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INTER-LGU FISHERIES MANAGEMENT PLAN

A Plan to Manage the Fisheries of Tawi-Tawi Marine Key Biodiversity Area

Applying the Ecosystem Approach to Fisheries Management

Covering the Municipalities of:

Bongao

Panglima Sugala

Sapa-Sapa

Simunul

South Ubian

Tandubas



December 2016



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1- INTRODUCTION

1.1 Site

Tawi-Tawi is an archipelagic and the southernmost province of the Philippines in the Sulu Archipelago bordering on Sabah, East Malaysia. It is part of the Autonomous Region of Muslim Mindanao and considered to be the most peaceful province of the region. It is divided into three groups of islands: 1) Cagayan de Sulu (Mapun) and Turtle Island Group; 2) Sibutu Island Group; and 3) the Tawi-Tawi Island Group. The province is a cluster of about 10 main islands and more than 300 islets, scattered southwards off the Zamboanga peninsula, beyond Basilan and Jolo. Of these more than 300 islets/islands, 88 are characterized by extensive coral reefs. (MSI-SMRR Report)

Tawi-Tawi has eleven municipalities, eight of which are island municipalities while three, also with islets, are found in the mainland. (Province) The Province is bounded by Sulu Sea on the north and west, and by the Sulawesi (Celebes) Sea on the east and south. The Mindoro/Panay throughflow reaches into the Sulu Sea and adjacent Bohol and Sibuyan Seas via the Verde Island Passage and the Tablas and the Dipolog Straits. The West Philippine Sea also connects to the southern Sulu Sea via the Balabac Strait. The Sibutu Passage links the southern Sulu Sea to the Sulawesi Sea or Celebes Sea. (MSI-SMRR Report) As such, the province boasts of rich nearshore and offshore fishing grounds. It is also home of the Turtle Islands Wildlife Sanctuary with an area of 242,649 hectares and hosting the largest sea turtle nesting beaches in the Philippines near the border of Malaysia (Ong et. al. 2002).



Figure 1: Tawi-Tawi Marine Key Biodiversity Area

Basic Features

All of Tawi-Tawi's eleven municipalities are coastal, with 198 of its 203 barangays primarily fishing villages. Bongao is the capital of the province where about 25% of the province's total population of 390,715 reside. (Census, as of August 2015) Population density ranges from 526 people per square kilometer in Sapa-Sapa to 84 in Tandubas. (ECOFISH CLE Training Report, July 2016 citing LGU Profiles)

The province’s total land area is 342,665 hectares or 3,426.55 sq. km. (Provincial Commodity Investment Plan) The composite shoreline for the 10 municipalities covers 821 km. Tandubas, the largest municipality has 241 km of shoreline while the smallest, Manuk-Manukan (Turtle Islands) has only 17km. (ECOFISH CLE Training Report, July 2016 citing LGU Profiles) Each of the municipalities has exclusive jurisdiction over its municipal waters measuring 12 kilometers from the general coastline. The ARMM Regional Government exercises jurisdiction over ARMM regional waters extending to offshore fishing grounds, up to all waters twenty-two and one-half (22 ½) kilometers from its coastline but inside the territorial waters of the Philippines, regardless of depth, the sea bed and the subsoil that are perpendicular to the general coastline. (Secs. 2.49 and 2.a, MMA 86)

The main ecosystem features of the coastal and marine areas of these municipalities within Tawi-Tawi Bay are:

1. Complex of islets and islands
2. Extensive coral reefs
3. Long stretch of coastline, with Tandubas having the longest at 241 kilometers
4. White sandy beaches

Figure 3. Focal Coastal LGUs of the Tawi-Tawi Marine Key Biodiversity Area (ECOFISH)

BONGAO



PANGLIMA SUGALA



SAPA-SAPA

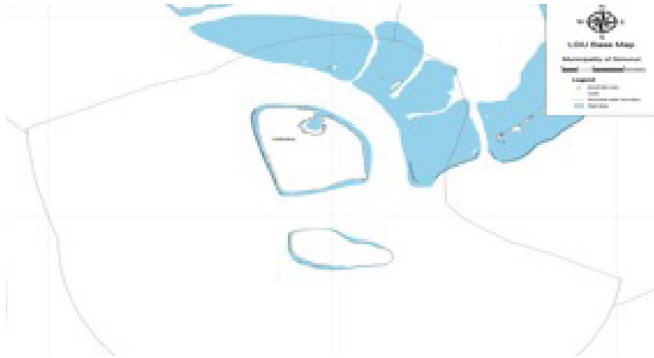


MUNICIPALITIES	SHORELINE (IN KILOMETERS)
Bongao	20
Languyan	142
Mapun	51
Panglima Sugala	94
Sapa-sapa	58
South Ubian	44
Simunul	29
Manuk-Manukan	17
Tandubas	241
Sitangkai	126
Sibutu	
TOTAL:	821

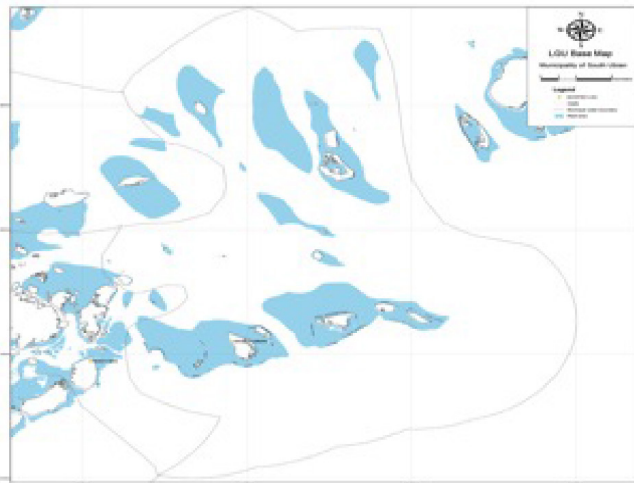
(ECOFISH CLE Training Report, July 2016 citing LGU Profiles.)

Tawi-Tawi Bay, which is the focal site of the ECOFISH project, is situated southwest of mainland Tawi-Tawi. The bay is surrounded by six municipalities, namely Bongao, Panglima Sugala, Tandubas, Sapa-Sapa and South Ubian. This Inter-LGU Fisheries Management Plan focuses on these six coastal municipalities within the Tawi-Tawi Marine Key Biodiversity Area.

SIMUNUL



SOUTH UBIAN



TANDUBAS



1.2 Background on the Plan

1.2.1 Rationale and Objectives

Traditionally, municipalities within Tawi-Tawi Bay plan and manage fisheries resources at the individual local government unit level. It has become increasingly apparent that the complexity and scale of fishery management extend beyond the boundaries of their respective municipal waters. Given the shared resource that they have, the Tawi-Tawi Bay that connects all of them, the six municipalities recognize that they need to work together to adopt common priority action plans and interventions. Earlier through the FISH Project funded by USAID/Philippines, three of these municipalities namely Bongao, Panglima Sugala and Simunul already started to harmonize their efforts. Through the current USAID Ecosystems Improved for Sustainable Fisheries (ECOFISH) Project, the three other municipalities are included in this harmonization of fisheries management.

The formulation of this Inter-LGU Fisheries Management Plan for Tawi-Tawi is an important step towards implementing and mainstreaming the Ecosystems Approach to Fisheries Management (EAFM). Through this plan and its implementation, the Municipalities of Bongao, Panglima Sugala, Tandubas, Sapa-Sapa and South Ubian, with support from the provincial, regional and national government as well as the academe, non-government organizations, can address the trans-boundary nature of the fisheries resources and habitats, their utilization, their management among themselves.

This Inter-LGU Fisheries Management Plan presents the various fisheries management issues under an ecosystem lens. Consequently, it is directed towards facilitating cooperation among the LGUs of Tawi-Tawi Bay and

and relevant provincial agencies/offices in implementing the priority fisheries management actions that they themselves have collectively identified based on pressing fisheries issues that the Tawi-Tawi Bay LGUs similarly face at present.

The specific objectives of the Inter-LGU Fisheries Management Plan are as follows:

- a) Identify the main fisheries-related problems and issues that commonly affect the Tawi-Tawi Bay coastal municipalities;
- b) Outline collective priority management actions in the short-/mid-term to address these specific issues with specific management objectives, expected outcomes, and success indicators;
- c) Specify the working arrangements, tasks, and functions of the relevant offices at the LGU, Province, and LGU alliances in implementing the various priority management actions;
- d) Guide decision-makers at the LGU and provincial levels to appropriate budget requirements for fisheries management in Tawi-Tawi Bay based on the outlined inter-LGU priority fisheries management issues of concern;
- e) Guide policy-makers at the LGU and provincial levels to develop or improve existing fisheries policies to make them more relevant and responsive to the inter-LGU priority fisheries management issues of concern;
- f) Outline a menu of monitoring and evaluation tools with which performance of the Plan's implementation shall be measured at the LGU and inter-LGU levels; and
- g) Adopt and mainstream the Ecosystem Approach to Fisheries Management in managing fishery resources of the Tawi-Tawi Bay municipalities by providing opportunities for joint management and evaluation of their fisheries

1.1.2 Guiding Principles for Planning and Implementation

This plan is guided by the general principles of the Ecosystem Approach to Fisheries Management (EAFM) (FAO Fisheries Department 2003; Garcia, Zerbi et al. 2003, RA 8550 as amended by RA 10654 and its IRR). In a nutshell, EAFM balances ecological and human well-being anchored on good governance, as illustrated below:

Figure 4. EAFM: Balancing Ecological and Human Well-Being Anchored on Good Governance

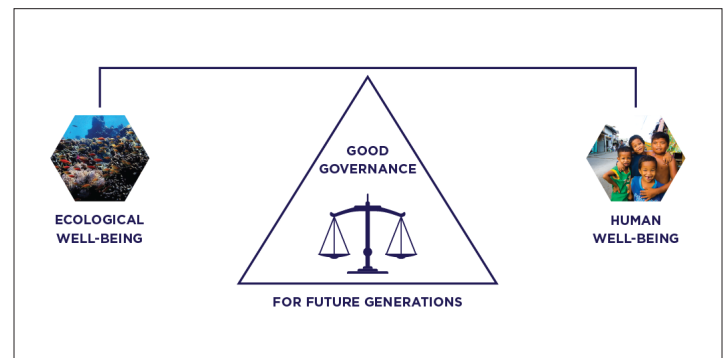


Figure 4.A: Considerations in EAFM



Mainstreaming EAFM, Philippine Version, BFAR, 2016

EAFM particularly relates to the following:

Ecological impacts of fishing. The impacts of harvesting a fishery species from the system do not end with that particular resource alone. Non-target species or non-target sizes of the catch may still end up as by-catch in fishing operations, or get injured and die from contact with the fishing gear underwater (incidental mortality). Further, the reduction or loss of a fishery resource, either at the species or functional group level, may result in many indirect impacts throughout the system in the form of disrupted predator-prey (trophic) interactions that may lead to likely shifts in relative dominance of populations and eventual changes in overall system function, productivity, and bio-diversity. Fishing operations should thus be conducted in a manner that: reduces, if not eliminates by-catch and/or the harvest of non-target sizes (i.e. juveniles); minimizes incidental mortality; and avoids over-harvesting of fishery species or stocks to maintain the “ecological relationship between harvested, dependent and related species”, and thereby ensure resource productivity and sustainable fisheries harvests.

Impacts of fishing on the environment and vice-versa. Fisheries activities may impact the physical and

oceanographic features of marine ecosystems that serve as habitats, feeding grounds, and spawning or nursery areas for the different fishery resources. Alterations to these features may cause a series of direct and indirect impacts to both target and non-targeted marine organisms such as disrupted life cycles, diminished food availability, and loss of shelter, thus leading to overall increased mortalities and reduced system productivity. Fishing operations should thus be conducted in a manner that minimizes their impacts on the physical and oceanographic features of marine ecosystems. Management measures should likewise be in place to safeguard critical component habitats and features of the marine environment against potentially harmful impacts of fishing.

The coastal and marine environment likewise hosts a multitude of activities and uses other than fishing, such as tourism and recreation, transport of people and goods, habitation, etc., that may also impact the marine ecosystem and the system’s productive capacity to support the fisheries. Policies should thus be in place to ensure the compatibility and appropriateness of the other activities and uses of the marine waters and minimize any of the potentially harmful impacts. This therefore necessitates a cross-sectoral approach in fisheries management.

Socio-economic impacts of fishing. A well-managed fishery is a productive fishery that sustainably provides for food, employment, and other elements that contribute to the overall social and economic well-being of coastal communities. Management policies and measures should therefore be in place to safeguard against activities that jeopardize the sustainability of the fisheries resources and their dependent livelihoods. Socio-economic approaches and incentives are moreover deemed necessary to complement the direct control and regulating mechanisms in fisheries management.

Finally, this plan adheres to the **Integrated Coastal Resource Management (ICRM)** framework that employs a holistic and interactive policy making approach to the planning and implementation process by facilitating the cooperation of different sectors and institutions at various levels of governance in addressing the complex management issues in the coastal areas, and by enabling the participation of various stakeholders in the planning, decision-making, and implementation of fisheries management programs and activities.

1.1.3 Planning Process and Content

This Inter-LGU Fisheries Management Plan of Tawi-Tawi is a product of a participatory planning process that involved all 6 partner municipalities of the ECOFISH, namely, Bongao, Panglima Sugala, Tandu Bas, Sapa-Sapa and South Ubian of the Province of Tawi-Tawi.



Municipal agriculturists, planning officers and members of the Committee on Agriculture/Fisheries/Environment of the Sangguniang Bayan and staff of these municipalities, participated in a series of workshops. Representatives from the Bureau of Fisheries and Aquatic Resources, Department of Environment and Natural Resources, Philippine National Police-Maritime Group, the Philippine Coast Guard, Mindanao State University, Tawi-Tawi Family Life Foundation, Regional Port Management Authority, among others, also provided inputs during the planning workshops in July 2014 and August 2016. Results of surveys conducted ECOFISH provided an updated baseline picture of the fisheries status in the area, with information on the bio-physical, socio-economic, and governance aspects of the area's fisheries (see ECOFISH 2014). All together, the survey results reinforced the inter-connected nature of the biological resources and habitats within and among the LGUs' respective municipal waters, the interrelatedness of the biological, economic, and social aspects of the fisheries, and ultimately, the interdependence of each LGU's fisheries governance success to the collective management efforts of all LGUs in the Tawi-Tawi MKBA.



They were also oriented on the Ecosystems Approach to Fisheries Management, whereby issues, threats and opportunities were drawn from them and their vision for the future articulated.



A Road Map & A Live Document

This plan essentially provides a roadmap for implementing the priority fisheries management actions of the Tawi-Tawi MKBA LGUs. The rest of the document is outlined to describe:

- **Where are we now?** (Sections 2-3: It is an annotated profile of Tawi-Tawi Bay LGUs, focusing on the fisheries status and the status of key coastal and marine systems and habitats; provides an overview of past and current management initiatives, issues, and opportunities)
- **Where do we want to go? How will we get there?** (Sections 4 & 5: They detail the Inter-LGU Priorities for the fisheries in the Tawi-Tawi MKBA, including the programs of action for each priority management, their objectives, expected outcomes, indicators of success and measurements, time-frame, relevant actors (responsible offices and agencies), and budget estimates)
- **How will we know that we are there?** (Section 6: It discusses a menu of M&E tools and the specific M&E mechanism adopted by the Tawi-Tawi MKBA)

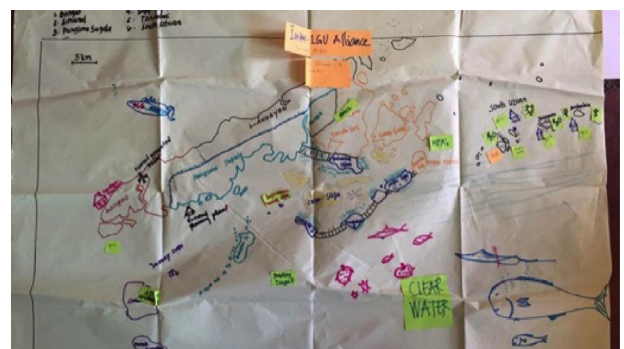
With the baseline information on hand, a review of the existing management policies and an evaluation of the common fisheries issues that continue to face the Tawi-Tawi Bay LGUs served as basis in formulating the priority fisheries management actions that shall be jointly pursued in the short/medium-term, in the next 3-5 years. Individual LGUs also identified their own complementary priority actions to be pursued at their respective municipal level in support of the inter-LGU priority actions.

Workshop participants were responsible in presenting the draft plans of action to their respective policy—and decision—makers for review and approval. Results were then validated in August 2016 and updated for incorporation into the overall Inter-LGU Fisheries Management Plan and finalized in November 2016.

The municipalities, with support from the provincial, regional and national governments, shall be guided by the Monitoring and Evaluation (M and E) section of this plan to periodically check whether or not targets and indicators are met, and if necessary, outline further steps to assist inter-LGU performance and cooperation.

This Inter-LGU Fisheries Management Plan is intended to be a live document, that the municipalities may enhance through additional planning for specific components of their fisheries management, such as on coastal law enforcement, on marine spatial planning and right-sizing as well as enterprise development planning and implementation.

Figure 5. A Vision for the Tawi-Tawi MKBA (Workshop Participants' Output)



2- PROFILE OF TAWI-TAWI MKBA

2.1 Key Ecological Features

2.1.1. Weather, Meteorology, Season

The dominant wind system over the Philippines is the Asian monsoon that blows from the northeast between December and March (amihan) and from the southwest between June and October (habagat) (Wang, et al. 2001). Based on Corona classification, the climate in the entire Sulu Archipelago is Type IV, which exhibits no distinct dry season and having evenly distributed rainfall throughout the year. Average temperature in Tawi-Tawi is between 26-27°C. Precipitation is generally less than 2,000 mm (Climate-data.org). Based on the climate typologies developed by David et al., the Sulu Archipelago belongs to Cluster VI, where higher intensity of Sea Surface Height (SSH) anomaly during negative Pacific Decadal Oscillation that occurs every 10 years is observed. (MSI-SSMR)

2.1.2 Oceanographic Characteristics

Tawi-Tawi is situated between two biogeographic regions of the Philippines: the Sulu Sea to the northwest and the Celebes Sea to the southeast. The Sibutu passage, which is an international sea-lane that separates the Sibutu and Sitangkai municipalities from the rest of Tawi-Tawi, serves as the main connection between the two seas. (MSI-SSMR) On the western side of the archipelago, water flows from the West Philippine Sea through the the Mindoro and Panay Straits.

The Mindoro/Panay throughflow reaches into the Sulu Sea and adjacent Bohol and Sibuyan Seas via the Verde Island Passage and the Tablas and the Dipolog Straits. The West Philippine Sea also connects to the southern Sulu Sea via the Balabac Strait. The Sibutu Passage links the southern Sulu Sea to the Sulawesi Sea (Celebes Sea). (MSI-SSMR)

2.1.3 Marine & Coastal Habitats

Coral Reefs, Seagrass and Mangroves

The status of coral reef/coral cover, sea grasses and mangroves of the six municipalities surrounding Tawi-Tawi Bay is detailed below, based on participatory coastal resource assessment.

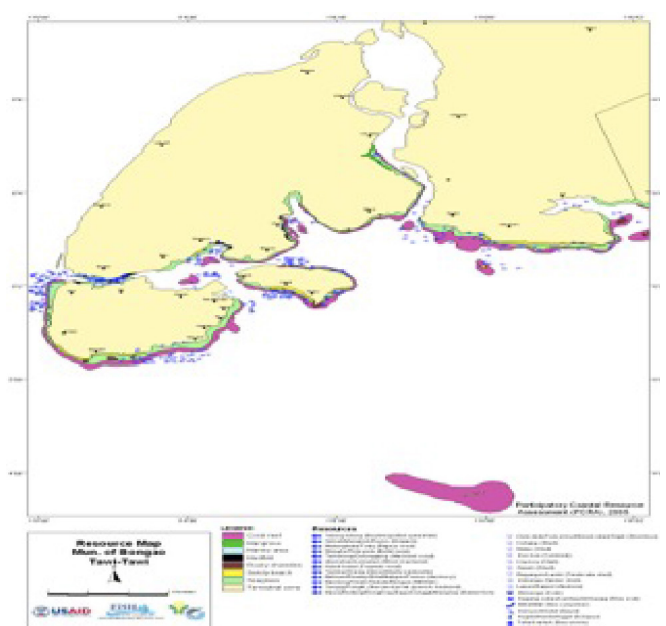
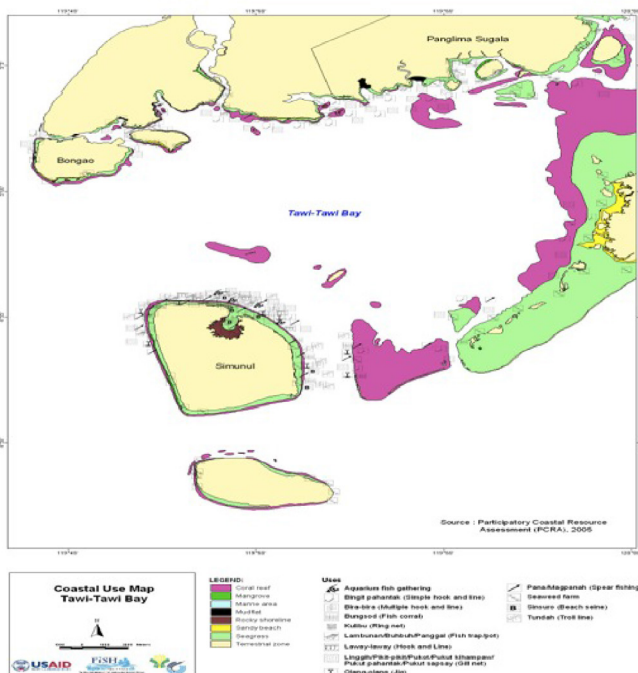
Figure 6. Key Marine Ecosystems

MUNICIPALITY	CORAL REEF/COVER	SEA GRASS/COVER	MANGROVE/COVER	WHITE SANDY BEACHES	SOURCE
Bongao	46% - Fair	40% - Disturbed	40% - Fair	-	PCRA, 2005
Panglima Sugala	46% - Fair	47% - Disturbed	58% - Good	-	PCRA, 2005
Tandu Bas	-	-	-	-	No Study Available
Sapa-Sapa	-	-	-	Panampangan Island	No Study Available
Simunul	41% - Fair	58% - Disturbed	46% - Fair	-	PCRA, 2005
South Ubian	-	-	-	-	No Study Available

(Participatory Coastal Resource Assessment, 2005)

Figure 6.A Uses of Coastal Resources and Environments in Tawi-Tawi Bay (FISH, 2005)

Figure 6.B Resource Map of Bongao (FISH, 2005)



Marine Protected Areas and Fish Sanctuaries

A total of twenty-four fish sanctuaries and marine protected areas have been established in Tawi-Tawi. Some of which are not functional while a few have yet to be supported by a legal instrument. Some of these were established by the LGUs with the assistance of the FISH Project, together with BFAR and MSU. The three MPAs in the Municipalities of Languyan, Mapun and Sitangkai were supported by World Wide Life Fund or WWF. Four more are proposed to be established in the Municipalities of Tandubas, Sapa-Sapa and South Ubian, through a Canadian-Government assistance.

Figure 7. MPA and Fish Sanctuaries in the Province of Tawi-Tawi

LOCATION	NAME OF FISH SANCTUARIES	AREA (has)	YEAR	ORDINANCE NO.
Municipality of Bongao				
Brgy Lagasan and Pababag	Lagasan_Pababag MPA	68.79	2005	163 s. 2005
Brgy Ungus-Ungus	Ungus-Ungus Fish Sanctuary	20.9	2007	167 s. 2007
Brgy Pasiagan	Pasiagan Fish Sanctuary	10.55	2009	176 s. 2009
Brgy Ipil	Ipil Fish Sanctuary	27.41	2009	177 s. 2009
Municipality of Panglima Sugala				
Brgy Batu-Batu and Kulape	Batu-Batu_Kulape MPA	52.33	2005	PS-03 s. 2005
Brgy Tondon	Tondon Fish Sanctuary	43.97	2007	PS-07-01 s. 2007
Brgy Babag	Babag Reef Sedentary Invertebrate Sanctuary	7.5	2007	PS-07-015 s. 2007
Brgy Liaburan	Liaburan Fish Sanctuary	23.38	2009	PS-09-002 s. 2009
Brgy Belatan Halo	Belatan Halo Fish Sanctuary	20.17	2009	PS-09-007 s. 2009
Brgy Buan	Buan Fish Sanctuary	31.84	2009	PS-09-003 s. 2009
Municipality of Simunul				
Brgy Doh Tong	Doh Tong MPA	44.89	2005	05-09 s. 2005
Brgy Tonggusung and Maruwa	Tonggusung_Maruwa Fish Sanctuary	8.2	2007	109-07 s. 2007
Municipality of Sitangkai				
Brgy Simalak	North Lagoon MPA	43.17	2007	
	Tubig Kuppiya MPA	87.42	2007	08 s. 2007
Municipality of Mapun	Tubig Kuppiya MPA	87.42	2007	08 s. 2007
Brgy Ungus Mataha	Manda Island MPA	52.61	2007	
Brgy Ungus Mataha	Manda Island MPA	52.61	2007	



LOCATION	NAME OF FISH SANCTUARIES	AREA (has)	YEAR	ORDINANCE NO.
Municipality of Tandubas	Sipungut Island Marine Sanctuary			
Municipality of Sapa-Sapa	Tonggusung-Bannaran Marine Sanctuary	4 (for 3 MS)	2007	No Specific Legal Instrument/Based on MMA 86 Same
	Top-Top Bannaran Marine Sanctuary Bannaran-Lookan Marine Sanctuary Malanta Fish Sanctuary	Unknown	2002	Same Res No. ..., S. 2002
Municipality of South Ubian	Tong Tampakan Fish Sanctuary	30	2014	No Legal Instrument Yet
	Sollogan Fish Sanctuary	30	2014	Same
	Bunay-Bunay Fish Sanctuary	30	2014	Same

(SSMR, ECOFISH, LGU-South Ubian, Simunul)

Seaweeds Farms

In Tawi-Tawi, the seaweed industry is considered as one of the major industries that benefit the majority of the coastal fisherfolk. Ninety (90) percent of the total coastal water in Sulu is suitable for seaweed culture. Two of the seaweed species being cultured in the seaweed farms are the Eucheuma and the Cappiphyucus spp. Sulu contributes 40% of the export on carrageenan, one of the world's foremost food and industrial additives today. Average domestic price of seaweeds shows an increasing trend. Fresh seaweed is at P58.00/kilo, chip is at P150/kilo and export of carrageenan is at \$4.50/kilo. Based on 2013 BFAR data, 5,621 hectares of planted seaweed produce f 26,956.2 metric tons of seaweeds. An additional of 3,786 hectares are considered potential area for seaweeds farming. Out of a total 2015 population of 262,176 from the six municipalities, 19,392 are engaged in seaweed farming.

(Provincial Commodity Investment Plan, 2015)

Municipality	Total Number of Population (Census, 2015)	Number of SW Farmers (PFO, 2014)	Production (MT) (PFO, 2014)	Area of Production (Hectares) (PFO, 2014)		Poverty Incidence (%) (PFO, 2014)
				EXISTING	POTENTIAL	
Bongao	100,527	3,203	21,632	1,228	30	30
Panglima	44,184	4,089	44,618	4,921	45	45
Sugala						
Sapa-Sapa	30,917	2,491	21,632	2,404	70	70
Simunul	31,223	3,203	26,867	2,949	63	63
South Ubian	25,935	3,203	32,829	3,611	1,085	48
Tandu Bas	29,390	3,203	41,357	4,559	2,118	70

(PCIP, 2015)

2.2. Key Socio-Economic Features: Population and Basic Demography, Post-Harvest, Market Infrastructure, Occupation, Income and Poverty

2.2.1 Population and Basic Demography

Tawi-Tawi is inhabited by several ethnic groups including the Sama, Tausug, Jama Mapun and Badjao (Sama Delaut), who constitute about 95% of its population. The Sama is the majority group inhabiting almost all of the island municipalities and they are seaweed farmers, fishers, boat-builders and traders in traders. The Tausug, originally from Sulu, have settled in Tawi-Tawi and are mostly farmers, fishers and traders. The Jama Mapun predominate in the Cagayan de Tawi-Tawi (Mapun Municipality) and Turtle Islands. The Badjao are the true indigenous people of the Sulu Islands but do not claim ancestral lands. Historically they were nomadic sea dwellers and lived on houseboats or lepa. Now they tend to live in houses on stilts near or over the sea or on their boats. They still maintain their original life of fishing, gleaning for shells and diving's for pearls and other valuable invertebrates. Most of them are highly marginalized and lack of access to education and social services. The Tawi-Tawi population is predominately Muslim with a strong influence from the Malay culture to the South. Islam was introduced in the Sulu Islands in 1380 by Karimul Makhdum who constructed the first mosque at Simunul. (ECOFISH CLE Training Report, July 2016 citing LGU Profile) The widely spoken language in the Sulu Archipelago is the Tausug language, while Yakan is spoken mainly in Basilan Islands. All throughout the archipelago, various dialects of Sinama are also spoken. (NSO CPH 2000, Tawi-Tawi Profile)

From a total 2015 population of 262,176 from the six municipalities, 34,140 fisherfolks are registered under the FishR while 980 boats from four municipalities are registered under the BoatR, as of November 2016. The Municipality of Bongao has the highest number of registered fisherfolk while Simunul has the least number of registered fishers.

Municipality	Tot. Number of Population (Census, 2015)	Number of Fishers Registered (FishR)	Number of Boats Registered (BoatR)
Bongao	100,527	9,501	86
Panglima	44,184	5,727	339
Sugala			
Sapa-Sapa	30,917	4,378	250
Simunul	31,223	4,174	305
South Ubian	25,935	4,901	619
Tandubas	29,390	5,459	-

2.2.2 Occupation, Income and Poverty

Seaweed farming and fishing are the major sources of the province's economy. In 2012, poverty threshold was at P10,027, although between 2009 to 2012, the Province of Tawi-Tawi posted the most significant decrease in poverty incidence from P7,289.00. This can be attributed to the increase of the price of seaweeds per kilo and the huge infrastructure investments that primed the once slow-moving economy. (Provincial Commodity Investment Plan) Based on a study, seaweed farmers earned an average of PhP21,000.00-PhP30,000.00 per annum. (PCIP citing Delasas and Tahiluddin, 2013)

The shallow depth of sea coupled with the short intervals of currents from the Sulu and Celebes Seas make Tawi-Tawi very conducive for seaweed farming (Eucheuma) which is the major of carrageenan, a seaweeds extract with multitudes of uses-from cosmetics, food additives, etc. to date, Tawi-Tawi is still the leading supplier of seaweeds throughout the country with 70% of total production. Tawi-Tawi stands to maintain this status in 2020 and beyond. (PCIP)



2.2.3 Post-Harvest, Market Infrastructure

A list of the major fish markets, fish landing sites and post-harvest support facilities is provided below. The number of these facilities in a particular LGU are indicative of the post-harvest support received by municipal fishers. The comparatively large number of fish ports in Bongao also reflect the volume of fishery products that are landed in the municipality.

Municipality	Fish Markets	Fish Landing Centers/Community Fish Landing Centers (CFLC, BFAR 2016)	Fish Ports	Ice Plant and Cold Storage
Bongao	1 - Bongao Poblacion	1 - Bongao Poblacion	5 - Poblacion, Lamion, Simandagit, Chinese Pier	3 - Poblacion, Lomboy Nalil, Tubig Mampallan
Panglima Sugala	2 - Bato-Bato Parangan	1 - Bato-Bato	1 - Bato-Bato Fishport	None
Tandubas	1 - Kepeng	1 - Kepeng (Completed, CFLC)	2 - Kepeng, Tandu en Salangan - Big	None
Sapa-Sapa	1 - Proper Sapa	3 - Proper Sapa, Banaran Island, Mantabuan	3 - Proper Sapa, Banaran Island	1 - Non-Operational
Simunul	1 - Ubol-Tubig Indangan	3 - Manok-Mangkaw, Bakong, Tonggosong 1-Ubol (Construction Phase, CFLC)	1 - Ubol-Tubig Indangan	None
South Ubian	1 - Tong Tampkan (Construction Phase-ARRM Helps, 2015)	Lahat Dampong (Construction Phase, CFLC) Tampakan Dampong	None	None

(Source: As reported by LGUs, BFAR CFLC, 2016)

Under BFAR's Community Fish Landing Center Program, four community fish landing centers have been completed, including those in Sitangkai, Sibutu and Languyan. Four more are currently being constructed, including that in Sitangkai. Community fish landing centers has a building for landing the fish catch as well as heavy duty refrigerator(s).

2.3 Key Institutional Features/Fisheries Governance

2.3.1 Overview of Relevant Laws, Regulations, Policies

In general, the Province of Tawi-Tawi located within the Autonomous Region of Muslim Mindanao is governed by the Organic Act of Muslim Mindanao, RA 6734, as amended by RA 9054 and the Fisheries Code of ARMM, MMA 86 as well as the Local Government Code of ARMM, MMA 25. MMA 86 provides for regional waters of 22.5 kilometers from the general coastline under the jurisdiction of the ARMM Regional Government and municipal waters extending to 12 kilometers from the general coastline under the jurisdiction of the LGUs.

At the municipal level, the fisheries and coastal resource management related policies and legislation of the Tawi-Tawi Bay LGUs are presented below. Significant executive orders pertain to the creation of technical working groups for coastal resource management and coastal law enforcement teams in the municipalities of Bongao, Simunul and Panglima-Sugala. Local legislation focuses on establishment of marine reserves, regulating measures, and fisheries registration. The three other coastal municipalities have yet to enact key fishery ordinances.



Figure 11. Summary of Local Legislation and Executive Issuances of Municipalities

Ordinance/Executive Order No	Title/Subject Matter
Municipality of Bongao	
Executive Order No. 8, S. 2005	■ Creation of CRM TWG
Executive Order No. 8, S. 2015	■ Creation of MCLET
Ordinance No. 163, S.2005	■ Establishing the Lagasan MPA
Ordinance No. 165, S.2006	■ Registration of fishing banca, gear and fisher
Ordinance No. 165, S.2006	■ Registration of fishing banca, gear and fisher
Ordinance No. 164, S. 2006	■ Illegal use of compressor
Ordinance No. 167, S.2007	■ Establishing the Ungus-Ungos Fish Sanctuary
Ordinance No. 168, S. 2007	■ Amending sec. 5 paragraph 1 of M.O 164
Ordinance No. 169, S. 2007	■ Banning the catching and transporting of mameng
Ordinance No. 176, S. 2009	■ Establishing the Pasiagan Fish Sanctuary
Ordinance No. 177, S. 2009	■ Establishing the Ipil Fish Sanctuary
Ordinance No. 207, s. 2014	■ Municipal Fisheries Code of Bongao
Municipality of Panglima Sugala	
Ordinance No. PS-07-002, S.2007	■ Banning of compressor
Ordinance No. PS-09-006, S. 2009	■ Banning of mameng
Ordinance No. PS-03, S. 2005	■ Ordinance establishing the Batu-Batu-Kulape marine protected area in the municipal water of Panglima Sugala
Resolution No. PS-09-003, S. 2009	■ Resolution adopting an ordinance declaring portion of municipal water in Barangay Buan,Panglima Sugala as marine protected area
Resolution No PS-09-002, S.2009	■ Resolution adopting an ordinance establishing fish sanctuary in Barangay Liaburan, Panglima Sugala
Ordinance No. 07, S. 2006	■ Ordinance adopting the registration and licensing of municipal fishers,fishing vessels and gears in the municipality of Panglima Sugala

Ordinance/Executive Order No	Title/Subject Matter
Ordinance No. PS 09-006, S. 2009	<ul style="list-style-type: none"> Ordinance banning the collection, gathering catching, selling and transporting of fish specie locally known as mameng within the municipal water of Panglima Sugala
Ordinance No. PS 09-005,S. 2009	<ul style="list-style-type: none"> Ordinance banning the catching and selling of any dolphins specie locally known as lumba-lumba or ubbung) within the municipal waters of Panglima Sugala
Ordinance No. PS 07-001, S.2009	<ul style="list-style-type: none"> Ordinance establishing the Tondon fish sanctuary in the municipal water of Panglima Sugala
Ordinance No PS 07-015, S.2007	<ul style="list-style-type: none"> Ordinance establishing the Bagbag Reef Sedentary Invertebrate Sanctuary in Tanduh, Barangay Tondon, Tawi-Tawi
Ordinance No. PS 07-002, S.2007	<ul style="list-style-type: none"> Ordinance banning the use of air compressor for fishing within the municipal water of Panglima Sugala
Executive Order No. PS 02, S.2005	<ul style="list-style-type: none"> Creating the Coastal Resource Management Technical Working Group (CRM-TWG) for the municipality of Panglima Sugala
Resolution No. 01,S. 2007	<ul style="list-style-type: none"> Resolution recommending portion of the coastal water in Barangay Tondon be declared fish sanctuary
Ordinance No. PS 07-001, S.2007	<ul style="list-style-type: none"> Ordinance establishing the Tondon Fish Sanctuary in the municipal water of Panglima Sugala
Resolution No PS-06-26,S. 2006	<ul style="list-style-type: none"> Resolution adopting the municipal fisheries management plan of the municipality of Panglima Sugala, Tawi-Tawi for the year 2006-2010
Executive Order No. 12, S. s 2006	<ul style="list-style-type: none"> Creation of the Panglima Sugala Coastal Law Enforcement Team



Ordinance/Executive Order No	Title/Subject Matter
<p>Municipality of Sapa-Sapa</p> <p>Resolution No. 01, S. 2002</p> <p>Resolution No. __, S. 2002</p>	<ul style="list-style-type: none">■ Seeking the help in Establishing a Fish Sanctuary in Brgy. Malanta■ Declaring Portions of Brgy. Malanta as Fish Sanctuary and Special Fisheries Management Zone
<p>Municipality of Simunul</p> <p>Ordinance No. 09-06, S.2006</p> <p>Ordinance No.08-06, S.2006</p> <p>Ordinance No. 002-14, S.2014</p> <p>Ordinance No. 003-14, S.2003</p> <p>Ordinance No. 07-08, S. 2007</p> <p>Resolution No. 005-06, S.2006</p> <p>Resolution No. 1, S. 2007</p> <p>Ordinance No. 03-04, S. 2003</p>	<ul style="list-style-type: none">■ An ordinance banning the use of air compressor for fishing within the municipal water of Simunul■ Ordinance adopting the registration and licensing of municipal fishers, fishing banca and gear in the municipality of Simunul■ Ordinance declaring the whole waters of Lo-ok at Barangay Tonggusong as expanded marine fish and crab sanctuary in the Municipality of Simunul, Tawi-Tawi, and prohibiting fishing or any mode of catching fish and crabs■ Ordinance regulating the quarrying of white sand in the municipality■ Establishment of Tonggusong-Maruwa Fish Sanctuary■ Adopting the Municipal Fisheries Management Plan of Simunul■ A joint resolution recommending portion of the coastal waters in Barangay Tonggusong and Maruwa be declared fish sanctuary■ Ordinance declaring a protected coastal resource area in the Municipality of Simunul

Ordinance/Executive Order No	Title/Subject Matter
Ordinance No. 06, S. 2010	<ul style="list-style-type: none"> ■ Creating Simunul Economic Enterprise and Development Section (SEEDS) in the Office the Municipal Treasurer of the Municipality of Simunul
Ordinance No. 05-08, S. 2005	<ul style="list-style-type: none"> ■ An ordinance Establishing the Doh Tong Marine Protected Area in the municipal water of the Municipality of Simunul
Executive Order No. 5, S. 2006	<ul style="list-style-type: none"> ■ Creation and designation of Coastal Resource Management Technical Working Group (CRM-TWG)

2.3. 2 Jurisdictional Boundaries of Municipal Waters

All of the municipalities have no ordinance for municipal water delineation and delimitation. All of the LGUs have identified this as one of the priority actions for fisheries management, requesting the assistance of ECOFISH to obtain the preliminary technical descriptions from the national government mapping agency NAMRIA charged with the preliminary delineation and delimitation of municipal waters. (Attachment 8.4)

2.3. 3 Organizations/Institutions Involved in Fisheries Management

By virtue of the Local Government Code (LGC) of the Autonomous Region of Muslim Mindanao (MMA 25) enacted in 1993 as well as the Fisheries and Aquatic Code of ARMM (MMA 86), functions related to CRM and fisheries management within the municipal waters have been devolved to Municipal Fisheries Office (MFO) under the Office of the Mayor. In some LGUs, CRM Technical Working Groups were created specifically to address CRM — related concerns in the municipality. These functions, include among others, the implementation of community — based forestry projects (i.e. mangrove rehabilitation, reforestation, and management projects); establishment and management of protected areas (e.g. MPAs, reserves,

fish sanctuaries); conservation of rare and endangered marine species; registration and licensing of municipal fishers, fishing vessels, and gears; enforcement of fishery laws; and the planning, developing, implementing and M&E of programs for the conservation and management of coastal and fishery resources.

2.3.4 Programs/Projects related to Fisheries and Coastal Resource Management

MPA and fish sanctuary establishment, mangrove planting, coastal clean-ups, education campaign and formation of coastal law enforcement teams are some of the key initiatives of the LGUs. Most of these were initiated in three municipalities largely with the assistance of the USAID-funded FISH Project from 2003 to 2009 and now currently through the ECOFISH Project. WWF and CIDA likewise provided assistance in coastal resource management. The Mindanao State University based in Bongai is also a strong partner in coastal resource management. Partner-LGUs, particularly Bongao, Panglima Sugala and Simunul were provided assistance in conducting habitat assessment, creation of CRM TWG, creation and training of law enforcement teams, monitoring and evaluation, developing information and education materials.



Figure 12. Major Fisheries and Coastal Resource Management Projects

Key Development Projects on Fisheries and Coastal Resource Management in Tawi-Tawi:

Coastal Resources and Fisheries Conservation Project implemented by World Wide Fund for Nature Philippines, with funding from USAID. Its goal is to have diverse, healthy and productive marine biodiversity, with sustained socio-economic benefits for Tawi-Tawi. This will be achieved through establishing and/or strengthening management of Marine Protected Areas (MPAs) in Tawi-Tawi.

Fisheries Improved for Sustainable Harvest (FISH) Project, with funding from USAID. In the Municipalities of Bongao, Simunul, and Panglima Sugala, the coastal areas suffered from overfishing and destructive practices of blast and cyanide fishing. The project provided community leadership trainings and extensive information and education campaign, supported policy and ordinance formulation and strengthened management and enforcement of laws relating to coastal resources. The FISH Project promoted sustainable traditional and indigenous fishing practices, with the target of increasing fish stocks by 10% in 10 years based on 2003 level.

ECOFISH, a BFAR-USAID Project, extended the technical assistance on fisheries management using an ecosystems approach to the three municipalities of Bongao, Simunul, and Panglima Sugala to include Sapa-Sapa, South Ubian and Tandubas, starting in 2013 until 2017.

Local Government Support Program for ARMM, with funding from CIDA. This is a coastal resource project that aimed to establish MPAs in Sapa-Sapa, Tandubas and South Ubian.

(MSI-SSMR, Ecofish)

The proposed inter-LGU arrangements for fisheries management will be the first attempt to bring together all six LGUs for the implementation of coastal management programs or initiatives. Previously, inter-LGU cooperation was secured for coastal law enforcement among the Municipalities of Bongao, Simunul and Panglima Sugala. The coastal municipalities have been attempting to form an alliance to address common issues for years now. In this plan, this is identified as the foremost priority action to be taken.

2.3.5 EAFM Benchmarks for LGUs

A 17-item Ecosystems Approach to Fisheries Management (EAFM) Governance Benchmarking system (Annex 3) developed by the ECOFISH Project provides a framework that guides the LGUs in effectively implementing EAFM programs in their respective localities, primarily by providing guideposts for the various stages of their implementation. The benchmarks are subdivided into two major groups: (A) 11 basic requirements and (B) 6 site specific requirements based on four levels. Level 0 to 1 means program/s are established. Level 2 indicates that programs are functional. Level 3 means programs are sustained and results realized.

A summary of the LGU benchmarking results for Tawi-Tawi in 2013 shows that majority of the LGUs are at levels 0 to 1 (programs established) for both basic and site-specific requirements. Bongao, Panglima Sugala and South Ubian achieved level 2 (programs functional) in some benchmarks. Only Panglima Sugala achieved level 3 (programs sustained and results realized) in for the basic requirement in relation to their marine protected areas.

Figure 13. Summary of LGU Performance Benchmarks in 2013 – Basic Requirements (ECOFISH)

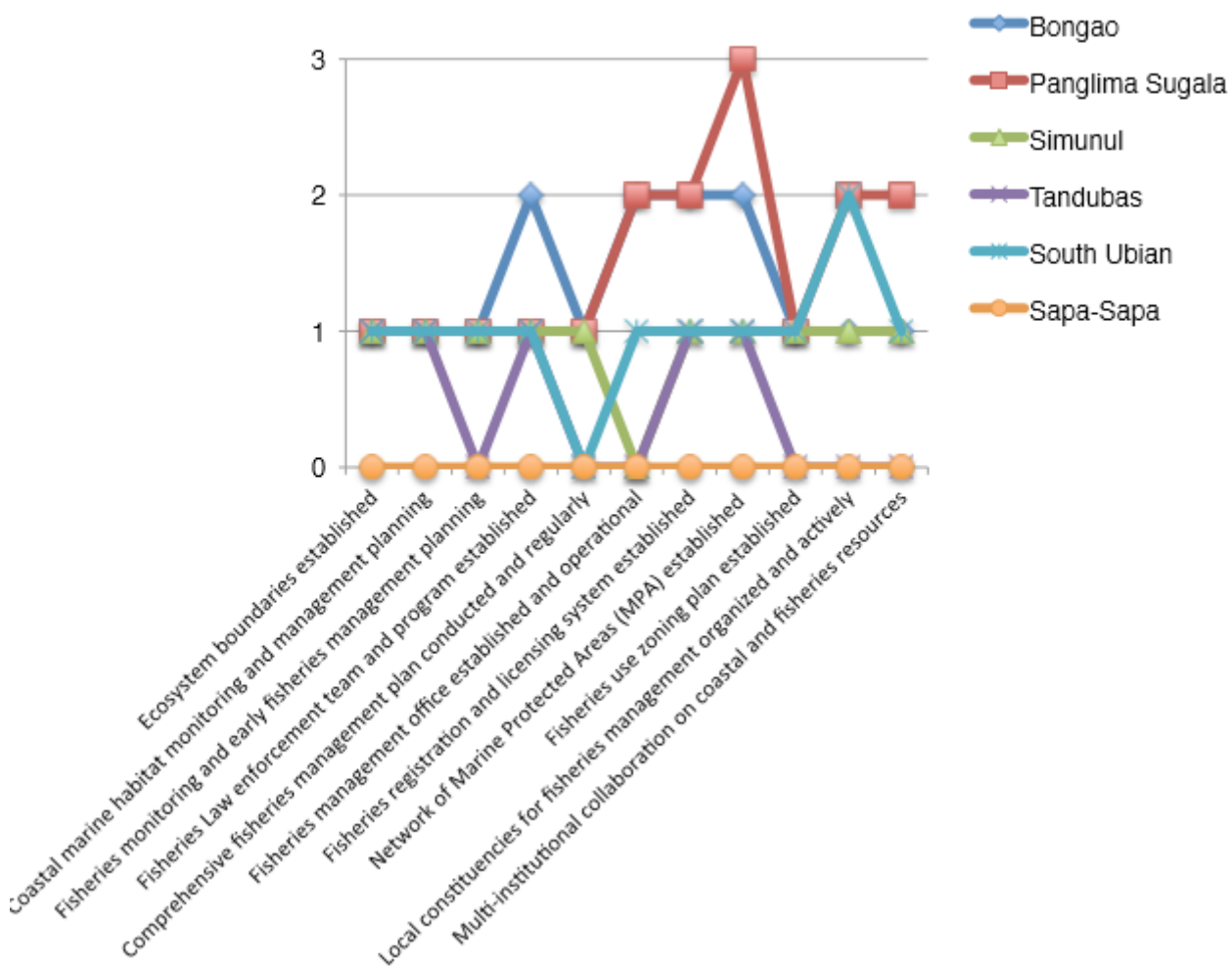
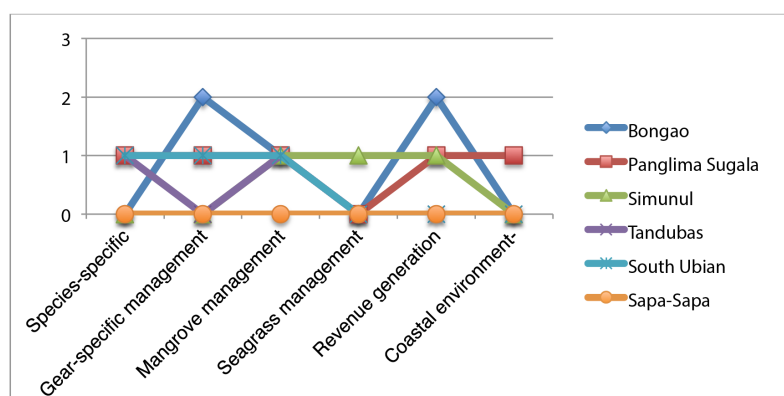


Figure 13.A Summary of LGU Performance Benchmarks in 2013 – Site Specific Requirements





2.4 Fisheries in Focus: Seaweed Culture and Capture Fisheries

2.4.1 Gears and Efforts, including Gear Distribution, Catch and Trends

Tawi-Tawi is considered as the top seaweed producing province in the Philippines. Based on 2013 estimates of the Bureau of Agricultural Statistics, the province produced about 294,595.80 metric tons of seaweeds equivalent to a value of PhP1,833,561,000. As of 2000, there was an estimated 26,800 hectares of seaweed farms in the entire province of Tawi-Tawi (Romero, 2002). The largest total area of seaweed farms was about 6,739 hectares in the Municipalities of Sitangkai and Sibutu. As of 2000, 21,500 fisherfolks are estimated to be engaged in seaweed culture throughout the province. (PCIP)

For capture fisheries, the total yield of municipal fisheries and commercial fisheries sectors were about 36,670.64 metric tons, valued at PhP 1,767,347,390, and 874.11 metric tons valued at PhP 30,825,000, respectively. In 2013, the most dominant catches from commercial fisheries were Indian sardines (tamban) followed by yellowfin tuna (tambakol/bariles) Indian mackerel (alumahan), big-eyed scad (matanbaka), frigate tuna (tulingan), Indo-pacific mackerel (hasa-hasa) and cavalla (talakitok). These fishes constitute more than 50% of the total catches from commercial fisheries. For municipal fisheries, the most commonly caught fishes were also dominated by pelagic fishes such as yellowfin tuna, Indian mackerel, Indian sardines and frigate tuna. (MSI-SMRR)

Aquarium and live reef fishery is also very common in the province. Based on the auxiliary invoices collected by BFAR's provincial office since 2010, Tawi-Tawi has been shipping between one to five tons of live fish annually out of the province, mostly to Zamboanga, Cebu and Manila. The invoices were collected at the Bongao pier, where all the fishery products are normally shipped out of the

province. There are also anecdotal accounts about some undocumented and illegal live fish trades particularly with foreign clients who go directly to Tawi-Tawi. (MSI-SMRR)

3 - ISSUES/PROBLEMS AND OPPORTUNITIES

3.1 Ecological Dimensions

Human disturbances such as such as increase in fishing pressure, coastal habitat destruction from sand quarrying and shore development; and pollution are threatening the sustainability of the province’s rich marine resources. Destructive fishing practices such as blast fishing, poison fishing and use of fine mesh nets are still very rampant in many areas in Tawi-Tawi. Commercial fishers from all over the country and from Malaysia poach inside the regional and municipal waters of Tawi-Tawi and ARMM. Live reef fish trade of various ornamental including IUCN red list and CITES protected species such as the leopard coral grouper or suno (*Plectropomus leopardus*), humpback grouper or señorita/kulapo kubing (*Cromileptes altivelis*) and humphead wrasse or mameng

(*Cheilinus undulatus*) is still on-going. Green sea turtles (*Chelonia mydas*) poaching is also a big challenge to law enforcers in the province. (Source: MSI-SMRR)

During a workshop in August 2016, workshop participants from the six municipalities and other institutions identified the perceived changes in their fishery resources and their habitats in the past twenty years. Details are shown in Annex A of this plan.

The top positive and negative changes observed are the following:

Figure 14: Top Perceived Changes and its Causes in Fisheries

Perceived Negative Changes	Perceived Causes
<ul style="list-style-type: none"> <input type="checkbox"/> Degraded habitats: reefs, sandy beaches, mangroves <input type="checkbox"/> Reduced fish catch 	<ul style="list-style-type: none"> <input type="checkbox"/> Destructive fishing practices increased pressure on resources due to rising population & use of mangroves for fuelwood andfor construction <input type="checkbox"/> Encroachment of commercial fishers <input type="checkbox"/> White sand quarrying Coastal development <input type="checkbox"/> Increase number of fishers and gear efficiency <input type="checkbox"/> Coastal dwellings over sea grasses
Perceived Positive Changes	Perceived Causes
<ul style="list-style-type: none"> <input type="checkbox"/> Establishment of MPAs <input type="checkbox"/> Fishery management initiatives <input type="checkbox"/> Improved fisheries enforcement <input type="checkbox"/> Economic progress 	<ul style="list-style-type: none"> <input type="checkbox"/> Increased awareness <input type="checkbox"/> Improved enforcement capabilities <input type="checkbox"/> Support and cooperation of agencies

Coral Cover and Fish Biomass

Based on a 2010 FISH Project survey, the mean coral cover in six marine protected areas and adjacent reefs within the Tawi-Tawi Bay ranged from 9-29% cover only, representing a decrease in a span of four years.

Previously, a 2006 baseline survey showed that 5 out of the 6 surveyed MPAs had 29-39% coral cover. (Figure 14) In terms of fish biomass, the mean values ranged from 27-47 metric tons per square kilometers. This is an over-all increase of about 24% compared to 2006 levels. (Figure15) (Annex D)

The increase in fish biomass can be attributed to the effectiveness of the established MPAs but also to the reduction of destructive fishing activities like blast and poison fishing, which were very rampant prior to the implementation of the FISH project. Despite the increase, fish biomass levels are still much lower than expected from the area's natural productivity. Therefore, with proper management, the condition of reef fish in Tawi-Tawi can potentially improve some more.

Figure 15. Coral Cover Percentage Decrease in Six MPAs and Adjacent Reefs Monitored from 2004-2010 (Fish Project)

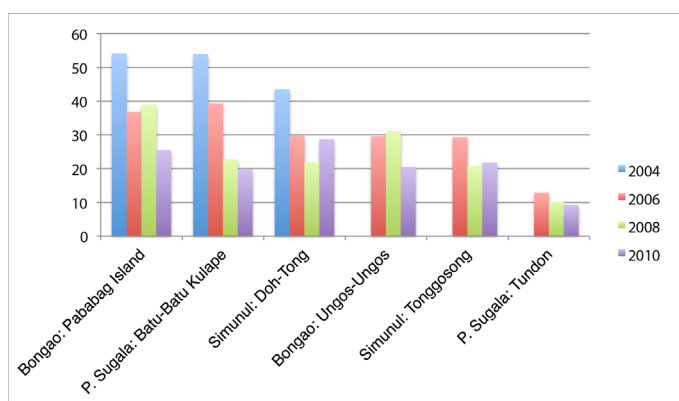
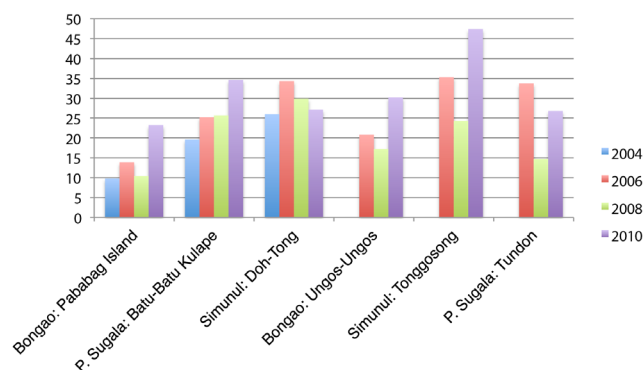


Figure 16. Fish Biomass Increase in Metric Tons Per Square Kilometer in Six MPAs and Adjacent Reefs Monitored from 2004-2010 (Fish Project)



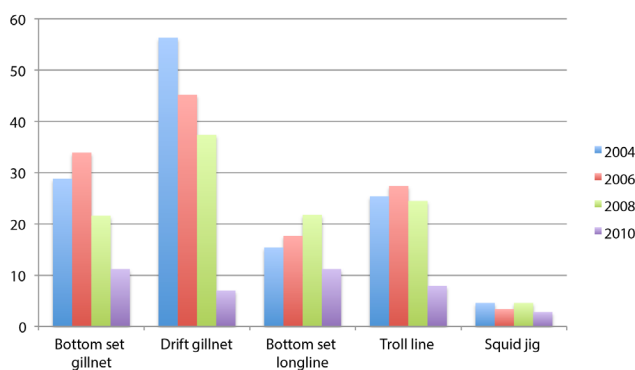
Landed Catch and Catch per Unit Effort (kilograms of fish per day of fishing)

An over-all decline in catch per unit effort or kilograms of fish caught per day of fishing from 2004 to 2010, based on monitoring of landed catch in select sites by the FISH Project (Figure 16). Severe decline occurred in the 2010 survey results, where catch rates dropped to less than half of the 2004 levels for bottom set gillnet, drift gill net and troll line.

The FISH Project conducted experimental fishing surveys using some major fishing gears to see what species of fish are being caught. These surveys are useful for monitoring trends in biomass and species mix, i.e. how much fish is there and what fishes are actually there. They provide a more unbiased picture of actual species mix, as they are conducted in randomly selected sampling stations across the bay, and not just in favored sites. For bottomset gillnets, catches were dominated by soft-bottom substrate associated fish such as threadfin breems (*Scolopsis taeniopterus*) slipmouths (*Leiognathus leuciscus*) and mojarras (*Gerres macrosoma*). Pelagic fish such as various species of scads and also coral reef associated demersal species such as the snappers and goatfish were also among the dominant catches.

The dominant catches of bottomset longlines were the carnivorous coral reef associated fish such as snappers, emperors and groupers. Jacks, a reef associated pelagic fish, were also among the commonly caught fish by bottomset longlines. (Fish Project)

Figure 17. Catch per Unit Effort or Kilograms of Fish Caught Per Day of Fishing Using Some Major Fishing Gears Monitored in Selected Landing Sites within the Tawi-Tawi Bay (FISH Project)



3.2 Socio-Economic Dimensions

3.2.1 Post-Harvest Losses

No available study on post-harvest losses informed this plan. Nonetheless, post-harvest losses (due to reduced fishery value) are incurred when fishery products are transported to external markets owing to factors such as mishandling, delays in transport, inadequate transport facilities, and inadequate preservation facilities. Significantly, only Bongao has functional ice plant and cold storage, with 3 such ice plants, while no other Municipality has such post-harvest facility. Through BFAR’s Program on Community Fish Landing Centers and ARMM Helps, landing centers are being built over the years to address this concern.

3.3 Social/Human Welfare Dimensions

3.3.1 Intensified Resource Use Competition and Conflict

Due to high exploitation rates, demersal fish catches have

reportedly declined over the years. Exploitation levels continue to rise over time, competition among fishers who are also growing in number, intensifies and the catch per unit effort decreases. The situation is exacerbated by illegal fishing practices such as the use of dynamite and cyanide, use of fine-meshed nets, and encroachment and poaching by commercial fishers in municipal waters as well white sand and coral quarrying for construction purposes.

3.3.2 Other Socio-Economic Issues

Owing to its proximity to Malaysia, Tawi-Tawi is a hotspot for human trafficking. Inter-island transportation is also an issue in this archipelagic province. Child labor in fisheries, seaweed farming and other industry also prevails. The growing population, aggravated by migration is also highly dependent on the coastal and marine resources for their livelihood, with not much alternatives. (LGU Discussions)

3.4 Institutional and Legal Dimensions

3.4.1 Limited Institutional Capabilities

Municipal Fisheries Office, MFARMCs

Most Municipal Fisheries Office (MFO) in the Tawi-Tawi Bay are staffed with only one to three dedicated personnel. The Municipality of Bongao has a designated MFO with three staff, Sapa-Sapa has an MFO with one staff, Panglima Sugala has one MFO with two staff while Tandubas, Simunul and South Ubian has no dedicated staff for their MFOs. MFARMCs in Bongao, Simunul and Panglima Sugala are established since 2005 while the three other municipalities of Tandubas, Sapa-Sapa and South Ubian has no MFARMC. Fisherfolk organizations exists in Tawi-Tawi Bay.



Local Capacities for Fisheries Law Enforcement

A Coastal Law Enforcement Baseline Assessment Workshop conducted in July 2016 diagnosed the status of various enforcement teams currently operating in Tawi-Tawi MKBA. Based on self-assessment and reporting, municipalities shared their available logistical support, mechanisms established, organizational structure, or the municipal fisheries policies and ordinances enacted, and results of their efforts. Only three out of the six municipalities have formed their enforcement teams. These three LGUs of Bongao, Panlima Sugala and Simunul organized an alliance of enforcement teams during the FISH Project, but which eventually became inactive. Of the three LGUs with enforcement teams, only two are operational, reporting 12 and 6 apprehensions but no single prosecution for 2015.

Figure 18. Status of Coastal Law Enforcement Teams

Official Name of Coastal Law Enforcement Team	Bongao MCLET	Panglima Sugala MCLET	Simunul MCLET
Legal Basis for establishing the team	Executive Order	E.O. No. 12	
Name of team leader in the field	MSOU C.O	VM Nagdar S. Salih	Reverick Jerry
Total number of members	48	120	14
Number of members (with financial support)	40	90	Php 500
Number of members (no financial support)	8		None
Number of Volunteer members	None	30	None
Number of members who are government employees	48	55	None
Number of Fish Wardens deputized by BFAR	None	None	None
Number of PNP participating in actual operations	15	8	None
Other enforcement units participating apart from PNP	AFP	Navy, Marines	None
Enforcement Budget allocated by LGU	Not fixed	Approx. P250,000	
Actual/estimated enforcement expenditure in 2015	P200,000.00	P500,000.00	
Main enforcement equipment/assets	Patrol boat, radio	2 pumpboats in MPA	None
Number of seaborne operation conduct in 2015	5	MPA's Daily	None
Number of land-based operation conducted in 2015	4	6	None
Total amount of items confiscated in 2015	20	10,500	None
Number of persons apprehended in 2015	12	6	None
Numbers of cases successfully prosecuted under the national law	None	None	None

Official Name of Coastal Law Enforcement Team	Bongao MCLET	Panglima Sugala MCLET	Simunul MCLET
Number of cases successfully prosecuted under the municipal ordinance	None	None	None
Law enforcement training attended in last 2 years	None	None	MPA Planning
Name of assisting organization on CLE	None	BFAR, ECOFISH, TF, PNP	None
Awards received by the team , if any	None	None	None

(Ecofish, 2016, CLE Training Report)

Among the LGUs in Tawi-Tawi MKBA, the municipality of Tandubas, South Ubian and Sapa-Sapa has the most number of violations happening in their coastal and marine environment. Various types of destructive fishing activities are being committed by fishers from neighbouring municipalities as well as local residents. It ranges from dynamite fishing, cyanide, compressor, collecting of sea turtle and cutting of mangroves. It appears that despite the presence of enforcement teams who have been organized since the mid-2000s, violators have not been deterred. According to the participants violators simply operate in areas where enforcement is weak. They also said that political intervention remains to be an issue. They also added that as leadership in the LGU changed through the years it also affected the compliance and enforcement in the area.

Figure 19. Violations, Violators and Residence of Violators

Violation/Threat to municipal waters	Exact location where it occurs	Suspected violator	Residence of the violator
Dynamite & explosive fishing	Banaran and Mantabuan Island Brgy. Panglima Mastol, Brgy. Bagid, Tubig Indangan, Brgy. Sangay Siapu Unasan, Tandubas(Silantup), Part of Ubian, Proper Laom Tabawan, Bintawlan, Bubuan Belatan Halo, Tabunan Buan, Tongbangkaw, Luuk Buntal, Balimbing, Liaburan	Native and outsiders	Pagasinan, Lamion, Tubig Mampallam, Tubig Tanah Simunul, Bongao Belatan Halo, Tabunan Buan, Tongbangkaw, Liaburan Silantup
Cyanide/ compressor	Banaran Island, Brgy. Ubol, Sokah Bulan, Tampakan, Bakong, Panglima Mastol, Bagid, Sangay Siapo, Part of Ubian Proper, Laom Tabawan, Bintawlan, Bubuan	Outsiders	Pagasinan, lamion Tubig, Mampallam, Bongao, from other provinces



Figure 19. Violations, Violators and Residence of Violators

Violation/Threat to municipal waters	Exact location where it occurs	Suspected violator	Residence of the violator
Coral Quarrying	Within Sapa-Sapa municipality Kalang	Residence	Sapa-Sapa Mainland Barangay
Turtle Poaching	Barangay Bagid, Tandubato, Municipal water of three adjacent municipality	Native	Simunul, Tandubato from the three municipality
Use of fine mesh nets	Barangay Tubig Indangan	Native	Simunul
Mangrove Cutting	Panglima Mastol, Tonggosong, Maruwa Belatan Halo, Tabunan Buan, Tongbangkaw, Luuk Buntal, Balimbing, Liaburan	Native	Simunul, Balimbing, Panangan, Kulape, Batu- Batu, Dungan, Karaha, Mallacca
Sand Quarrying	Sangay saipu Belatan Halo, Tabunan Buan, Tongbangkaw, Luuk Buntal, Balimbing, Liaburan	Outsider	Bongao, Lamion, Simandagit, Pagasinan- Balimbing, Panangan, Kulape, Batu-Batu, Dungan, Karaha, Mallacca
Encroachment	Within the municipal water	Fisherfolks from different places	From different municipalities and provinces
Compressor, activities Beach seine	Buan, Balimbing Silupah, Tongbangkaw	From Bongao, Sapa-Sapa, Simunul	Sapa-Sapa, Simunul, Bongao, Tongbangkaw, Belatan Halo
Hangpas Tubli	Belatan Halo, Tongbangkaw Sibaloo		Belatan Halo, Tongbangkaw Sibaloo
Dumping of solid waste	All Barangays	Everyone	Residence 60%



3.4.2 Inadequate Fisheries Policies

Most municipalities in Tawi-Tawi MKBA do not have comprehensive fisheries ordinances. Only three out of six municipalities have enacted ordinances in the past decade. These are mostly for purposes of establishing fish sanctuaries and marine protected areas. The organization of the MFARMC for most of the municipalities is needed to be done, to activate this multi-sectoral bodies tasked with recommending and endorsing fishery-related ordinances.



4-PROGRAM/PROJECT INTERVENTIONS

Past management initiatives and studies on the fisheries in Tawi-Tawi MKBA have identified a range of possible management actions for both the biological harvest and component habitats in the area. This section is not meant to discuss them. It outlines a set of management actions that are based on the priority fisheries management issues and needs in the MKBA as identified by the local partners during a series of Inter-LGU Fisheries Management Planning Workshops. These priorities correspond to either (a) management issues that warrant urgent attention because of potentially serious sustainability impacts or (b) capacity-and constituency-building pre-requisites to facilitate the overall management of the Tawi-Tawi fisheries resources guided by the EAFM and ICRM frameworks. Subsequently, priority management actions earlier identified in existing Fisheries and CRM Plans, and those that had been identified together with partner NGAs, NGOs, and other stakeholders to have an ecosystem bearing are likewise included. The short/mid-term priority management areas for intervention for the next three to five years are as follows:

4. 1. Inter-LGU/MKBA-Wide Management Actions

The three short-and mid-term priority inter-LGU management actions for the Tawi-Tawi MKBA focal LGUs are:

1. Inter-LGU Alliance (Tawi-Tawi MKBA Alliance (MPANet, CLE, FM Plans)
2. Delineation of Municipal Boundaries and Zoning
3. Economic Incentives

The objectives, indicators of success and action matrix for each of these priority action are presented below.

4. 1.1. Inter-LGU Alliance -Tawi-Tawi MKBA Alliance (MPANet, CLE, FM Plans)

Objectives:

1. To establish the Tawi-Tawi MKBA Alliance
2. To strengthen the Coastal Law Enforcement Team (reactivate and inclusion of the 3)
3. To ensure effective management of the MKBA
4. To formulate an Inter-LGU Fisheries Management Plan

Indicators of success:

1. Legal instrument establishing the Alliance (Resolutions, MOA)
2. Members identified and roles defined (BFAR as advisory or Secretariat)
3. Functional and operational MFOs
4. Deputized/authorized Bantay Sanctuary
5. Decrease in illegal fishing practices
6. Increase in biomass of MPAs (marine habitats) and catch per unit effort
7. Inter-LGU Fisheries Management Plan adopted (Resolution, Ordinance)
8. Number of activities in the FM Plan implemented

Figure 20. Action Plan Matrix for Priority 1

Activities	Expected Outputs	Timeframe	Responsible Agencies
Organization of a TWG	Members identified Roles defined Policy framework formulated	First Quarter, 2017	BFAR-PFO (MFCs), (Secretariat) MFOs, SB (Env't, Fish, Agri), FARMC Coordinators, MPDC, Other line agencies
Formulation of Inter-LGU FM Plan	Members identified Roles defined Policy framework formulated	Last Quarter, 2017	TWG
Profiling of existing Bantay Sanctuary members + the South Ubian, Sapa-sapa, Tandubas	Database of Bantay Sanctuary members	First Quarter, 2017	MFOs with MFCs
Re-training of Bantay Sanctuary members + new recruits	Bantay Sanctuary members trained in basic maritime enforcement	3rd Quarter, 2016	BFAR, ECOFISH, PNP MG, PN (TF62)
Reorganization of Bantay Sanctuary Alliance	Bantay Sanctuary officers elected	First Quarter 2017	BFAR
Regular MCS	Bantay Sanctuary operation reports	Quarterly	Bantay Sanctuary Alliance
Regular meeting of Bantay Sanctuary Alliance	Updates, accomplishment reports	Quarterly	BFAR, BS Members
Training on Fish Examiners	Fish Examiner for each municipality	Second Quarter 2017	BFAR, ECOFISH
MOA formulation, adoption of Inter-LGU Alliance		30 January 2017	LGU tech., LCEs, assisted by BFAR, ECOFISH and other partner agencies



4.1.2. Delineation of Municipal Boundaries and Zoning

Objectives:

1. Municipal water boundaries delineated and adopted through an ordinance by the 6-LGUs by end of 2015
2. Zoning Plan adopted in each LGUs by end of 2015

Indicators of success:

1. NAMRIA certified maps
2. Ordinance adopting the municipal water boundaries
3. Ordinance adopting zoning plan

Activities	Expected Outputs	Timeframe	Responsible Agencies
Preliminary Technical Description of MW by NAMRIA, initial presentation	Preliminary TD of MW, Map result determining the Coastal Terminal Points for those LGUs with CTP	Fourth Quarter, 2016	ECOFISH, NAMRIA
Validation by LGUs	Verified CTP/Validated Preliminary TD	First Quarter, 2017	LGU, PLGU, NAMRIA, ECOFISH
Negotiation with concerned LGUs	Resolutions/Confirmation of Neighboring LGUs	First-Second Quarter, 2017	LGUs, BFAR, PLGU, ECOFISH
Submission of Validated TD of MW, with Conformity of Neighboring LGUs	NAMRIA-Certified Maps	Second-Third Quarter, 2016	LGUs
Enacting of ordinance declaring the municipal boundaries	Ordinance adopted based on NAMRIA-certified maps of MW	Last Quarter, 2017	LGUs
Re-visit and review of existing draft of zoning plan, workshop for zoning plan for 3 LGUs	Final draft for zoning plan	Last Quarter, 2017	ECOFISH, LGUs

Activities	Expected Outputs	Timeframe	Responsible Agencies
Public consultation on draft zoning plan	Public awareness about zoning	Last Quarter, 2017	LGUs
Adoption through a zoning ordinance	Zoning Ordinance adopted	1st Quarter, 2018	ECOFISH



NAMRIA's Engr. Mario Princer discusses the delineation and delimitation of municipal waters, and thereafter distributed the preliminary technical description of the Tawi-Tawi Bay LGU's municipal waters. **November 2016**

4. 1.3. Economic Incentives

Objective: Revenue generation mechanisms and livelihood programs established by end of 2015

Indicators of success:

1. Number of livelihood programs provided to fisherfolk
2. User fee system adopted through an ordinance by each LGU

Figure 22: Action Plan Matrix for Priority 3

Activities	Expected Outputs	Timeframe	Responsible Agencies
Conduct of User-fees training and workshop	User fee system developed	1st - 2nd Quarter, 2017	ECOFISH, LGUs
Conduct of Enterprise Development training	At least 1 enterprise development program established per LGU	1st - 2nd Quarter, 2017	ECOFISH, Fisherfolk, LGUs
Value Chain Analysis Training	At least 1 enterprise development program established per LGU	3rd Quarter, 2017	ECOFISH, LGUs



4. 2. Individual LGU Management Actions

The individual LGU priority management areas that are summarized in Figure 23 and detailed in Attachment 8.3 highlight the unique management priorities of the respective LGUs. This shows the specific local issues, challenges, and management needs in these areas such as post-harvest support and eco-tourism, and institutionalization of coastal resource management through a dedicated municipal fisheries officer. At the same time, commonly-identified priorities such as coastal law enforcement, marine sanctuary establishment serve to complement the management actions that are planned at the inter-LGU level.

Municipality	Priority Management Action
Bongao	<ul style="list-style-type: none"> <input type="checkbox"/> Delineation of Municipal Boundaries <input type="checkbox"/> Full Operationalization of MFO <input type="checkbox"/> Development of Mangrove Eco-Park
Panglima Sugala	<ul style="list-style-type: none"> <input type="checkbox"/> Mangrove Management and Development Plan <input type="checkbox"/> MPA Management Plan <input type="checkbox"/> MFO Establishment/Operational
Sapa-Sapa	<ul style="list-style-type: none"> <input type="checkbox"/> Strengthening of Coastal Law Enforcement <input type="checkbox"/> Rehabilitation of Mangrove Areas
Simunul	<ul style="list-style-type: none"> <input type="checkbox"/> Formulation of Municipal Coastal Resource Management Plan <input type="checkbox"/> Organization of Municipal Coastal Law Enforcement Team <input type="checkbox"/> Processing of Fisheries products (shells, seaweeds, and fishes)
South Ubian	<ul style="list-style-type: none"> <input type="checkbox"/> Establishment of Marine Protected Area <input type="checkbox"/> Organization of Bantay Sanctuary and Coastal Law Enforcement
Tandubas	<ul style="list-style-type: none"> <input type="checkbox"/> Formulation of Municipal Fisheries Management Plan <input type="checkbox"/> Organizing of Municipal Law Enforcement Team <input type="checkbox"/> Strengthening and Creation of Marine Protected Areas

5 - ADOPTION AND IMPLEMENTATION

5.1 Adoption of this Inter-LGU Fisheries Management Plan

Options for the adoption of this Inter-LGU Fisheries Management Plan include a Sangguniang Bayan Resolution from each of the LGUs and a Sangguniang Panglalawigan Resolution from the Province of Tawi-Tawi, to elicit support from these legislative bodies, especially for annual appropriation for the implementation and monitoring of the plan. An executive order from the Local Chief Executive of the Province and Municipalities may also be issued directing the adoption and implementation of this plan. These executive and legislative actions may be preceded by endorsements from the existing Coastal Resource Management Technical Working Group, and/or the Municipal Fisheries Officers of the LGUs, as well as from other national government and non-government partner organizations.

After discussion, consensus was reached among LGU representatives that this plan shall be adopted by January 30, 2017. LGUs shall work for the approval of the plan through an appropriate resolution from the Sangguniang Bayan. Meanwhile, some LGUs will also be approving the plan, through their Local Chief Executive.

5.2 Organization and Management (Institutional Arrangements)

While the LGUs hold the primary responsibility for implementing the Plan within their respective municipalities and cities, sectoral policies and mandates remain within the relevant government offices and agencies at the provincial level. Technical assistance, coordination, and inter-LGU

planning roles may be provided by the DA-BFAR Provincial Fisheries Office, together with the Provincial Government of Tawi-Tawi, and in partnership with the other national agencies such as DENR, PNP-Maritime Group and Philippine Coast Guard in ARMM as well as academic institutions such as the Mindanao State University.



6 - ADOPTION AND IMPLEMENTATION

Monitoring and evaluation (M and E) should be an on-going process. Through M & E, municipalities, as well as partner agencies namely the Provincial, Regional and National Governments such as DA-BFAR, DENR, Philippine National Police-Maritime Group, Philippine Coast Guard in the ARMM, as well as the Mindanao State University and other organizations, can examine the progress and impact of the implementation of this Inter-LGU Fisheries Management Plan and the identified priority fisheries management actions. M and E is a key aspect in determining whether or not the identified management actions are being carried out or not, as planned. It examines whether the interventions are successful and identifies what else needs to be done if the interventions do not meet the stated objectives, in order to make improvements.

The municipalities and its partner agencies may use the specified indicators, benchmarks and targets that correspond to the respective objectives to monitor the management actions' performance and effectiveness.

Below are examples of standard monitoring and evaluation mechanisms and tools by which the progress of implementation of the various components of this plan and specified management actions can be measured. These are based on available training guides for M and E:

- Governance: EAFM Benchmarks (ECOFISH 2014)
- Marine Protected Areas (MPAs) and fish sanctuaries: bio-physical assessment and monitoring (Uychiaoco, Green et al. 2001), management evaluation (MPA Management Effectiveness Assessment Tool (MEAT) (available from the MPA Support Network)

- Habitats monitoring: Participatory Coastal Resources Assessment (PCRA) (Walters, Maragos et al. 1998)
- Fisheries monitoring: Fish catch assessment and monitoring (FISH 2005)
- Socio-economic aspect of the fisheries: Socio-economic monitoring (Bunce and Pomeroy 2003; ECOFISH 2014)

The LGUs, together with its partner agencies, agree to adopt a monitoring and evaluation scheme, using the specified benchmarks and indicators for the different fisheries management actions.

A team from the 6 LGUs, together with representatives from BFAR and the PLGU as well as Ecofish, while project is on-going, will monitor and evaluate the implementation of this plan. M&E will be done via site visit and consultations that will also serve as sessions for sharing experiences, lessons learned & technology. The EAFM Benchmarking will also be adopted in the Tawi-Tawi MKBA. M&E will be done on a quarterly basis for 2017 and thereafter, on a semi-annual basis.

7 - REFERENCES

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Attachment 8.1 Benchmarking, 2013

Legend: B-Bongao, PS-Panglima-Sugala, Si-Simunul, T-Tandubas, SU-South Ubian, Sa-Sapa-Sapa

Benchmark		2013						2014						2014-A							
		B	PS	Si	T	SU	Sa	B	PS	Si	T	SU	Sa	B	PS	Si	T	SU	Sa		
A. Basic Requirement																					
1	Ecosystem boundaries established	1	1	1	1	1	0		0	0	0			0	0	0	0	0	0		
2	Coastal marine habitat monitoring and management planning established	1	1	1	1	1	0	1	1	0	0			1	1	1	1	0	0		
3	Fisheries monitoring and early fisheries management planning established	1	1	1	0	1	0	1	1	0	0			1	1	1	1	0	0		
4	Fisheries Law enforcement team and program established	2	1	1	1	1	0	2	3	1	1	1			1	1	1	1	0	0	
5	Comprehensive fisheries management plan conducted and regularly updated	1	1	1	0	0	0	1	2	0	0			1	2	1	1	0	0		
6	Fisheries management office established and operational	2	2	0	0	1	0	0	0	0	0	1			0	0	0	0	0	0	
7	Fisheries registration and licensing system established	2	2	1	1	1	0	2	2	1	0	1			1	1	1	1	0	0	
8	Network of Marine Protected Areas (MPA) established	2	3	1	1	1	0	1	1	1	0	1			1	1	1	1	0	0	
9	Fisheries use zoning plan established	1	1	1	0	1	0	1	1	1	0	0		1	1	1	1	0	0		
10	Local constituencies for fisheries management organized and actively involved	1	2	1	0	2	0	1	2	0	0	1	1			1	1	0	0	0	0
11	Multi-institutional collaboration on coastal and fisheries resources management (CFRM)	1	2	1	0	1	0		1	0	0			1	1	1	1	0	0		
B. Site specific requirements																					
12	Species-specific management measures established (ex. Live fish, Siganiids-danggit, Ballpen pusit, mud crab, other invertebrates)	0	1	0	1	1	0	0	0	0	0	0		0	0	0	0	0	0		
13	Gear-specific management measures established (ex. Restrictions on location, time of use, technical description, etc.)	2	1	0	0	1	0	0	0	1	0			0	0	0	0	0	0		
14	Mangrove management area established	1	1	1	1	1	0	1	1	1	0			1	1	1	1	0	0		
15	Seagrass management area established	0	0	1	0	0	0	1	0	0	0			1	1	1	1	0	0		
16	Revenue generation established	2*	1	1	0	0	0	1	0	1	0			0	0	0	0	0	0		
17	Coastal environment-friendly enterprises established	0	1**	0	0	0	0	1	0	0	0	1			0	0	0	0	0	0	
* license, fines, aux receipts (not viable)																					
** seaweeds coop, tourism council but not sustained																					

Attachment 8.2 Perceived Changes in Fisheries Resources in the Past 20 Years and their Causes

Status in the Past (20 years ago)	Present Status (2016)	Major Change/s Observed	Cause of Change
Municipality of Bongao			
<ul style="list-style-type: none"> ■ The seas were more abundant ■ More variety of fish ■ Fewer fishers ■ Illegal/destructive fishing already happening but not as rampant ■ Use of mostly traditional fishing gears ■ Fewer houses along the coasts ■ Start of seaweeds farming 	<ul style="list-style-type: none"> ■ Increase in the number of coastal structures (housing, etc.) ■ More people with higher demand for natural resources (for food, shelter, livelihood) ■ More fishers and fishing gears 	<p>Positive:</p> <ul style="list-style-type: none"> ■ Economic Progress <p>Negative:</p> <ul style="list-style-type: none"> ■ Increased pressure on natural resources ■ Erosion of Sangay-siapu 	<ul style="list-style-type: none"> ■ Immigration, availability of business opportunities ■ Immigration, more people ■ Sand quarrying for construction
Municipality of Panglima Sugala			
<ul style="list-style-type: none"> ■ “mas maraming isda” ■ Cheaper fish ■ Fishing areas relatively close to shore or “sa likod bahay” 	<ul style="list-style-type: none"> ■ Higher incidence of encroachment of commercial fishing vessels in municipal waters ■ Increase in overall fishing effort ■ Garbage problem ■ Increase in fisher population ■ Reduced area and condition of natural habitats ■ Engaged in aquasilviculture 	<p>Positive:</p> <ul style="list-style-type: none"> ■ Improved fisheries enforcement <p>Negative:</p> <ul style="list-style-type: none"> ■ Reduced area of mangroves ■ Lower catch by local fishers 	<ul style="list-style-type: none"> ■ Improved capabilities and composition of MCLET ■ Cutting for charcoal, construction materials ■ Encroachment of commercial fishing; competition among increasing number of fishers using gears with higher efficiency



Status in the Past (20 years ago)	Present Status (2016)	Major Change/s Observed	Cause of Change
Municipality of Sapa-Sapa			
<ul style="list-style-type: none"> ■ “very rich fishing ground” ■ Higher CPUEs (ranging from 100 to 500 kg a day depending on the target species) ■ Fishing areas relatively close to shore 	<ul style="list-style-type: none"> ■ Lower fish catches ■ CPUEs reduced remarkably ■ Habitat damage ■ Increase in tuna catch using payao 	Positive: <ul style="list-style-type: none"> ■ With additional sources of income, other forms of livelihood (not just fishing) 	<ul style="list-style-type: none"> ■ Progress
		Negative: <ul style="list-style-type: none"> ■ 50-75% of reefs considered to be damaged ■ Lower catches 	<ul style="list-style-type: none"> ■ Illegal and destructive fishing (blast fishing, muro-ami) ■ Encroachment
Municipality of Simunul			
<ul style="list-style-type: none"> ■ Puno ng isda ang karagatan” ■ Habitats such as white sandy beaches, mangroves, seagrasses and coral reefs were intact and healthy 	<ul style="list-style-type: none"> ■ “Mas kaunti nalang ang isda sa karagatan” ■ Decrease in overall area and general condition of coastal and marine habitats 	Positive: <ul style="list-style-type: none"> ■ Establishment of MPAs 	<ul style="list-style-type: none"> ■ Agencies; awareness
		Negative: <ul style="list-style-type: none"> ■ Degraded marine habitats (not under protection) such as: white sand beaches lower catches 	<ul style="list-style-type: none"> ■ Sand quarrying for ■ Construction illegal/ destructive fishing practices; high fishing pressure
Municipality of South Ubian			
<ul style="list-style-type: none"> ■ Fewer inhabitants Fewer houses along the shore ■ Use of traditional fishing gears ■ Lower incidence of illegal fishing activities ■ Top 5 species in the catch 	<ul style="list-style-type: none"> ■ More fishers and fishing gears leading to increased competition for fisheries ■ Higher overall population ■ Higher fish prices due to higher demand ■ Down to top 3 species in the catch ■ With initiatives to combat illegal fishing (regular patrols) and for habitat protection (MPAs) 	Positive: <ul style="list-style-type: none"> ■ Fisheries management initiatives 	<ul style="list-style-type: none"> ■ Agencies; awareness
		Negative: <ul style="list-style-type: none"> ■ Reduced overall catch 	<ul style="list-style-type: none"> ■ More people/fishers; illegal & destructive fishing impacts over the years

Status in the Past (20 years ago)	Present Status (2016)	Major Change/s Observed	Cause of Change
Municipality of Tandubas			
<ul style="list-style-type: none"> ■ "mas maraming isda" ■ Larger area covered by mangroves and seagrasses ■ Tandubas proper with relatively high population since then ■ More variety of corals 	<ul style="list-style-type: none"> ■ Reduced mangrove and seagrass cover ■ Increase in the number of households ■ Destructive fishing activities 	Positive: Negative: <ul style="list-style-type: none"> ■ Reduced mangrove and seagrass cover; degraded condition of habitats 	<ul style="list-style-type: none"> ■ Mangroves are cut for fuel; coastal dwellings over seagrass beds; destructive fishing and sand quarrying for construction

Attachment 8.3. Changes in Coral Cover and Fish Biomass as Monitored from 2004-2010

Coral Cover Percentage Decrease in Six MPAs and Adjacent Reefs Monitored from 2004-2010

Municipality	MPA Name	Y2004	Y2006	Y2008	Y2010
Bongao	Pababag Island	54.1 ±28.3	36.8 ±15.3	38.9 ±20.6	25.5 ±13.1
P. Sugala	Batu-Batu Kulape	53.9 ±22.6	39.3 ±15.7	22.8 ±14.3	19.7 ±14.5
Simunul	Doh-Tong	43.5 ±27.2	29.8 ±13.1	21.9 ±10.3	28.7 ±12.5
Bongao	Ungos-Ungos	-----	29.6 ±13.9	31.1 ±17.4	20.5 ±6.3
Simunul	Tonggosong	-----	29.3 ±10.5	20.9 ±13.2	21.8 ±10.5
P. Sugala	Tundon	-----	12.9 ±6.7	10.2 ±5.7	9.2 ±6.6
Mean:		50.5 ±26.0	29.6 ±12.5	24.3 ±13.6	20.9 ±10.6

Table 33, FISH Final Report

Fish Biomass in Metric Tons Per Square Kilometer (mean ±s.d.) in Six MPAs and Adjacent Reefs Monitored

Municipality	MPA Name	Y2004	Y2006	Y2008	Y2010
Bongao	Pababag Island	9.8 ±2.9	13.9 ±11.0	10.4 ±6.8	23.2 ±18.9
P. Sugala	Batu-Batu Kulape	19.6 ±7.1	25.2 ±18.1	25.7 ±13.1	34.6 ±36.2
Simunul	Doh-Tong	26.0 ±12.8	34.3 ±30.6	29.9 ±21.6	27.1 ±20.8
Bongao	Ungos-Ungos	-----	20.8 ±14.4	17.2 ±10.6	30.2 ±32.1
Simunul	Tonggosong	-----	35.3 ±24.4	24.3 ±17.1	47.4 ±37.9
P. Sugala	Tundon	-----	33.7 ±33.6	14.7 ±8.8	26.8 ±21.3
Mean		18.5 ±7.6	27.2 ±22.0	20.4 ±13.0	31.6 ±27.8

Table 31, FISH Final Report



Catch per Unit Effort in kilograms of fish per day of fishing (mean ±s.d.) of Some Major Fishing Gears Monitored in Selected Landing Sites within the Tawi-Tawi Bay

Fishing gear	Y2004	Y2006	Y2008	Y2010
Bottom set gillnet	28.8±16.1	33.9±20.0	21.6±12.1	11.2±6.3
Drift gillnet	56.3±39.4	45.2±20.3	37.4±17.4	7.0±5.2
Bottom set longline	15.4±11.0	17.7±13.1	21.8±14.2	11.2±6.3
Troll line	25.4±24.0	27.4±14.2	24.5±11.9	7.9±5.8
Squid jig	4.6±3.4	3.4±2.9	4.6±2.9	2.8±1.3

Source: Table 30, FISH Final Report

Attachment 8.4. Individual LGU Priority Action Plans

MUNICIPALITY OF BONGAO					
Objectives	Indicators of Success	Activities	Expected Output	Time Frame	Responsible Agencies
Priority Action 1: Delineation of Municipal Boundaries					
<ul style="list-style-type: none"> To determine total area and boundary limits of municipal waters by 2016 To avoid boundary conflicts with adjacent LGUs To adopt appropriate policies and implement essential programs, projects and activities 	<ul style="list-style-type: none"> Total area of municipal waters identified and recorded Markers along strategic points of the boundary limits established Number of cases of boundary conflicts resolved Copy of ordinances and number of projects and activities implemented 	<ul style="list-style-type: none"> Proposal preparation Fund sourcing Creation of Survey Team Actual survey Survey plan preparation MOU with adjacent LGUs Setting up of boundary markers 	<ul style="list-style-type: none"> Proposal document Available funds for the activities Survey Team organized Area survey conducted Survey plan prepared and area identified MOU signed Boundary markers established 	<ul style="list-style-type: none"> November 2016 November 2016 January 2017 April 2017 May 2017 June 2017 	<ul style="list-style-type: none"> LGU LGU LGU, BFAR, Ecofish LGU, BFAR, Ecofish LGU, BFAR, Ecofish LGU, MKBA Alliance LGU, MKBA Alliance, BFAR, Ecofish
Priority Action 2: Full Operationalization of Municipal Fishery Office					
<ul style="list-style-type: none"> To fill up 3 positions at the MFO (MFO, FRO I and FRO II) To provide the necessary logistics to the MFO 	<ul style="list-style-type: none"> Number of assigned/hired MFO personnel Number of trainings conducted Availability of budget, facilities, supplies and materials at the MFO 	<ul style="list-style-type: none"> Advocacy with Municipal Officials Preparation of office budget Hiring/Assigning of personnel Provision of logistics 	<ul style="list-style-type: none"> Meetings conducted Budget prepared Availability of personnel at MFO Available logistics 	<ul style="list-style-type: none"> August 2016 September 2016 January 2017 1st Quarter, 2017 	<ul style="list-style-type: none"> LGU, BFAR, Ecofish LGU LGU LGU, Ecofish, BFAR

Objectives	Indicators of Success	Activities	Expected Output	Time Frame	Responsible Agencies
Priority Action 3: Development of Mangrove Eco-Park					
<ul style="list-style-type: none"> To develop the Lapid-Lapid Mangrove Eco-Park as a tourist destination To put up essential support facilities in the Eco-Park To intensify tourism activities in the area To improve family income of residents through tourism 	<ul style="list-style-type: none"> Eco-tourism support facilities established in the area Eco-Park Management Committee members identified through an Executive Order People's Organization members organized Increased family income from non-fishing sources of residents in area Additional revenue for the LGU 	<ul style="list-style-type: none"> Conduct of social and policy development activities Organize the PO in the community Train PO members on eco-park management Complete construction of waiting facility Survey of the area/eco-park Establishment of boundary markers Provision of skills training and capital outlay Building linkages with partner organizations Preparation of IEC materials Marketing of the Eco-park as a lakbay-aral and tourist destination 	<ul style="list-style-type: none"> Policies formulated PO organized PO members trained Facility constructed Area survey plan available Boundary markers established Skills training of PO members conducted and capital outlay provided IEC materials available Lakbay-aral conducted/influx of tourist in the area 	<ul style="list-style-type: none"> June-September 2017 June-September 2017 December 2017 September-October 2017 January 2018 1st Quarter 2018 2nd Quarter 2017 December 2016 	<ul style="list-style-type: none"> LGU LGU LGU LGU Ecofish, BFAR, DENR, LGU Ecofish, BFAR, DENR, LGU Ecofish, BFAR, LGU, PNP-MG Ecofish, BFAR, LGU, PNP-MG, DENR Ecofish, M/P Tourism Offices, Media Group LGUs, DepEd, PCL, LMP
Priority Action 3: Development of Mangrove Eco-Park					
<ul style="list-style-type: none"> To develop the Lapid-Lapid Mangrove Eco-park as a tourist destination To put up essential support facilities in the Eco-Park To intensify tourism activities in the area To improve family income of residents through tourism 	<ul style="list-style-type: none"> Eco-tourism support facilities established in the area Eco-Park Management Committee members identified through an Executive Order People's Organization members organized Increased family income from non-fishing 	<ul style="list-style-type: none"> Conduct of social and policy development activities Organize the PO in the community Train PO members on eco-park management Complete construction of waiting facility Survey of the area/eco-park 	<ul style="list-style-type: none"> Policies formulated PO organized PO members trained Facility constructed Area survey plan available Boundary markers established 	<ul style="list-style-type: none"> June - September 2017 June-September 2017 December 2017 September-October 2017 January 2018 1st Quarter 2018 2nd Quarter 2017 	<ul style="list-style-type: none"> LGU LGU LGU LGU Ecofish, BFAR, DENR, LGU Ecofish, BFAR, DENR, LGU Ecofish, BFAR, LGU, PNP-MG



Objectives	Indicators of Success	Activities	Expected Output	Time Frame	Responsible Agencies
Priority Action 3: Development of Mangrove Eco-Park					
		<ul style="list-style-type: none"> Establishment of boundary markers Provision of skills training and capital outlay Building linkages with partner organizations Preparation of IEC materials Marketing of the Eco-park as a lakbay-aral and tourist destination 	<ul style="list-style-type: none"> Skills training of PO members conducted and capital outlay provided IEC materials available Lakbay-aral conducted/influx of tourist in the area 		<ul style="list-style-type: none"> Ecofish, BFAR, LGU, PNP-MG, DENR
MUNICIPALITY OF PANGLIMA SUGALA					
Priority Action 1: Mangrove Management and Development					
<ul style="list-style-type: none"> To promote sustainable mangrove management and development To minimize illegal mangrove cutting To improve fish spawning area To increase income of marginalized fisherfolks 	<ul style="list-style-type: none"> Cutting of mangrove activities lessened Fish biomass increased Income of fisherfolks increased Ordinance adopted 	<ul style="list-style-type: none"> Organize TWG Formulate plans and programs Lobby with Sangguniang Bayan for adoption plans and programs through ordinance Conduct IEC Mangrove reforestation Monitoring Assessment/Evaluation 	<ul style="list-style-type: none"> EO creating TWG Members identified and roles defined Framework plan, database Ordinance regarding mangrove management and regulation adopted Community educated/ Apprised Community involvement/participation No. of hectares increased Status of mangrove ecosystem determined 	<ul style="list-style-type: none"> September 27, 2016 October 4, 2016 October 10, 2017 October 25, 2016 onward 1st Saturday of every quarter Every quarter beginning 2017 Every quarter beginning 2017 	<ul style="list-style-type: none"> MFO, SB-Environment Committee, BFAR/MFC, MPDC TWG SB-Environment Committee, MFO, TWG MFO, BFAR, SB-Environment, TWG MFO, MFCs, M/BLGU Staff TWG/BFAR TWG/BFAR

Objectives	Indicators of Success	Activities	Expected Output	Time Frame	Responsible Agencies
Priority Action 1: Mangrove Management and Development					
			<ul style="list-style-type: none"> Database created Success of project determined; SWOT analyzed 		
Priority Action 2: MPA MANAGEMENT					
<ul style="list-style-type: none"> To strengthen the established MPAs in Panglima Sugala To establish MPA alliance To generate revenue 	<ul style="list-style-type: none"> MPA markers improved Fish biomass increased Marine habitats (corals, seagrass, others) enhanced Bantay Sanctuary strengthened/empowered 	<ul style="list-style-type: none"> Revisiting of existing MPA management plan Formulation of MPA Management Plan for newly established MPA Lobby with SB for adoption of plans for new MPA Fund sourcing from both internal and external sources Implementation of plans and programs IEC in new MPA Training of new Bantay Sanctuary and re-training of the existing Bantay Sanctuary Establishment of alliance/network of MPAs Lobby with SB for the passage of ordinance authorizing collection of users fee Monitoring and evaluation 	<ul style="list-style-type: none"> MPA management plan updated MPA Management Plan for new MPA established Ordinance adopted and implemented for new MPA Donors identified, commitment expressed and SB resolutions issued Itemized plans and programs implemented accordingly Community acceptance lessens illegal fishing activities Inter-MPA alliance in Panglima Sugala is established, MOU formulated and roles and responsibilities defined Revenue generation ordinance is adopted Accomplishments and success of project are determined and SWOT analyzed 	February 2017 February- March 2017 March 2017 January 2017 onward March 2017 onward Date to be set with Ecofish September 2016 Date to be set with Ecofish Every quarter beginning 2017	MFO, SB-Environment, COM, BFAR/MFC, MPDC MFO, SB-Environment, COM, BFAR/MFC, MPDC MFO, SB-Environment, COM, BFAR/MFC, MPDC MFO, TWG, MLGU MFO, MPA TWG, POs MFO, SB-Environment, COM, BFAR/MFC BFAR, ECOFISH, PNP-MG, PN TF 62, MFO MFO, BFAR, TWG MFO, SB Environment Committee MFO, TWG



Objectives	Indicators of Success	Activities	Expected Output	Time Frame	Responsible Agencies
Priority Action No. 3: Municipal Fisheries Office Establishment and Operationalization					
<ul style="list-style-type: none"> To create 3 position items for the MFO and 2 staff To provide the necessary logistics to the MFO To intensify FCRM initiatives 	<ul style="list-style-type: none"> Number of assigned/hired MFO personnel MFO attended training Availability of budget, facilities, supplies and materials at the MFO Fisheries management plan implemented accordingly 	<ul style="list-style-type: none"> Advocacy with municipal officials Proposed with SB for the creation of the MFO and staff Preparation of office budget Hiring/assigning of personnel Provision of logistics 	<ul style="list-style-type: none"> Meetings conducted Ordinance creating MFO and staff position adopted Budget prepared Availability of personnel at the MFO Available logistics 	<ul style="list-style-type: none"> November 17, 2016 November 24, 2016 November 27, 2016 January 1, 2017 1st Quarter 2017 	<ul style="list-style-type: none"> LGU, BFAR, Ecofish LGU LGU LGU LGU, Ecofish, BFAR
MUNICIPALITY OF SAPA-SAPA					
Priority Action 1: Marine Protected Area					
<ul style="list-style-type: none"> To minimize illegal fishing in the area 		<ul style="list-style-type: none"> Meeting with Mayor Consultation with Community Baseline assessment and mapping Feedbacking with community for acceptance of MPA Barangay resolution MPA establishment Public hearing Ordinance enactment Creation of management body 	<ul style="list-style-type: none"> MPAs Established - Sapa Sapa I Panampangan Sapa Sapa II Ordinance enacted 	<ul style="list-style-type: none"> December 20, 2016 January 2, 2017 	<ul style="list-style-type: none"> Ecofish, BFAR, LGU Ecofish, LGU Ecofish, LGU

Objectives	Indicators of Success	Activities	Expected Output	Time Frame	Responsible Agencies
Priority Action 2: Bantay Sanctuary and Coastal Law Enforcement					
<ul style="list-style-type: none"> To strengthen the Bantay Sanctuary 		<ul style="list-style-type: none"> Meeting with Mayor and Sangguniang Bayan Consultation with Mayor and Barangay Leaders Organize Bantay Sanctuary Conduct training Construct Bantay Guard House 	<ul style="list-style-type: none"> Meetings conducted Ordinance creating MFO and staff position adopted Budget prepared Availability of personnel at the MFO Available logistics 	<ul style="list-style-type: none"> November 17, 2016 November 24, 2016 November 27, 2016 January 1, 2017 1st Quarter 2017 	<ul style="list-style-type: none"> LGU, BFAR, Ecofish LGU LGU LGU LGU, Ecofish, BFAR
MUNICIPALITY OF SIMUNUL					
Priority Action 1: Strengthening of Coastal and Fisheries Law Enforcement					
<ul style="list-style-type: none"> Effective, functional and well-equipped law enforcement Minimize illegal fishing activities 	<ul style="list-style-type: none"> Increase in fish stock and biomass Awareness on abuses of fishing activities 	<ul style="list-style-type: none"> Reactivation of Municipal Coastal Law Enforcement Team (MCLET) Re-orientation of MCLET Inventory and improvement of law enforcement activities 	<ul style="list-style-type: none"> MCLET re-activated Well-oriented MCLET 	<ul style="list-style-type: none"> November 10, 2016 	<ul style="list-style-type: none"> LGU, BFAR, PNP-Maritime Group, NGO, POs, & Ecofish
Priority Action 2: Rehabilitation of Mangrove Areas					
<ul style="list-style-type: none"> Reforestation of degraded mangrove areas Increased biodiversity within mangrove ecosystem Increased biomass of mangrove-associated organisms 	<ul style="list-style-type: none"> Degraded mangrove areas reforested Improved Mangrove biodiversity increased Increased production of various organisms associated with mangroves 	<ul style="list-style-type: none"> Adoption of ordinance on mangrove rehabilitation and protection Conduct of Information, Education Campaign (IEC) on benefits and importance of mangrove ecosystem Reforestation in mangrove areas/communities 	<ul style="list-style-type: none"> Ordinance adopted and implemented Well-informed community on importance of mangrove ecosystem Degraded mangrove areas replanted and improved Mangrove communities well-monitored and protected 	<ul style="list-style-type: none"> March 2, 2017 April 20, 2017 May 4-21, 2017 June 10, 2017 September 20, 2017 	<ul style="list-style-type: none"> LGU LGU-Municipality and Barangay, BFAR, and Ecofish LGU-Municipality and Barangay, BFAR, and Academe



Objectives	Indicators of Success	Activities	Expected Output	Time Frame	Responsible Agencies
Priority Action 2: Bantay Sanctuary and Coastal Law Enforcement					
		<ul style="list-style-type: none"> Regular monitoring, control and surveillance of mangrove areas Species inventory and fisheries baseline assessment of mangrove ecosystem 	<ul style="list-style-type: none"> Database on mangrove biodiversity established/ developed 		
MUNICIPALITY OF SOUTH UBIAN					
Priority Action 1: Formulation of Municipal Coastal Resource Management Plan					
<ul style="list-style-type: none"> Formulate program for Municipal Coastal Resource Management Plan Identify projects priorities for MCRMP. Identify fisherfolk issues and concerns on fishing 	<ul style="list-style-type: none"> Fisheries projects priorities identified. Addressed fisherfolk issues and concerns on fishing. Formulated program for MCRMP. 	<ul style="list-style-type: none"> Organization of a TWG Identification MCRMP priority projects and activities Drafting of MCRMP Drafting of Resolutions and Ordinances needed for MCRMP Public consultation on ordinances and resolutions and MCRMP Approval of MCRMP Implementation of MCRMP 	<ul style="list-style-type: none"> Members identified, roles defined, policy framework formulated Identified priority projects and activities Drafted MCRMP Drafted resolutions and ordinances Consulted/approved ordinances and resolution Approved MCRMP Implemented MCRMP 		<p>MFC, MFO, SB (Env't, Fish, Agri), MFARMC, MPDC</p> <p>TWG</p> <p>TWG SB members and vice mayor (chairman)</p> <p>LGU</p> <p>LCE, LGU officials</p> <p>BFAR, LGU.</p> <p>ECOFISH</p>

Objectives	Indicators of Success	Activities	Expected Output	Time Frame	Responsible Agencies
Priority Action 2: Organization of Municipal Coastal Law Enforcement Team					
<ul style="list-style-type: none"> Organization of MCLET Functional and operational enforcement team. 	<ul style="list-style-type: none"> Legal instrument establishing MCLET Ordinance adopting the creation of MCLET. Members identified and roles defined 	<ul style="list-style-type: none"> Convening of law enforcers, bantay dagat (Sanctuary) Organization of MCLET Enacting of ordinance declaring MCLET MCLET operationalization 	<ul style="list-style-type: none"> Convened law enforcers and bantay dagat (sanctuary) Organized MCLET Ordinance adopted Operationalized MCLET 		<ul style="list-style-type: none"> PNP, LCE, MPC,MFO, MFC, bantay dagat PNP,LCE, MPDC,MFO, MFC,bantay dagat LGUs LGUs,MCLET
Priority Action 3: Processing of Fisheries products (shells, seaweeds, and fishes)					
<ul style="list-style-type: none"> To process fisheries products abundant in the area. To train women on processing fisheries products. 	<ul style="list-style-type: none"> Number of training provided to mothers. Livelihood training availed by mothers. Increased women participation in the processing of fisheries products 	<ul style="list-style-type: none"> Profiling of mothers/ women organization Identification of fisheries products abundant in the area Prioritization of training to conducted Conduct of training 	<ul style="list-style-type: none"> Organization profiled Products identified Training prioritized Training conducted 		<ul style="list-style-type: none"> DSWD,LGU Fisherfolks, BFAR,LGU Fisherfolks, BFAR,LGU, TESDA Fisherfolks, BFAR,LGU, TESDA, ECOFISH



MUNICIPALITY OF TANDUBAS

Objectives	Indicators of Success	Activities	Expected Output	Time Frame	Responsible Agencies
Priority Action 1: Formulation of Municipal Fisheries Management Plan					
<ul style="list-style-type: none"> To formulate of Municipal Fisheries Management Plan 	<ul style="list-style-type: none"> Municipal Fisheries Management Plan Implemented 	<ul style="list-style-type: none"> SB resolution for the creation of MFMP Creation of TWG for the formulation of a comprehensive MFMP Drafting MFMP MFMP implementation 	<ul style="list-style-type: none"> Approved SB resolution Comprehensive plan formulated MFMP drafted MFMP implemented 	<ul style="list-style-type: none"> 2017 	<ul style="list-style-type: none"> SB Secretary, SB members, Vice Mayor, Mayor SB, Secretary, SB members, Vice Mayor, Mayor TWG LGU
Priority Action 2: Organizing of Municipal Law Enforcement Team					
<ul style="list-style-type: none"> To organized MCLET, To strengthen MLET To train the MCLET 	<ul style="list-style-type: none"> MCLET is functional and operational Minimized illegal fishing activity MCLET is more equipped on fisheries law 	<ul style="list-style-type: none"> MCLET Training 	<ul style="list-style-type: none"> MCLET Trained 	<ul style="list-style-type: none"> December 2016 	<ul style="list-style-type: none"> LGU, PNP, Brgy Official, BFAR
Priority Action 3: Strengthening and Creation Marine Protected Area					
<ul style="list-style-type: none"> To increase the Biomass Density and Catch per unit effort 	<ul style="list-style-type: none"> Establishment of new MPA, Rehabilitation of Existing MPA, Marine protected areas functional 	<ul style="list-style-type: none"> Rehabilitation of existing MPA Expansion new MPA 	<ul style="list-style-type: none"> MPA rehabilitation existing MPA Expanded new MPA 	<ul style="list-style-type: none"> 3rd week January 2017 	<ul style="list-style-type: none"> MCLET MCLET
Priority Action 4: Conservation and Protection of Mangroves Area					
<ul style="list-style-type: none"> To create an ordinance for banning cutting mangroves To rehabilitate potential area for mangroves 	<ul style="list-style-type: none"> Ordinance Executed Increase of mangroves 	<ul style="list-style-type: none"> Passing the ordinance for the mangroves management Execution of an ordinance Rehabilitation of mangroves 	<ul style="list-style-type: none"> Ordinance created Ordinance Executed Mangrove rehabilitated 	<ul style="list-style-type: none"> January 2017 1st week February 2017 Quarterly 	<ul style="list-style-type: none"> SB Members LGU LGU

