Sustaining Fisheries from Climate Variability through Marine Protected Area (MPA) Development: A Challenge for Indonesia

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Introduction

Recently, interest in using MPA as a tool for marine resource management has been driven by the expectation that MPA might counteract collapse in marine fisheries due to climate variability and anthropogenic impacts. In line with this idea, GoI has formulated policy and enacted a new regulation on MPA that attached to fisheries management scheme (cf. National Act No. 31, 2004 [1]). The National Act is implemented through Government Regulation No. 60, 2007 on Conservation of Fisheries Resources. Under this new regulation, there were four MPA categories have been identified: “Suaka Alam Perairan” (Marine Wildlife Reserve), “Taman Nasional Perairan” (Marine National Park), “Taman Wisata Perairan” (Marine Recreational Park) and “Suaka Perikanan” (Fisheries Refugee). However, there is no
study so far to include each of these MPAs into IUCN categories

**Impact of Climate variability will follow a mechanism as follow:** Climate, Ecosystem, fisheries and people welfare. Studies showed that most of Indonesia’s capture fisheries are either full or over-exploited [2][1][3]. Policy formulation workshop commissioned by Ministry of Marine Affairs and Fisheries [4][5][6] conclude a comparable advice. Under current fisheries status, every government plan to increase fishing effort can be considered as flawed, putting sustainability and long-term profitability of Indonesia’s fisheries at risk. Furthermore, most of coastal habitats that support fishery stocks are degraded due to destructive fishing practices [7][8][9][10] - More than 70% of coral reefs are under stress condition and total mangrove area is declining every year. Indeed, as common in Southeast Asia, marine resources in Indonesia are seriously threatened by destructive and over-exploitation [11]. So, the current conventional fisheries management tool may not enough to prevent marine resources from over-exploitation and habitat degradation [12].

Where fisheries are heavily exploited (over-exploitation), setting aside and protecting some critical areas as MPA could replenish the surrounding fisheries [13][14]. This could be done through mainly two mechanisms: spill-over of recruits and export of eggs-larvae to the adjacent fishery [15][16]. Also, MPAs could protect and hence, improve habitat quality available to support fisheries [17]. It was very strategic and appropriate when Government of Indonesia decided to use MPA as fisheries management tool, coupled with the currently existing tool. So, the new national Act on Fisheries introduces MPA as an approach to fishery management. A MPA, of course, should meet certain criteria to provide benefit for fisheries [18][19]. This need proper knowledge and experience on design, selection and management of MPAs.

This study showed that MPAs in Indonesia do not reach the objective to improve adjacent fishery. Over-fishing would result in reduced catch, and fishermen have to find other places to fish. MPA is characterized by the presence of sizeable No-Take Zone (NTZ). As MPA becomes mature, there will be more and bigger fish inside NTZ compared to fished areas. Fishermen would always stay close to un-fished areas and even tend to enter NTZ. This was the main difficulty to strictly implement MPAs when surrounding fisheries are heavily exploited. MPA authority will need intensive resources to maintain their presence in the field, to enforce all MPA rules.
Briefly, MPAs in Indonesia may function in two ways: to protect marine biodiversity that meet global value and to maintain sustainable utilization of marine resources, especially marine capture fisheries. MPAs that managed under Ministry of Marine Affairs and Fisheries has the opportunity to involve more and wider stakeholders. However, these MPAs were still in early phase and immature; so there was no success story that can be outreached to public regarding positive impact of MPAs to fisheries [20].

**Mitigation of impacts through Coastal and Small Islands Zoning**

The impacts of climate change have been perceived in many Indonesian coastal areas in the form of frequent coastal inundation from sea tide, erosion, and extreme wave and storm events. Response and adaptation at the local level remains a challenge for most local governments [21]. Lack of data and information, awareness on the issues, and capacity to develop an adaptive management are among the problems.

The adaptation programs on the other hand need a strong policy and program commitment to ensure its sustainability. As the impacts are cross cutting and related to many sectors in coastal areas, we need an integrated approach for developing and implementing an adaptation program. ICM provides many opportunities to address different sector interests and increase local participation. Implementation of related legislation basis is a must to encourage all stakeholders to respond to climate change impacts in their everyday life.

**A Case Study from BerauMPA and Coastal Zonation**

Berau is one of the coastal regency in East Kalimantan, Indonesia that has faced coastal resources degradation, however this coastal area has a huge of potential resources to be preserved. A number of land conversions to shrimp pond degraded mangrove forest and remain 49,000 Ha and coral reef degradation due to illegal fishing have been have been identified. Coastal and small islands of Berau District have a total area of about 1.1 million Ha, with a large conservation area of about 257,000 Ha. When compared with the total area of coastal and small islands, the area of conservation areas is about 23%. With the expansion of this magnitude, then the conservation area of Berau areomendasi line as proposed by the World
Conservation Union, which is recommended to build a world conservation area between 20-30% of the habitat conservation area should be as no-take zone within Marine Protected Area (MPA) until 2012. The similar case was recommended for countries belonging to the SIDS (Small Island Development State) to develop a conservation area by 20% of the area waters.

It needs to be understood that coastal area management is a vast subject/concept, that includes resources and environment. Integration within the coordination of various cross sectoral and multi disciplinary activities is a perequisite to achieve the goal of optimizing the utilization of resources and its environment, including impact of climate variability on coastal ecosystem [22]. Berau regency coastal and small island zonation plan is one of four coastal and small islands hierarchycal management plan, as stated in UU no. 27 year 2007, is an effort or berau regency local goverment to manage coastal and small island resources sustainably and with global perspective, with regards of society’s aspiration and participation, and national value based on law. It is based on the understanding that coastal and small islands resources are development potential that needs to be protected and utilized for people’s prosperity, in this generation and/or the next.

Summary

Integration of science and management has been shown during the identification of climate variability impacting coastal and fisheries activities. Harmonization between national program and district program need to be carried out to optimize available resources. Local participation and input during issue identification, plan development of MPA and Coastal Zoning, and project execution provided valuable support for successful implementation.

References


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