Implementation of coral triangle initiative on coral reefs, fisheries, and food security (CTI-CFF) in Indonesia and Philippines

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Abstract. This study aims to discover and examine forms of implementation of the multilateral cooperation initiated by Indonesia in 2007 and agreed upon by five other nations located inside the Coral Triangle region in 2009 which was known as Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF) to safeguard the coral reefs and marine ecosystem inside the Coral Triangle region, to ensure sustainable fisheries practices and the achievement of food security in two of its members, Indonesia and Philippines. To achieve said objective, this study will exemplify the general situation in the Coral Triangle region, the circumstances being faced by Indonesia and Philippines in regard of their marine sector as a whole, and both legal proceedings and any supportive activities in relation to CTI-CFF that have been done in since its inception in 2009 by both nations. The result of this study indicates that the implementation of CTI-CFF inside the two countries was being based on a synthesis between recommendations inside CTI-CFF’s Regional Plan of Action (RPoA). The document serves as a policy and regulation blueprint in both countries, being used in the making of regulations and policies in regard to fisheries management, food security, and marine ecosystem conservation. The influence of RPoA is apparent in many regulations, policies, and activities inside both countries, in which some explicitly contain the very recommendations contained inside the RPoA document.

1. Introduction

The Coral Triangle region is the biggest marine biodiversity hotspot in the world, containing over 73% of known coral species, 37% of coral reef-based fish species, and 53% of coral reefs population on Earth. All of those could be found inside the region which merely occupies over 1.6% of the sea area in the world. The abundance of marine resources and biodiversity in this area has been felt by the people who live in this region for a long time especially for those who live in the coastal area within, relying on the region’s abundance of resources to fulfill their everyday needs. The Coral Triangle region spans over 6 nations in Southeast Asia and the Pacific region, in which both Southeast Asia and the Pacific region are containing over 363 million people [1].

The importance of the region is truly apparent for the people, considering several points such as: (1) over one-third of the population living in the region—around 120 million people, particularly those who are living in coastal communities across the region—depend on local marine and coastal resources for their livelihood, income, and food security; (2) the estimated annual value of the coral reefs, mangroves, and associated natural habitats in Coral Triangle region totals around $2.3 billion; (3) healthy reefs system and mangrove belts help to protect the coastal areas from severe impacts and...
destructive effects of natural disasters, such as heavy storms, hurricanes, or tsunamis, which in turn could reduce the number of casualties, future reconstruction costs, and the need of international aid; (4) tuna spawning and nursery grounds within the region provide not only livelihood for thousands of people within the fisheries and fish processing industry, but it helps fulfill the need of an important and lucrative food item to consumers around the globe; (5) other types of wild-caught marine products (e.g. grouper, snapper, shrimp) are sold to local fish markets and exported worldwide, generating hundreds of millions of US dollars in additional annual revenue and providing additional food sources; (6) productive coral reefs systems provide most of the $800+ million annual trade in live reef food fish (primarily supplying markets in China), and also provide for a major share of the $100+ million in live reefs aquarium fish and other ornamentals (supplying markets worldwide); (7) and healthy marine resources contribute to a nature-based tourism industry within the region (e.g. dive tourism), generating tens of millions of dollars (US) annually and thousands of job [1].

As the biggest archipelagic nation in the world, Indonesia will always put its sea territory as one of its priorities. Many aspects within the nation are being influenced by the state of its sea territory, from economics, social, geopolitical, and even the nation’s diversity itself. The fisheries sector within the nation is on the rise in its trends within the past few years, achieving 5.9 million metric tons in wild-catch fisheries and 4.4 million metric tons in aquaculture fisheries. Around 6 million people within the nation are working in the fisheries sector, with the addition of around 1 million people within its related food processing and production industries. For coastal communities across the nation, becoming a fisherman is the most common choice to make a living with [2]. Fish consumption in Indonesia is quite high as well, increasing from 38,14 kg per capita per year in 2014 to 43,94 kg per capita per year in 2016 [3]. The Philippines, as a fellow archipelagic nation, generally enjoys the same advantages as Indonesia. Located at the apex of the Coral Triangle, its coastal and marine territory are rich in both biodiversity and resources. Many economic activities within its sea territory like fisheries, tourism, sea transportation, coastal mining, and off-shore oil and gas development contribute heavily to the country’s GDP and provide a livelihood to the people in the nation [4]. Fish consumption within the Philippines is also high as many people within the nation rely on fish as the primary source of animal protein, in which fish occupies around 70% of the nation’s total of animal protein consumption and 30% of its total protein consumption [5].

Both nations are plagued by many environmental challenges, putting not only the Coral Triangle region within their territory at risk, but their coastal and sea territory as well. Land-based pollutions, such as sediments and agricultural run-offs are threatening the coastal areas in both nations, contributing to the significant decrease in coastal ecosystem quality in many impacted areas within both nations. Overfishing and destructive fishing methods are also affecting the sustainability of fish stock within both nations as well. Climate change is also affecting the health of coral reefs within the region, causing coral bleaching due to the rise of seawater temperature [2,5,6]. To safeguard the region’s marine and coastal biological resources, the six nations within the region (Indonesia, Philippines, Malaysia, Papua New Guinea, the Solomon Islands, and Timor-Leste) decided to establish the Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF) in 2009 [2]. The multilateral cooperation of the six nations resulted in the development of the ambitious and visionary 10-year Regional Plan of Action, in which from the Regional Plan of Action each nation made their own National Plan of Actions, intended to be a policy blueprint for each nation to ensure the achievement of targets and goals in the Regional Plan of Action. Considering the fact that the Regional Plan of Action is not a legally-binding document, each nation has the freedom to decide which direction they would take on implementing the result of this multilateral cooperation, especially Indonesia and the Philippines which are the focus on this research. While both Indonesia and the Philippines are archipelagic nations in nature and some advantages provided by the presence of the Coral Triangle region and the bountiful coastal and marine territory within the nations are similar, enations would have a different experience in the challenges they face to ensure the condition and sustainability of their sea territory and marine ecosystems and obviously different take of direction on both their policies and regulations on the matter.
Considering such endeavor, this research sets much importance in putting the National Plan of Actions of each Indonesia and Philippines, other supportive CTI-CFF programs within both nations, and related past and newest regulations related to the three main themes of CTI-CFF which are (1) coral reefs preservations, (2) fisheries regulations and sustainability, and (3) the achievement of food security within both Indonesia and the Philippines and their connections with both Regional Plan of Action and their own respective National Plan of Actions as the epicenter of this analysis. In another words, this research aims to discover the influence of Regional Plan of Actions and other related programs from CTI-CFF inside the two nations, and to discover more about their point-of-view in interpreting the Regional Plan of Actions to their cause on protecting and regulating not only their part of the Coral Triangle region, but also their sea territory and marine ecosystems as a whole. Therefore, this research focuses in answering two questions, covering (1) how Indonesia implements the Regional Plan of Action of the CTI-CFF considering their past regulations and circumstances, and (2) how the Philippines implements the same Regional Plan of Action considering their past regulations and their own circumstances as well.

2. Methodology
The type of research used in this research is descriptive qualitative. This method explains how the result from the CTI-CFF is interpreted by Indonesia and Philippines governments, then being interpreted further into their own respective National Plan of Action and how each nation would take the documents as policy blueprint and implement the many points they have agreed upon into regulations and programs related to the three main themes of CTI-CFF, which are coral reefs and general marine ecosystems conservation, fisheries regulations and food security within their own nations.

The data collection technique used by authors to acquire the necessary data for this research is literature review. The method of collecting data is undertaken through the examinations of various literatures related to the problem studied, covering from books, journals, documents, papers, reports, magazines, newspapers, and articles related to the research problems. For this study, data is collected from the year 2009 (implementation of the CTI-CFF) until 2019, to provide a comprehensive understanding of the dynamics that are reflected since its implementation.

The data analysis technique used the by authors is qualitative analysis techniques to analyze the data obtained during the research process. In the qualitative analysis techniques, the problem is described and explained based on the data and relevant facts related to the main phenomena that are examined in the research, research participants, and research locations, and further describe those empirical facts accompanied by supporting arguments. Then the results of the description and explanation are followed with analysis to draw analytic conclusions.

3. Results and discussion
3.1. General situation on the coral triangle within both Indonesia and the Philippines
The Coral Triangle region is located within the archipelagic part of Southeast Asia region into the western part of the Pacific region and containing around 79,000 km² of coral reefs, around 29% of the global total of coral reefs habitat [7]. The region also becomes the home for more than 150 million people who rely on healthy coral reefs and other coastal ecosystems to sustain their daily needs.

They rely on many healthy marine ecosystems such as coral reefs, mangrove, and seagrass beds to provide food, building materials, as a natural barrier on coastal areas, to support fisheries industry and tourism, and many more. The reefs and other marine ecosystems are supporting the livelihood for more than 100 million people who live in the coastal lines inside the Coral Triangle region [8]. The government of both Indonesia and the Philippines also enjoy many economical benefits from the region. Coral reefs, for example, is a favorite tourism spot for many entertaining and recreational activities, such as snorkeling, fishing, and even professional diving. The tourism industry contributes to the GDP of both nations, although the percentage for both nations is around 2% for the Philippines and around more than 1% for Indonesia. The conservation of coral reefs and any other marine ecosystems...
ecosystems will also provide net economic benefits for both nations, in which it is around 387 million USD for Indonesia and around 400 million USD for the Philippines (converted from USD 2010). These numbers will increase more nowadays due to the increase of development around the coastal areas in both nations [7]. The many species within marine ecosystems could provide many types of chemicals for the medical sector. There have been some researches on the potential benefits provided by the chemicals to combat many types of illnesses, such as HIV treatment, cancer, and malaria. Knowing there are only a few species that have been sampled to look for their chemical benefits on health, the potential to find more beneficial chemical substances is still as wide as the ocean [7].

Marine ecosystems and sea territory within the Coral Triangle region are both under many kinds of threats as well, coming from local threats within the region and from global nature phenomenon. Destructive fishing is one of the common local threats, and within the region it is happening at an unhealthy rate, causing severe damage to the ecosystem. The effect is apparent, resulting in the extinction of several types of local fishes, depletion of local fish stocks, and the closure of the fisheries industry in several locations. Agricultural run-off, industrial waste, and unsustainable coastal development are causing much damage to many marine ecosystems as well. Climate change as a global phenomenon is also contributing to a phenomenon called coral bleaching, where coral reefs are releasing their colourful zooxanthellae due to their sensitivity against the increase of seawater temperature. The process makes them expose their bone-white structure, and without much coverage from the zooxanthellae they become more prone to damage and could be die as well [7].

3.2. Regional plan of action and national plans of action
To achieve the goal to safeguard not only the Coral Triangle region but also related marine ecosystems and sea territory, the Regional Plan of Action was made as a policy blueprint to be adopted by each member. Considering its non-binding characteristic, each nation could implement it in a way suitable to their internal conditions and related existing regulations.

There are five overall goals inside the document, such as (1) priority seascapes; (2) ecosystem approach in fisheries management and other marine resources; (3) marine protected area; (4) climate change adaptation, and (5) threatened species. Each goal would have one or more time-bound targets to achieve [2]. As the multilateral cooperation progressed, each nation finally made its own respective National Plan of Actions as the result of the synthesis between the many suggestions inside the Regional Plan of Actions and their existing regulations and policy direction related to the said targets. Both Indonesia and the Philippines were expressing their willingness to achieve the many goals inside their own respective National Plan of Action, explaining their stances and focuses on said documents.

3.3. Implementation of CTI-CFF in Indonesia
To achieve the goal of conserving the coral reefs and other marine ecosystems, sustainable fisheries practice and the achievement of food security, the government of Indonesia has taken several steps to achieve said goals. As the biggest archipelagic nation in the world, Indonesia will obviously put much importance on its sea territory and marine ecosystems.

The government of Indonesia appointed several ministries to spearhead the implementation of CTI-CFF in 2009, such as (1) Directorate General of Forest Protection and Nature Conservation of the Ministry of Forestry; (2) Ministry of Marine Affairs and Fisheries and (3) Ministry of Environment [9]. These ministries were expected to be the leading actors in implementing the plan of action into a more concrete form.

In coral reefs and marine ecosystem conservation, the most notable step Indonesia has done is to further enhance the establishment and the regulations of Marine Protected Areas (MPAs) in Indonesia. Several past regulations, such as (1) Minister of Maritime Affairs and Fisheries Regulation (Permen-KP) No. Per.02 / Men / 2009 concerning Procedures for Establishing Water Conservation Areas and (2) National Law No. 32 of 2009 concerning Environmental Protection and Management are being enhanced further through the making of several supportive regulations, such as (1) Regulation of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia No. 13 of 2014 concerning the
Network of Aquatic Conservation Areas which serves as the legal basis and to allow many different MPAs to cooperate and collaborate with each other inside a much wider MPAs-network system and (2) Regulation of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia No. 47 of 2016 concerning Utilization of Fisheries Conservation Areas that regulates the proper usage of Fisheries Conservation Area. In both fisheries and food security aspects, the Ecosystem Approach on Fisheries Management (EAFM) is the main issue to implement in Indonesia. It is being aimed a complementary step to further support several past regulations, such as the National Law No. 31 of 2004 concerning Fisheries, Law No. 27 of 2007 concerning Management of Coastal Areas and Government Regulation No. 60 of 2007 concerning Conservation of Fisheries Resources [9]. EAFM could be understood as an effort to find the middle ground between the many social-economy goals with sustainable fisheries practices. To achieve it, the government of Indonesia has made several regulations to support the cause, such as (1) Regulation of the Minister of Maritime Affairs and Fisheries (Permen-KP) of the Republic of Indonesia No. 2 of 2015 concerning the Prohibition of the Use of Trawls and Seine Nets in the Fisheries Management Region of the Republic of Indonesia to limit the usage of several types of fishing nets, (2) Regulation of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia No. 4 of 2015 concerning the Prohibition of Fishing in the Fisheries Management Area of the Republic of Indonesia 714 that puts some limitations on fishing activities in Banda Sea near Maluku islands as the place is known as a fish breeding ground and (3) Regulation of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia No. 3 of 2012 concerning Implementation of Food and Energy Security Credit (KKP-E) in the Field of Maritime Affairs and Fisheries to further ease the access to funding for the fishermen communities in the form of bank loan, aiming to help their productivities further. This particular program is in line with the COATFISH (CTI Sustainable Coastal Fisheries and Poverty Reduction Initiative) goal within the Regional Plan of Action, which points out the need to provide proper funding programs for many coastal communities within the region through investments and supportive programs.

3.4. Implementation of CTI-CFF in the Philippines
To achieve the goals stated in the Regional Plan of Action and their respective National Plan of Action, especially the conservation of coral reefs and other marine ecosystems, sustainable fisheries practice and the achievement of food security, the Philippines also has taken several steps to achieve said targets. the Philippines government made an organizing committee to be the spearhead to achieve the goals, headed by the Department of Environment and Natural Resource and Department of Agriculture through the Bureau of Fisheries and Aquatic Resources. The members are consisting of several government agencies, non-government organizations, and several education institutions [5].

In coral reefs and marine ecosystems, the Philippines has taken some measures back then in 1991 through the Local Government Code of 1991 that allowed local and municipal governments the freedom to establish their own MPAs within their territory. The ruling was further enhanced through the National Protected Areas (NIPAS) Act of 1992 that improved several MPAs status as national MPAs, with Tubbataha Reefs Natural Park and World Heritage Site as one of the MPAs which got its status improved within the Act [10]. The NIPAS Act has been amended as well through the Republic Act No. 11038 as well, providing additional legal protection to around 94 of certain protected areas in which only 13 protected areas before them that were covered with additional legal protections outside of the NIPAS Act.

In fisheries and food security, the Philippines also aims to establish proper EAFM as well. Several regulations, such as The Philippine Constitution 1987, Fisheries Code, NIPAS Act are the general basis within the Philippines to establish a proper implementation of fisheries and coastal resources management. Although there has been no explicit regulation in regard of EAFM in the Philippines and some of the related regulations are not being implemented effectively with some apparent policy gap as well in their implementations, there have been several programs and policies which have aimed at specific fisheries management strategies and the establishment of conservation areas in which EAFM could be or have been implemented. Fisheries Code itself has been improved
through its amendment, Republic Act No. 10654, including IUU (Illegal, Unreported, and Unregulated) fishing as an additional concern within the Act [11].

4. Conclusion

As a conclusion, Indonesia and the Philippines have shown their efforts to implement the Regional Plan of Action of CTI-CFF inside their own countries, especially in relation to the three main themes of CTI-CFF, which are coral reefs and marine ecosystem conservation, fisheries management, and food security. The implementation done by both nations is being done dominantly in the form of enhancing and the amendment of past regulations.

Most of the implementations done by both countries are aiming at marine ecosystem conservation and fisheries management aspects. But for the food security aspect, both countries is approaching the matter according to the COATFISH program. While it is addressing the need to channel investments to coastal communities, more concise regulations are needed to not only giving the communities access to easier funding, but also easier access to affordable food and its availability as well.

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