Pangkep), South Sulawesi.The results of the study indicated that vulnerability to climate change among several islands in the Pangkep District is generally low. The study suggested continue need for (1) the protection of coral reef ecosystems to improve habitat quality, (2) the termination of coral mining activities, and (3) the development of reef conservation and rehabilitation programs to enhance the adaptive capacity of small islands.

*3. Saonek Island (Raja Ampat), Barrang Lompo Island (Makassar) and Kasu Island (Batam)*

Vulnerability assessment study of small islands was conducted (by Tahir, (2010). Three small islands situated on the west, central, and eastern Indonesian region were chosen as sites, namely: Kasu Island in Batam, Barrang Lompo Island in Makassar, and Saonek Island in Raja Ampat. The research was carried out using a modified version of the vulnerability model used in previous research. A summary of the results of the vulnerability assessment is presented in Table 8.

Table 8. Island specific characteristics

| Island | Vulnerability Score | | | | Specific Feature |
|---|---|---|---|---|---|
| | Exposure | Sensitivity | Adaptive capacity | Vulnerabi-lity Index | |
| Kasu | 2.93 | 2.50 | 3.00 | 2.44 | • Community housing exists very near the water front, (some regularly inundated during high tide)<br>• Coastal habitats are dominated by mangroves and seagrasses<br>• Island elevation level is above 2 m |
| Barrang Lompo | 6.28 | 4.15 | 3.40 | 7.67 | • Dominant elevation level of the island is less than 2 m<br>• Near previous tsunami impact area<br>• Coastal habitats are dominated by coral reefs and seagrasses |
| Saonek | 4.85 | 3.82 | 3.00 | 6.18 | • Relatively high waves<br>• Coral reefs, seagrasses, and mangroves in the area |

Table 9 presents adaptation strategies for each island.

Table 9. Proposed adaptation strategies

| No. | Scope of Planning | Adaptation Strategies | | |
|---|---|---|---|---|
| | | Kasu Island | Barrang Lompo Island | Saonek Island |
| 1. | Short-term (1-5 years) | Establishment of a Marine Protected Area to protect mangrove incorporating at least 30% of the coastal area | Designation of 30% coral reefs as Marine Protected Areas (MPA) | Designation of mangroves and coral reefs as MPAs, incorporating 30% of coastal habitats |
| 2. | Medium-term (6-10 years) | Establishment of MPA to protect mangrove incorporating 50% of the coastal area<br>Relocation of community housing to the inland area of the island | Establishment of MPAs to protect coral reefs incorporating 50% of the coastal areas<br><br>Construction of beach protection structures. | Designation of mangroves and coral reefs as MPAs, incorporating 50% of the coastal zone<br><br>Construction of beach protection structures in eroded coastal zones. |
| 3. | Long-term (11-20 years) | Continuation of housing relocation further inland. | Construction of a wave-break structure on the outer side of the island and construction of houses on stilts. | Relocation of community housing to the higher elevations on the island. |

Adaptation strategies designed for the three islands were (1) the establishment of Marine Protected Areas (coral reefs, seagrasses, and mangroves), including conducting public awareness event and rehabilitation of coastal ecosystems, (2) developing coastal protection structures, and (3) relocation of housing to the safer areas (with higher adaptation potential). Adaptation strategies as presented in Table 9 are commonly applied in many sites worldwide. Bijlsma (1996) mentioned the three common strategies for coastal zone, namely protection, accommodation, and relocation. Technical protection of hard engineering such as construction of a groins, seawalls, breakwaters, and bulkheads construction have been utilized to address erosion and inundations in island countries. Unfortunately, this approach is sometimes insufficient and ineffective and can increase vulnerability in other nearby areas (Mimura and Nunn 1998; Solomon and Forbes 1999). This approach is the best option in coastal zones in which the vital infrastructure is highly vulnerable.

# 6. Other Channels for Coastal Adaptation Mainstreaming

## 6.1 ICM Professionals Societies and Operational Mechanisms

The Indonesian Association of Coastal Management Experts (HAPPI) is a nonprofit, independent professional society, with competency to carry out certification programs in coastal management. HAPPI is founded on honesty, openness, benefits, balance and mutual partnership in the development of science, technology, social, economic and cultural rights. HAPPI's function as a professional organization is to gather together coastal management experts and observers who will jointly contribute to the national development and the advancement of science, technology, and the social, economic and cultural likes of people This function is realized through several efforts: (a) the development and improvement of cooperation between government agencies, universities, research institutions, private and public institutions; (b)the development of scientific, technological, social, economic and cultural aspects related to coastal management; (c) increasing the capacity of coastal experts; (d) encouraging innovation of coastal experts on the development of environmentally sound coastal management activities; and (e) providing training and certification programs for coastal management.

HAPPI members are individuals who have experience in the field of coastal management, and have completed a college degree. HAPPI central offices are located in Jakarta and supported by HAPPI branch offices in other areas. At present, there are six HAPPI branch offices: for South Sulawesi, located in Makassar, for East Java in Surabaya, for Maluku in Ambon, for West Nusa Tenggara in Mataram, for Central Java in Semarang, and for West Java in Bogor.

## 6.2 The Role and Participation of Non-Governmental Organizations (NGOs) and the Private Sector

Law No. 27/2007 does not do much to describe the functional role of NGOs in the planning process of coastal and small island management. However, Article 41 of the Law states the establishment of Mitra Bahari as a collaborative forum among central and regional governments, higher education and research institutions, NGOs, professional organizations, community leaders, and the private sectors and suggests its function in capacity of stakeholders for coastal and small island management. Article 43 states that research and development efforts related to coastal and small island management can be implemented by the central government, local governments, universities, NGOs, research institutions and private institution, as well as individuals. In Government Regulation (PP) No. 21/2008 regarding Disaster Management, Article 45 states the role of Agency for National Disaster Mitigation (the Head of BPBD) in producing accountability report for all funding and/or goods received from the public. One paragraph of Article 1 (Section 1) explains that, "communities" are individuals, corporations, legal institutions, NGOs, international organizations and non-governmental foreign institutions.

In the Government Regulation (PP) No. 64/2010, concerning Disaster Mitigation in Coastal Zone and Small Islands, there is no mention of the role of NGOs in the implementation of disaster mitigation in coastal zone and small islands areas.

Chapter VII of BPBD Decree No. 4/2008 regarding the Guidelines for Disaster Mitigation Planning regulates the stakeholder allocation and role in disaster mitigation activities mentioning the versatility and capacity of NGOs in disaster relief efforts. With appropriate coordination NGOs can participate in and contribute to all phases of disaster prevention and response. In practice, several NGOs have developed programs and plans related to climate change and adaptation to climate change, especially for the coastal and marine areas.

## 6.3 Coastal Livelihoods and Climate Change Resilience

Programs to strengthen coastal community resilience related to livelihood security have been developed by various agencies and regional governments. Such programs are intended to anticipate the impact of climate change on the livelihood of coastal communities. These programs have managed to secure significant funding and advocacy from several NGOs and international organizations.

One such effort is the "Development of Resilient Coastal Village Program" (*PDPT- Program Pengembangan Desa Pesisir Tangguh*). This program aims to organize and improve the livelihoods of coastal and fishing villages. The program has received significant contributions from universities, international organizations, and NGOs.

Another effort is the marine conservation program. Central and regional governments are committed to improving the resilience and adaptability of coastal communities, especially those related to marine resources and livelihood security.

# 7. Gap Analysis and Recommendations

**Strengths**

1. A substantial legislative and policy umbrella for management of coastal areas and small islands at the national level already exists.
2. The West Nusa Tenggara province has passed legislation on the management of coastal areasand small islands, which includes disaster management and adaptation programs for coastal communities.
3. Agencies for coastal management and disaster management have been established.
4. Stakeholder involvement in coastal and disaster management, including that of the private sector, NGOs and the community, has been ensured and regulated.

**Weaknesses**

1. Implementation of coastal and small island legislation is limited, in part due to very limited funding. Strategic and Zoning Plans for coastal and small island management have been developed for only a small percentage of the total number of Provinces and coastal Regencies/Cities.
2. Coastal vulnerability assessments have mainly been conducted by the Ministry of Environment and the Ministry of Marine Affairs and Fisheries. Few locally driven vulnerability assessments have been prepared.
3. Efforts to improve coastal community resilience and adaptation to climate change have been insufficient. The government lacks a multi-year program in place to build capacity. Increasing the adaptive capacity of coastal communities requires sustained programs over many years.
4. The processes involved in planning and implementing programs for climate change adaptation and disaster mitigation are cumbersome and complicated, and the capacity and manpower to develop decent plans are lacking. In addition to building the capacity and increasing manpower, there is also a need to simplify the processes involved in such programming.

A more detailed summative assessment of the status, gaps, and needs regarding policies, legislation and programs is presented in Table 10.

**Table 10.** Gap Analysis of Climate Change Mainstreaming and Adaptation in Coastal Areas and Small Islands

| Item | Status | Gaps | Implication/Recommendation |
|---|---|---|---|
| Coastal and Small Islands Management Plans | • Currently 48% of Indonesian provinces are a equipped with strategic plan on coastal and small islands, and 17.9% of regencies/cities had established coastal zonation plan for coastal and small island.<br>• It is mandatory for both regional and local governments to develop strategic plans and zonation plans. | • Less than 10 percent of all provinces and regencies have strategic and zoning plans adopted by PERDA<br>• Budget limitations have hindered the development of Strategic Plans and Zoning Plans. | • Collective efforts are required in the development of Strategic and Zonation Plans for coastal and small islands at the provincial and regencies/cities levels, Budget issue affected by national government budgetary constraints need to be resolved. |
| Plan Accreditation | • Coastal and small island program accreditation has been detailed in Article 40 Law 27/2007<br>• Related regulation with more technical details have been issued by Ministerial Decree of Marine Affairs and Fisheries No.18/Men/2008 | • Regardless of the existing regulations on accreditation, many programs have yet to be accredited by both the central government and regional governments. | • Accreditation should be seen as mandatory for regional governments with coastal and marine areas and will to encourage other programs supporting sustainable coastal resources management.<br>• Continuous funding is required for every regional government to follow through with accreditation programs. |
| Mitra Bahari Program | The Mitra Bahari program has been established and in detailed in Ministerial Decree of Marine Affairs and Fisheries No. 14/Men/2009 | The Mitra Bahari program has been successful but needs to be further leveraged. The Mitra Bahari program initiated by the central government has been more successful than those from regional governments. | • The Mitra Bahari program should be considered compulsory for regional governments with coastal and marine areas and would facilitate other programs supporting sustainable coastal resources management.<br>• Development of Mitra Bahari program could be supported by a competitive grants system, which would support research projects and programs for coastal |

| Item | Status | Gaps | Implication/Recommendation |
|---|---|---|---|
| | | | and smalls islands. |
| National Action Plan for Mitigation and Adaptation to Climate Change (RAN- MAPI) | National Action Plan on climate change initiatives have been established by BAPPENAS, thus national action strategy and implementation on climate change has been developed and stated in the document. | Implementation of the National Action Plan has been insufficient. • Efforts to develop sectoral roadmaps in accordance with RAN MAPI have been insufficient | Every sectoral and regional development program related to climate change should follow the RAN MAPI technical guidelines and should further consider climate change adaptation and disaster mitigation strategies, particularly those in coastal zones. |
| Adaptation planning status in NTB and SULTRA | Two provinces, Southeast Sulawesi (SULTRA) and West Nusa Tenggara (NTB), have developed their own coastal and small island Strategic Plans (RSWP3K) and Zonation Plan (RZWP3K). | These Strategic and Zonation Plan have yet to be legalized in the form of regional regulations (PERDA). | Collective efforts are required to initiate and support the development of regional regulations on coastal and small island management. |
| | A Coastal vulnerability study has been conducted for Lombok Island (NTB), but not yet in SULTRA | The coastal vulnerability study in Lombok was limited to physical considerations and failed to consider the adaptive capacity of coastal communities. | Vulnerability assessments should embrace adaptive capacity of coastal communities. To support such studies, other research institution should become involved. in providing additional |
| | At the regional level, aspects related to disaster management have been incorporated into several regional regulations: spatial planning (PERDA No. 3/2010), coastal and small island management (PERDA No. 2.2008), as well in Governor of NTB Decree No. 219/2007. | NTB still lacks zonation plans for coastal zone and small islands (RZWP3K), and has yet to pass regional regulations (PERDA). | A zonation plan for coastal zone and small islands in NTB is required to support the coastal and small island spatial planning. |
| National vulnerability assessments | Indonesia has developed a coastal vulnerability map at the national level. | National assessment on coastal vulnerability still focuses on physical environmental aspects. Social | Vulnerability studies related with climate change should consider social vulnerability aspects. Areas with high levels of vulnerability |

| Item | Status | Gaps | Implication/Recommendation |
|---|---|---|---|
| | | vulnerability aspects have yet to be studied at the national level. | should be equipped with adaptation and mitigation strategies as a precaution in dealing with climate change related impacts. |
| Vulnerability assessment: Jakarta, Bekasi, Tangerang, Pekalongan, Surabaya | Vulnerability assessments have also been conducted on the north coasts of Java and include 5 major cities. | The Coastal vulnerability assessments were limited and considered only physical aspects. | • Additional vulnerability assessments should be conducted on the south coasts of Java with reference to several regions prone to tsunami disaster.<br>• Vulnerability assessments should consider social aspects. |
| Small island vulnerability | Several specific studies on vulnerability assessment in small island areas were performed for Seribu Islands, Pangkep, and Raja Ampat. | Indonesia still lack appropriate methods to calculate small island vulnerability. Several existing scientific methods to measure small island vulnerability are yet to be institutionalized. | • With regard to small islands the scope and methodology of vulnerability assessments should be determined earlier.<br>• In order to be prepared for climate change related impacts on small island communities, maps of vulnerability status need to be published. |
| Organizations | The Indonesian Association of Coastal Management Experts (HAPPI) has been established, which serves to enhance cooperation between institutions and to build capacity among coastal management experts. | Of the four established HAPPI programs, only one has conducted training and provided certification for Indonesian coastal management experts. | • More active involvement in HAPPI is needed. The organization should work more actively to (a) improve cooperation between government agencies, universities, research institutions, private and public institutions, (b) to develop scientific, technological, social, economic and cultural understandings to coastal management; (c) to increase the capacity of coastal experts, (d) to encourage innovation and support environmentally sound coastal development activities. |

| Item | Status | Gaps | Implication/Recommendation |
|---|---|---|---|
| | | | • Official recognition is required to help realize the functional roles of the organization. |
| Non-governmental organizations | NGO functional roles have been accommodated in Article 41 Law 27/2007, and with regard to disaster mitigation in Government Regulation No. 64/2010 | There is a lack of NGO involvement in climate change related studies. NGO's involvement in coastal management has been limited to development of conservation areas and community advocacy in managing the environment. | • NGO's should increase their participation in climate change related studies, both in vulnerability assessments and in assessing the adaptive capacity ofcommunities.<br>• Pilot projects in climate change adaptation and mitigation strategies should be carried out and used to developlesson- learned materials which might helpother coastal communities in Indonesia. |
| Mainstreaming climate change in coastal planning | Several legal institutional documents have been established related to the climate change issue in coastal and small islands,: Law No. 17/2007, Law No. 24/2007, Law No. 27/2007, Government Regulation No. 21/2008, Government Regulation No. 64/2010, and Presidential Decree No. 46/2008. | Climate change adaptation programs, particularly those focusing on coastal and small islands are still very limited. | • Improvement of the climate change vulnerability studies should be made mandatory.<br>• NG)'s should be involved in studies of coastal vulnerability and adaptation to climate change. |
| Coastal variable consideration in climate change vulnerability assessment and adaptation studies (in provincial and regency/city | Several vulnerability studies were conducted in major cities and regions in Indonesia which specifically the susceptibility of coastal areas to climate change related impacts. | Most climate change vulnerability assessments only focused on physical environmental aspects. Social vulnerability and coastal adaptive patterns have yet to be studied. | • More comprehensive approaches to studying coastal vulnerability to climate change are required and need to take into consideration both physical/environmental and socio-economic aspects.<br>• Certain variables specific to coastal areas and subject to climate change should be studied/monitored carefully.<br>• Already existing adaptive patterns of |

| Item | Status | Gaps | Implication/Recommendation |
|---|---|---|---|
| level). | | | coastal communities should be integrated into climate change programing and planning |
| Climate change related issues and BAPPEDA planning | Since the initial stages of the development of the marine affairs and fisheries roadmap, BAPPEDA has positioned to integrate climate change issues in coastal areas into regional development planning (RPJP, RTRW, and RZPWP3K). | • Climate change adaptation planing is lacking among many regional governments in Indonesia are lacking.<br>• Many regional governments are spatial and zonation planning documents (RTRW and RZPWPK). | • Efforts need to be intensified and steps need to be taken to ensure the development of coastal spatial planning with reference to climate change adaptation. |

# References

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