

NATIONAL TUNA MANAGEMENT PLAN



BUREAU OF FISHERIES AND AQUATIC RESOURCES





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PCA Building Elliptical Road, Diliman, Quezon City, Philippines

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MESSAGES FROM THE
SECRETARY
AND THE
DIRECTOR



MESSAGE FROM THE SECRETARY

The Review and Updating of the National Tuna Management Plan is a significant initiative of the Department Agriculture thru the Bureau of Fisheries and Aquatic Resources to strengthen the unwavering commitment towards achieving the sustainable Fisheries production for food security and continuing support to the economic well-being of its Stakeholders while improving good governance of the Philippine Tuna Industry.

This Plan will serve as platform to provide the Industry Players with clear directions to effectively attain the goals, management actions, projections and challenges for a competitive and sustainable tuna Sector. The collective efforts and consensus building among the National and Local Governments, Fishing Industry, Academes, Civil Society and other Allied Services Groups have identified the appropriate strategies /courses of actions to insure that our Tuna Fishery Resources will be protected and well managed.

I would like to extend my deepest appreciation to all our Industry Partners who have actively participated and unselfishly shared their brilliant ideas and contributions in the development of this National Tuna Management Plan.

Rest Assured that through Our Strong Partnership, we can achieve together the overall Government and Fishing Industry aspirations of continuing and remarkable technological, conservation and management convergence for a Globally - Competitive Tuna Fishing Industry.

Mabuhay ang Sektor ng Pangisdaan!

EMMANUEL F. PIÑOL
Secretary, Department of Agriculture



MESSAGE FROM THE DIRECTOR

First of all, I would like to extend my sincere Congratulations to all the participants who have actively contributed and shared their expertise in the Updating and Preparation of the National Tuna Management Plan from 2019-2023 as a Medium Term Target of the Philippine Tuna Fisheries Sector.

The Bureau of Fisheries and Aquatic Resources is very grateful with the publication of the NTMP which is a product of the series of Consultations undertaken and work collaborations among the Government both the National and Local Governments, Private Fisheries Sectors, Academe, Civil Society Groups and other Participating Sectors which addressed the concerns of the Philippine Tuna Fishing Industry .

I am optimistic that the clear directions, Management Actions, targets and strategies stated in the National Tuna Management Plan will guide BFAR and all Stakeholders to fully achieve its overall visions, missions, goals and objectives geared towards Sustainable Tuna Production to respond to the competitive local and international market demands.

In this regard, BFAR will continuously support the Philippine Fishing Industry to implement the actions and strategies stated in the Plan leading to the attainment of globally competitive Tuna Fisheries Industry five years and beyond.

COMMODORE EDUARDO B. GONGONA, PCG (Ret)

Undersecretary for Fisheries, Department of Agriculture
National Director, Bureau of Fisheries and Aquatic Resources

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ACRO

ACPC	Agriculture Credit Policy Council
BAS	Bureau of Agricultural Statistics
BFAR	Bureau of Fisheries and Aquatic Resources
BoatR	Boat Registration
BOI	Board of Investment
CAC	Codex Alimentarius Commission
CCSBT	Commission for the Conservation of Southern Bluefin Tuna (CCSBT)
CFGL	Commercial fishing gear license
CFVL	Commercial fishing vessel license
CITEM	Center for International Trade Expositions and Missions
CBD	Convention on Biological Diversity
CITES	Convention on the International Trade in Endangered Species of Wild Flora and Fauna
CMM	Conservation and Management Measures
CMS	Convention on Migratory Species
CNFIDP	Comprehensive National Fisheries Industry Development Plan
CODEX	Codex Alimentarius or Food Code
DBM	Department of Budget and Management
DENR	Department of Environment and Natural Resources
DFA	Department of Foreign Affairs
DOLE-DAO	Department of Labor and Employment- Department Administrative Order
DOST	Department of Science and Technology
DOST-ICTO	Department of Science and Technology – Information and Communications Technology Office
DTI	Department of Trade and Industry
DNA	Deoxyribonucleic acid
DWFF	Distant Water Fishing Fleets
EAFM	Ecosystem Approach to Fisheries Management
EEZ	Exclusive Economic Zone
EU	European Union
FAD	Fish Aggregating Device
FARMCS	Fisheries and Aquatic Resource Management Councils
FAOs	Fisheries Administrative Orders
FelIS	Fishing Vessel Electronic Licensing System
FB	Fishing Boat
FFA	Forum Fisheries Agency
FIQD/FIS	Fisheries Inspection and Quarantine Division/Fisheries Inspection Section
FL	Fork Length
FLE	Fisheries Law Enforcement
FLEMIS	Fisheries Law Enforcement Management Information
FOP	Fisheries Observer Program

NYMMS

FPTLS	Fisheries Product Testing Laboratory Section
FRLD	Fisheries Regulatory and Licensing Division
GFIs	Government Financial Institutions
GMP	Good Manufacturing Practices
GSFPC	General Santos Fish Port Complex
HACCP	Hazard Analysis Critical Control Point
HCR	Harvest Control Rule
HR	Human Resources
HSP1	High Seas Pocket 1
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICT	Information and Communications Technology
IDSFA	Inter-island Deep Sea Fishing Association
IEC	Information Education Campaign
IOTC	Indian Ocean Tuna Commission
IRR	Implementing Rules and Regulations
ISO	International Organization for Standardization
IUUF	Illegal, Unreported, and Unregulated Fishing
LGU	Local Government Unit
LSPSV	Large-scale purse seine vessel
MARINA	Maritime Industry Authority
MCS	Monitoring Control and Surveillance
MCSCOCs	Monitoring Control and Surveillance Coordinating and Operations Centers
MENA	Middle East and North Africa
MHLC	Multilateral High-Level Conference
MMOVs	Multi Mission Offshore Vessels
MSY	Maximum Sustainable Yield
MSME	Micro and Small Medium Enterprises
NAMRIA	National Mapping and Resource Information Authority
NCIE	National Committee on Illegal Entrants
NDRRMC	National Disaster and Risk Reduction Management Council
NEDA	National Economic Development Authority
NFRDI	National Fisheries Research and Development Institute
NGO	Non-Government Organization
NMFDC	National Marine Fisheries Development Center
NSAP	National Stock Assessment Program
NTIC	National Tuna Industry Council
NTMP	National Tuna Management Plan
OFF/SPC	Oceanic Fisheries Programme/ Secretariat of the Pacific Community
PCAARRD	Philippine Council for Agriculture and Aquatic Resources Research and Development

PCAF	Philippine Council for Agriculture and Fisheries
PFDA	Philippine Fisheries Development Authority
PHTD	Post-Harvest Technology Division
PIN	Pacific Island Nations
PNG	Papua New Guinea
PPA	Philippine Ports Authority
PSA	Philippine Statistics Authority
PSM	Port State Measures
PTDF	Pacific Tuna Development Foundation
RFMO	Regional Fisheries Management Organization
RFO	Regional Field Offices
SFFAI	SOCKSARGEN Federation of Fishing and Allied Industries, Inc.
SMA	Special Management Area
SPC	Secretariat of the Pacific Community
SSI	Species of Special Interest
SUCs	State Universities and Colleges
TBT/SPS	Technical Barriers to Trade and Sanitary and Phytosanitary Measures
tRFMOs	tuna Regional Fisheries Management Organizations
UNCLOS	United Nations Convention on the Law of the Sea
UN/FAO CCRF	United Nations/Food and Agriculture Organization Code of Conduct for Responsible Fisheries
UNFSA	United Nations Fish Stock Agreement
UP-MSI	University of the Philippines-Marine Science Institute
US	United States of America
USAID	United States Agency for International Development
VMS/VMM	Vessel Monitoring System/Vessel Monitoring Measure
WCPFC	Western and Central Pacific Fisheries Commission
WCPFC-CA	Western and Central Pacific Fisheries Commission Convention Area
WCPO	Western and Central Pacific Ocean
WPEA	West Pacific East Asia
WPS	West Philippine Sea
WTO/GATT	World Trade Organization/General Agreements on Tariffs and Trade
WWF	World Wildlife Fund

NATIONAL TUNA MANAGEMENT PLAN



VISION



To establish a sustainably-managed and equitably-allocated tuna fisheries by 2026 to promote responsible fishing practices and trade of tuna products and thereby ensure (1) the continuing provision of gainful livelihood and substantial income to tuna fishers and of growth opportunities to associated businesses and (2) food security for the growing population of the country.



BACKGROUND

The adoption of a National Tuna Management Plan (NTMP), which is envisioned to serve as a road map to the establishment of a sustainable tuna industry, is important in view of the following considerations:

The need for sustainable exploitation of tuna resources. As one of the major tuna-fishing nations, the Philippines should be able to balance its need for growth and development (which drives its increasing tuna fishing requirements) against the need for sustainability (which requires it to engage in international cooperative arrangements in managing tunas and other highly migratory and transboundary fish stocks).

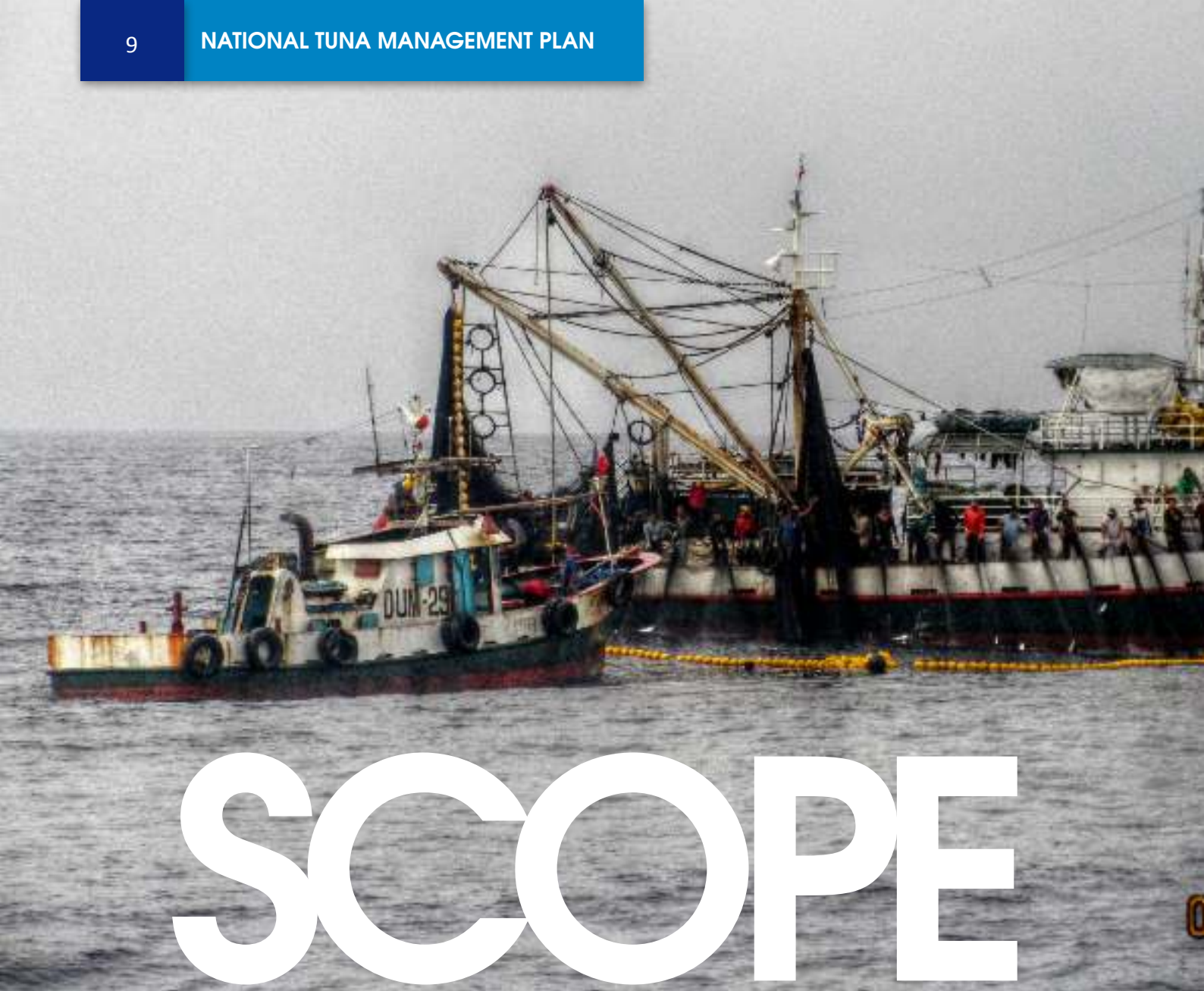
The need for transnational fishery cooperation. Regional and global events have intensified the implementation of joint management measures designed to protect the tuna and other tuna-like and migratory resources across various countries. Interestingly, this cooperation is played out even within the Philippines as evidenced by the high degree of inter-dependence among its tuna fisheries.

Increasing catch levels in the Western and Central Pacific Ocean (WCPO) have led the Western Central Pacific Fisheries Commission (WCPFC) to adopt, for implementation by member-countries, a growing number of Conservation and Management Measures (CMMs). Being a responsible member-country, the Philippines is duty-bound to introduce them to its fisheries industry.

The need for deterrence against illegal, unreported and unregulated tuna-fishing. In addition, Republic Act 10654, which amended Republic Act 8550 (otherwise known as the Philippine Fisheries Code of 1998), instituted the concept of Illegal, Unreported and Unregulated (IUU) fishing and sets increased penalties and sanctions as a deterrent. Moreover, it prescribes that the number of licenses and permits for the conduct of fishery activities is subject to harvest control rules and reference points. And just as importantly, it adopts the precautionary principle and mandates the management of fishery and aquatic resources consistent with the Ecosystem Approach to Fisheries Management (EAFM), which requires striking a balance – through good governance and sustainable fishing practices – between ecological and human well-being, between over-protection and over-exploitation of resources.

The need for aligning national tuna management with the Comprehensive National Fisheries Industry Development Plan (CNFIDP) 2016-2020. Any NTMP crafted has to dovetail perfectly with the CNFIDP 2016–2020, which provides the broader context in which it would be implemented. It should be noted that the CNFIDP identifies targets, strategies, and actions to attain the following objectives: sufficient contribution to food security for the growing Philippine population, which is estimated to number 103 million at present and expected to reach 130 million in 2025; inclusive growth; sustainable, science-based fisheries and aquatic resource management practices; compliance with international laws, policies, and standards, and enforcement of corresponding local laws and regulations; strengthened capacities in infrastructure development, technology adaptation, human resource and information sharing; and resilience to environmental hazards.





SCOPE

This Plan applies to the catching, processing, and marketing of skipjack tuna (SKJ, otherwise known as *Katsuwonus pelamis*), yellowfin tuna (YFT, otherwise known as *Thunnus albacares*), bigeye tuna (BET, otherwise known as *Thunnus obesus*), albacore tuna (ALB otherwise known as *Thunnus alalunga*), and Pacific bluefin tuna (PBF otherwise known as *Thunnus orientalis*).

It covers both municipal and commercial fishing employing purse seine, ringnet, longline, handline (or hook and line), and other fishing methods and gears that are operated in Philippine waters including the EEZ. Likewise, it covers certain operations of Philippine-flagged vessels operating beyond national jurisdictions (high seas and/or jurisdiction of other coastal states).

It covers as well the trade of tuna products originating in, and those transshipped to and processed in, the Philippines.

Lastly, it covers any and all species-specific tuna fisheries management plans that may be formulated subsequently in furtherance of its stipulated vision, goals, and objectives.

PROFILE OF PHILIPPINE TUNA FISHERIES



Fleet Structure and Fishing Grounds

Tuna fishing in the Philippines involves both municipal (< 3GT) and commercial (>3GT) fishing vessels.

Municipal handline (or hook and line), troll line, and gillnet among others are used to catch the oceanic tunas. Small-scale and medium-scale commercial vessels (3.1-150 GT) like the purse seine, ringnet, and handline are the primary fishing boats which fish beyond municipal waters and the EEZ. Philippine-flagged purse seine/ring vessels (not more than 250 GT), currently limited to 36 tuna catchers, operate in the high seas pocket 1 (HSP1) pursuant to WCPFC policy. Relatively larger vessel/large purse seine vessels (>500GT) operate in other Pacific island countries. A small number of Philippine-flagged tuna longline vessels used to fish in the WCPO and Indian Ocean (IO); these vessels have reportedly been inactive since 2015.¹

The distant water fleet is currently composed of 55 Philippine-flagged vessels fishing in other coastal countries (Papua New Guinea) and 36 registered group-seine tuna catchers in the high seas pocket 1 (HSP1).

The number of registered municipal fishing boat is 244,398 as of April 4, 2017 (BoatR) although the number of boats engaged by fishing category is unclear. Handline (or hook and line), drift gill net and troll line are the municipal tuna fishing boats that operate in both municipal waters (within 15 km) and beyond. It is carried out nationwide, with important fishing grounds in Sulu Sea, Moro Gulf/Celebes Sea, Pacific seaboard including archipelagic waters of Lagonoy Gulf, Albay Gulf, Davao Gulf, Davao Oriental, West Philippine Sea, Antique, Mindoro, Zambales, Ilocos Norte and Ilocos Sur.

Table 1. Registered commercial fishing boats for tuna by gear type, 2017
(Source: FeLIS, 30 January 2018)

Gear Type	Number of vessels
Gill Net	36
Handline (or hook and line)	745
Ring Net	1,005
Tuna Purse Seine	164
Total	1,950

¹ Though inactive (presumably on account of concerns about costs and profitability), these vessels can resume operations in the area inasmuch as the Philippine has retained its fishing access thereto.



The Philippine-registered Philippine vessels operating in the Western and Central Pacific Region according to the classification of the Bureau of Fisheries and Aquatic Resources (BFAR) is shown in Table 2. These vessels are based mainly in General Santos and Navotas.

Table 2. Philippine-registered vessels in the WCPFC
(Source: WCPFC website, April 18, 2018)

Type of Vessel	Number of registered vessels				Total
	3.1-250 GT	>250-500 GT	>500-1,000 GT	>1,000 GT	
Fish carrier	101	9	7	15	132
Purse seine	45	10	14	22	91
Support vessel	173	1	-	-	174
Total	319	29	21	37	397

Tuna resources and stock status in the WCPO

Ten (10) tuna species, classified either as oceanic or neritic, are caught in the Philippines. The key oceanic tuna species aside from SKJ, YFT, and BET are the albacore tuna (*Thunnus alalunga*), longtail tuna (*Thunnus tonggol*), and striped Bonito (*Sarda sarda*) – all of which are caught in lesser quantities and only recently included in statistical reports. The other species is the Pacific Bluefin Tuna (*Thunnus orientalis*), the catch of which is occasionally reported.

Frigate tuna (*Auxis thazard*), bullet tuna (*Auxis rochei*) and eastern little tuna/kawa-kawa (*Euthynnus affinis*) form the bulk of the landing for neritic tunas.

Inasmuch as the stock of oceanic tunas is generally considered part of, and lumped with, the West Central Pacific (WCPO) stocks, the usual stock assessment hardly gives it discrete treatment, and this would explain why local research studies thereon have been very limited.

The stock assessment of SKJ in 2016 indicated that it was not in an overfished state and that no overfishing occurred. Catches were lower than but nearing the MSY, and fishing mortality remained below the level that would result in the MSY (McKechnie et al, 2016).

The stock assessment of YFT in 2017 showed that it was not in an overfished state as recent spawning biomass in the absence of fishing was above the limit reference point ($SB_{2012-2015}/SBF=0 = 0.33$ with 92% probability. The ratio $F_{\text{recent}}/F_{\text{MSY}}$ (from 2011 to 2014) was estimated to be 0.74, indicating that there was a 96% probability that overfishing was not occurring (WCPFC-SC13, 2017).

The stock assessment of BET in 2017 likewise showed that it was not in an overfished state as recent spawning biomass in the absence of fishing was above the limit reference point ($SB_{2012-2015}/SBF=0 = 0.32$ with 85% probability. The ratio $F_{\text{recent}}/F_{\text{MSY}}$ (from 2011 to 2014) was estimated to be 0.83, indicating that there was a 77% probability that overfishing was not occurring (WCPFC-SC13, 2017). This latest stock assessment was considered a significant improvement compared with the one undertaken in 2014 although its results contained higher uncertainty due to the inclusion of new information on BET growth and regional structures.

Bycatch of tuna fishery

The bycatch of tuna fishery include mackerel scad (*Decapterus macarellus*), various species of billfishes, and other species such as dolphin fish (*Coryphaena hippurus*), wahoo, opah, rainbow runner (*Elagatis bipinnulatus*), trigger fish, shark species, and juvenile oceanic tunas.

Statistics and Production

Tuna production attributed to the Philippines is often undertaken by (1) municipal handlines, which operate within 15 km of the shoreline; (2) commercial handlines, which operate within the EEZ; and (3) purse seines/ringnets, which fish within the EEZ, in the HSP1, and even in distant waters where the Philippines enjoys fishing access.

Philippine Statistics Authority

Since 1987, fisheries statistics have been produced by the Bureau of Agricultural Statistics (BAS), which was transferred to the Philippine Statistics Authority (PSA) in 2013. Such statistics are based on probability (i.e. stratified random sampling by data collectors) and non-probability surveys (i.e. interviews by regular BAS staff) and are supplemented by secondary data from administrative sources (e.g. landings sites and ports) (Vallesteros, 2002). Annual Fisheries Statistics for commercial, municipal, inland and aquaculture sectors are published for 3-year timeframes and present volume and value of production by province and by region, information on fish prices and foreign trade statistics.

The official fisheries statistics, however, are those published by the PSA. However, the sampling techniques and estimates used are intended for macroeconomic purposes, not for stock assessment. Recognizing that such techniques and estimates require improvement especially in terms of species identification and estimation for YFT and BET (for which the estimates were combined prior to 2005), the PSA is embarking on a new initiative to adopt new statistical frames and methodologies.

The tuna catch estimates made by the PSA include all the tunas unloaded in Philippine ports regardless of the flag of the vessel and area where the fish were caught. They include, but do not distinguish, catches from within Philippine waters or beyond national waters (high seas from EEZ of other coastal states). Neither do they disaggregate such catches to attribute them to Philippine-flagged or foreign-flagged vessels. The PSA tuna catch for the last five years is shown in Table 3.

Table 3. PSA tuna catch by species, 2012-2017 in metric tons
(Source: PSA Annual Fisheries Statistics, 2017 data are provisional)

Year	Commercial			Municipal			TOTAL
	Skipjack	Yellowfin	Bigeye	Skipjack	Yellowfin	Bigeye	
2012	163,026	77,730	7,912	41,327	45,698	4,568	340,262
2013	168,183	83,142	6,899	40,963	46,742	4,962	350,891
2014	194,583	94,256	6,188	39,270	45,664	4,980	384,942
2015	199,153	102,400	5,258	34,392	40,987	5,614	387,804
2016	181,610	70,565	8,106	30,321	35,103	7,505	333,209
2017	211,794	70,565	19,325	29,872	36,730	8,623	375,299

Reconciliation of Tuna Catch Estimates

In order to provide an estimate for stock assessment in aid of policy and program formulation, the BFAR has conducted the Annual Tuna Fisheries Catch Estimates Review Workshop since 2008. This initiative, undertaken through its National Stock Assessment Program (NSAP) with support from the Global Environment Fund-sponsored Project on West Pacific East Asia, is intended to review and validate the tuna catch estimates by species, gear type, and fishing areas by Philippine-flagged vessels. Used as inputs to the workshop are the data from the BFAR itself; the data from logsheets from purse seine and ringnets, cannery receipts, and the Observer Program; and the data from the PSA, PFDA, and other stakeholders in the industry.

The Workshop output is submitted to the WCPFC as part of the Philippine annual report for inclusion in the Tuna Yearbook of the WCPFC.

The most recent workshop, which was held from 28 to 29 May 2018, was the 11th Tuna Fisheries Catch Estimates Review Workshop for the year 2017 (Table 4). The estimated catch for the three species (i.e. SKJ, YFT, and BET) was 241,208 MT, 67,000 MT (28%) of which was caught by the distant water fleet in PNG and PICs. The bulk of the catch from the domestic fleet came from purse seine and ringnet (61%). The contribution of the operations of group seining in the HSP1 was about 25,514 MT (11%) and handline (or hook and line) was 59,025 MT (24%). The HSP1 production was about 25% of the total domestic purse seine tuna landings.

Table 4. Reconciled catch estimate of skipjack, yellowfin, and bigeye tunas for Philippine-flagged vessels by gear type and fleet, 2017 in metric tons
(Source: 11th Philippine Tuna Catch Review Workshop Report)

Fleet /Gear	2017			
	BET	YFT	SKJ	
PH	4,209	74,668	95,331	174,208
Handline	1,290	23,916	3,038	28,244
Hook and Line	510	19,529	10,742	30,781
Longline				-
Others	90	4,187	4,878	9,155
Ringnet	611	9,592	27,827	38,030
Purse Seine	1,708	17,444	48,846	67,998
DW	1,683	17,188	48,129	67,000
Purse Seine	1,683	17,188	48,129	67,000
Grand Total	5,892	91,856	143,460	241,208

Note: PH – Philippine-flagged vessels fishing in Philippine waters and high seas pocket 1 (HSP1)
DW- Distant-water fleet, Philippine-flagged vessels fishing with access to other coastal states

*Table 5. Catch of skipjack, yellowfin, and bigeye of Philippine-flagged vessels, by gear and fleet, 2013-2017 in metric tons
(Source: WCPFC Tuna Yearbook; 11th Philippine Tuna Catch Review Workshop Report)*

Gear/Fleet	2013	2014	2015	2016	2017	Average
PH (Domestic)	144,402	180,055	172,574	143,284	174,208	162,905
Handline	14,206	31,444	24,388	20,397	28,248	23,737
Hook & Line	21,800	14,866	31,144	20,379	30,777	23,793
Longline	194	327	-	-	-	104
Others	6491	9763	14,283	9,090	9,155	9,756
Ringnet	37,992	45,502	45,799	35,128	38,030	40,490
Purse seine	63,719	78,153	56,960	58,290	67,998	65,024
DW (Distant Waters)	84,837	106,980	75,260	71,394	67,000	81,094
Purse seine	84,837	106,980	75,260	71,394	67,000	81,094
Grand Total	229,239	287,035	247,834	214,678	241,208	243,999

Note: 2017 figures are preliminary





The average catch of Philippine-flagged vessels for the recent five years was about 243,999 MT. The contributions of the domestic purse seine/ringnet and handline (or hook and line) fishery are 43% and 19%, respectively. The catch by purse seine Philippine-flagged vessels in PNG and other coastal states was about 33%. The catch contribution of the distant water fleet declined in recent years.

There has been no Philippine-flagged longline vessel operating in the WCPFC Convention Area since 2015. Previously, two (2) longline vessels with fishing access (e.g. to Kiribati) operated in the WCPO,² with their catch summarized as follows:

Table 6. Catch of Philippine-flagged longline vessels operating in the WCPO, 2011-2014 in metric tons.

Species	2011	2012	2013	2014
Yellowfin	145.77	60.63	27.16	2.78
Bigeye	777.06	247.83	166.56	52.90
Albacore	36.39	23.96	30.47	1.16
Others	174.96	62.66	10.69	38.67
Total	1,134.18	398.08	234.87	95.51

² Same explanation as that in Footnote No. 1 applies.

Transshipment at port and Processing

Transshipment of tuna by foreign vessels is also included in the Philippine tuna statistics. Transshipment by foreign vessels is permitted only at the PFDA Port in Toril, Davao. From 2012 to 2016, the average annual port calls was 300, with an average volume of about 2,720 tons per unloading vessel.

Most of the municipal tuna catch are landed in the more than 8,000 landing sites nationwide and sold in wet markets. There is no available data on the disposal of municipal tuna catch, however, although it is assumed that a large quantity of such catch is consumed fresh and a less significant quantity is processed by traditional methods like smoking, drying, and salting. Except for handline-caught tunas that are landed in General Santos, Mindoro, and Albay, an insignificant quantity of such catch goes into commercial processing.

In general, YFT and BET are processed as fresh/chilled, loins/whole, whole gilled, and gutted frozen, mostly in the National Capital Region (Metro Manila) and Region 12 (General Santos). Some of the processing facilities are use tin cans and retort pouches.

A significant component of the post-harvest sector of the Philippine tuna fishing industry is its export market. Canned tuna constitutes the bulk of tuna products being exported. Tuna, mackerel, and sardines were major fish exports in 2013 and 30% of exports were accounted for by tuna.

Interestingly, the domestic catch from commercial fishing is increasingly used by domestic canneries, with smaller quantities processed as smoked, boiled, and frozen products for both domestic and export markets.

There are currently seven tuna canneries in the Philippines - six in General Santos City and one in Zamboanga. Raw materials to these canneries come from Philippine waters (70%) and from overseas (30%). There are two Philippine-owned and operated canneries in Papua New Guinea – one in Madang and one in Lae. There are more than 15 frozen tuna processors in the Philippines, 80% of which are located in General Santos City and the rest, in Metro Manila.



Fish ports and landing centers

There are 455 commercial fish landing centers in the Philippines, which include PFDA and LGU-controlled ports as well as private wharves.

The **General Santos Fish Port Complex (GSFPC)** is the country's major tuna unloading port, where 189,944.2 MT tuna were unloaded in 2017. It has undergone expansion and improvement. Major components of the said expansion and improvement include the construction of deep wharves, cold storage and processing area, port handling equipment, power substation, waste water treatment plant, water supply system, and other ancillary facilities. Just as importantly, the GSFPC port facilities meet the minimum standard requirements for food safety.

The **Navotas Fish Port Complex** in Metro Manila is the country's second largest tuna port, where 6,821.56 MT tuna were unloaded in 2017. Its rehabilitation includes the upgrading of port facilities (such as roads, electrical and power system, landing quay and west breakwater) and construction of cold storage, processing plant, and waste water treatment facilities.

Under the CNFIDP, the BFAR has targeted to establish 729 **Community Fish Landing Centers (CFLCs)** nationwide. As of May 2018, a total of 411 units (56%) of targeted CFLCs were completed, and of these completed units, 89 (12%) were certified as operational.

The establishment of the CFLCs is meant to (1) provide an appropriate and a more hygienic hub for the fishermen to land their catch, (2) serve as a monitoring site for the NSAP, (3) serve as a training venue for the fisherfolks, and (4) serve, in part (via its roof deck), as a facility for sun drying and smoking of fish during the peak months.

On the other hand, the **Distant Water Fishing Fleets (DWFFs)** are fishing in the waters of foreign countries but also deliver their excess catches to the canneries in General Santos City or other parts of the Philippines. Since they are Philippine-flagged vessels, their catches are attributed to the Philippines and qualify for export to the European Union (EU) under the Generalized Systems of Preference Plus (GSP+) scheme.

Tuna export and import

Since 2004, the tuna has dominated Philippine fishery exports, and this is likely to continue in subsequent years (Yap and Diaz, 2015; BFAR, 2015). Tuna export comes in the following product forms: fresh/chilled, loins/whole tuna, canned/pouched, and whole gilled/gutted frozen.

In 2015, tuna exports accounted for 42% of the country's total fishery exports, with a total volume of 226,821 tons valued at PHP 13.4B (USD 293.009M). Top country destinations were Japan, USA, and Italy for fresh/chilled/frozen varieties; and USA, Canada, and Japan for prepared/preserved varieties.

At the same time, tuna, however, also constitutes the country's largest fishery import. In 2015, it was imported at a total volume of 153,110 MT valued at PHP 8.44B (USD186.051M) or about 37.91% of the total fishery import volume of 403,840 MT valued at PHP 18.79 B (USD 414.154M). The import, which consisted of fresh/chilled/frozen varieties and used as raw materials for canning, came mostly from Indonesia, Taiwan, and Papua New Guinea. Notwithstanding this fact, the country remains a net exporter of tuna, with a trade surplus of PHP 5.04B (USD 106.958M) (Philippine Fisheries Profile, 2015).

The official figures for tuna exports from 2013 to 2017 are summarized in Table 7 below.

Table 7. Tuna exports by product form, 2013-2017 in metric tons (Source: PSA),

Tuna commodity, by volume (MT)	2013	2014	2015	2016	2017
Fresh/chilled/frozen	20,177	28,808	26,815	22,381	25,637
Dried/smoked	2,725	1,460	548	1,252	1,434
Canned	29,660	58,660	73,411	66,284	75,928
TOTAL VALUE (million USD)	664.0	459.8	414.4	274.2	283.5

Socio-Economic Benefits of Tuna Fisheries

Tuna fisheries, which comprise about 33% of the total municipal fisheries production, provide employment and income to those who are totally dependent on it, and they happen to constitute a significant proportion of the 1.7M fisherfolks (BFAR-FishR, 2016).

Tuna fisheries likewise support the commercial sector (which includes seven tuna canneries and other processing centers), enabling it to provide employment and income as well. General Santos City alone is home to some 200,000 workers in the tuna industry according to the estimates of the Sentro ng mga Nagkakaisa at Progresibong Manggagawa (Center of United and Progressive Workers).

Interestingly, tuna fisheries allows ancillary industries to benefit immensely, as evidenced by the handline sector, which employs over 40,000 fishers to man its 2,500 outrigger boats.

Approximately 90% of the national tuna production is located in Mindanao, providing over 100,000 jobs and annual direct revenues of \$400 million. General Santos City in Mindanao is the center of the tuna industry. Six of the country's seven major tuna canning factories are located in General Santos City and so are 15 of the 19 fish processors and exporters in the country.

Incidentally, it may be noted that a huge percentage of tunas processed in General Santos City comes from the whole country particularly from the eastern Pacific seaboard. Tunas caught by handline (or hook and line) come from Mati, Compostela Valley, Surigao, Leyte, Samar, and even as far as Bicol.

Stakeholders

Some of the key stakeholders in the effective management and conservation of tuna resources in the Philippines include the following: municipal fisherfolks engaged in tuna fishing and their organizations, commercial tuna fleet operators and their organizations (SOCKSARGEN Federation of Fishing and Allied Industries, Inc. (SFFAI), Alliance of Philippine Fishing Federations, Inc. (APFFI), Alliance of Tuna Handliners (ATH), the National Tuna Industry Council (NTIC), National Fisheries and Aquatic Resources Management (NFARMC), and national government agencies (NGAs), local government units (LGUs), and academia and non-governmental organization (NGOs).

Various mechanisms (such as national and municipal FARMCs) have been put in place by the government to ensure effective consultation with, and efficient dissemination of information to, key stakeholders.



HISTORY

History of Tuna Management

Done in coastal fishing grounds, tuna fishing in the Philippines dates back to the late 19th and early 20th century. Done mainly for subsistence, it requires the use of simple fishing gears.

Commercial tuna fishing is believed to have continued albeit in insignificant volumes during the Japanese occupation, with reports of several tuna longline fishing operations in Davao in the 1940s, and throughout the American occupation in the 1950s (BFAR/NFRDI, 2012).

In the 1960s, American importers and local fishing corporations started financing small fishers using handliners and trolls in southern Mindanao to catch tuna. And then, during the 1970s, the unprecedented increase in tuna exports led to the establishment of tuna producers and exporters association. With the subsequent introduction of the payao, which further resulted in significant increases in tuna landings towards the latter part of the same decade, tuna production surpassed 100,000 t (Figure 1).

General Santos City, in particular, benefited immensely as well from the tuna boom. Credit for its good fortune is given to the introduction not only of payao but also purse seining by companies (such as Mar Fishing Corporation).

The tuna boom and the developments in the fisheries industry that it entailed necessitated the issuance of Presidential Decree 704, which formed the foundational policy structure for fisheries to ensure that gains are optimized yet preserved.

In the 1980s, increasing fish production remained the main concern even as the Philippines became the top producer of tuna in Southeast Asia. Consequently, joint venture agreements were forged (such as those with Taiwan in the use of longlines). But then the demand for fish supply resulted in the expansion of ringnet and purse seine fleets, which, in turn, resulted in the decline of catch rates in Philippine waters. And this adverse turn of events induced the Philippines to venture farther, prompting it to become one of the main distant-water fishing nations in the Pacific (in addition to US, Japan, Korea, Taiwan and China). By 1990, its tuna production exceeded 200,000 t (Figure 1).

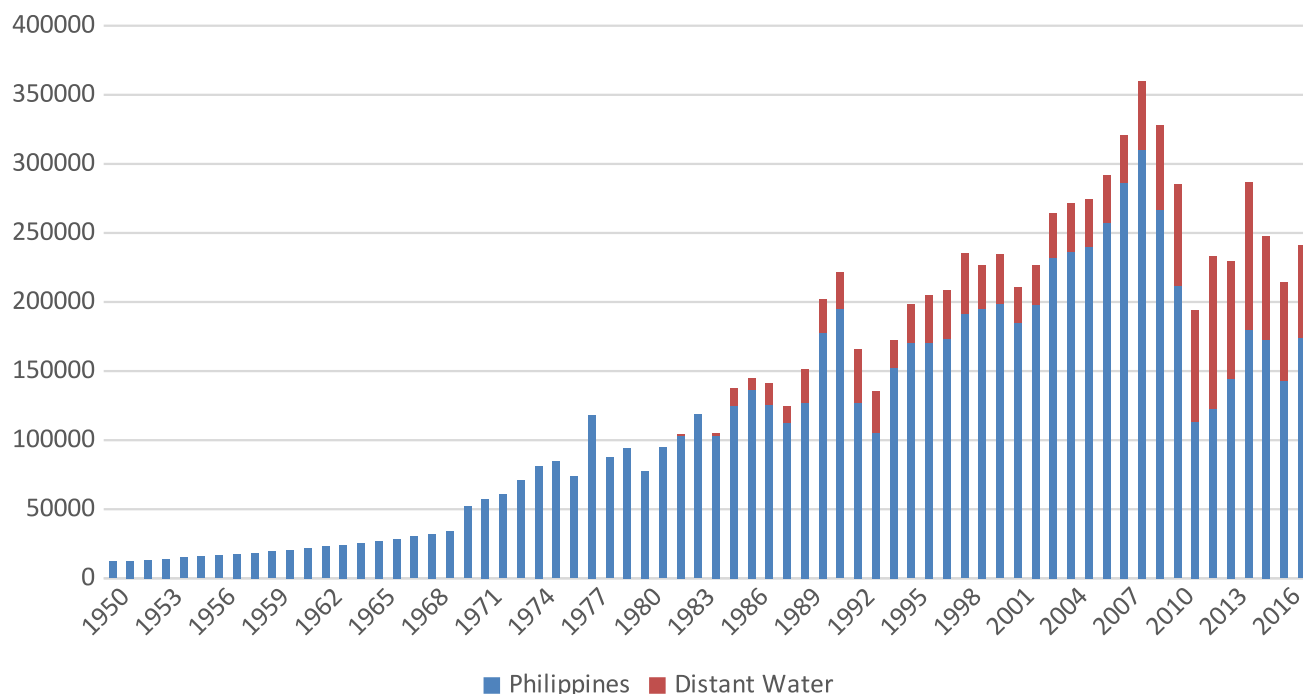
By the 1990s, export development and market expansion emerged as the main concerns alongside fisheries conservation and management. In 1998, Republic Act No. 8550 (otherwise known as the Philippine Fisheries Code of 1998) was promulgated in response. It provided for fisheries management approach based on UNCLOS/UN/FAO CCRF, and introduced the concepts of Maximum Sustainable Yield (MSY), catch quota and total allowable catches (TACs), Fisheries and Aquatic Resources Management Council, sustainable fisheries, among others.

By the turn of the century, the Philippines actively participated in the establishment of the WCPFC, which put in place the tuna management regime for the WCPO. Tuna production from Philippine vessels was on the upswing during this decade, with the highest recorded catch for the Philippines in 2008 at 360,000 t .

However, as fishing pressures continued to increase, resulting in the decline of fish biomass (particularly that of the bigeye stock), conservation and management measures under the WCPFC became more stringent. The closure of the high seas pocket 1 (HSP1) was effected, and the use of Fish Aggregating Devices was restricted. And the resulting catch decline negatively impacted on the tuna production of the country, with landings dropping to less than 200,000 t in 2011. To compensate for its loss, the Philippines lobbied for the re-opening of HSP1 for its displaced fleet, which was being forced to resort to catching juveniles in Philippine waters. Its lobby succeeded, with the WCPFC granting access to 36 catcher vessels for group seine operations starting late 2012.

In 2014 and 2015, in further pursuit of fisheries conservation and management, stiffer penalties and sanctions to deter illegal, unreported, and unregulated fishing (IUUF) were imposed through the amendment of Republic Act No. 8550 by Republic Act No. 10654. On top of that, the broad spectrum of pressing, cognate challenges facing fisheries resources were addressed with greater earnestness through the updating of the Comprehensive National Fisheries Industry Development Plan (CNFIDP) (BFAR 2016).

Figure 1. Tuna production of the Philippines, 1950-2016
(Source : WCPFC Tuna Yearbook; 11th Tuna Catch Workshop)



MANAGEMENT AND INSTITUTIONAL FRAMEWORK



National and local legislation and institutions

Generally, the policy and legal framework for fisheries management in the Philippines is underpinned chiefly by the following pieces of legislation:

- The **Philippine Fisheries Code**³ (otherwise known as Republic Act No. 8550 as amended by Republic Act No. 10654) sets out the general framework for managing the country's fisheries sector, and designates the BFAR to serve as the lead government agency responsible for conservation and management of fishery resources beyond municipal waters. In imbuing Republic Act No. 8850 with the concept of IUUF, Republic Act No. 10654 legitimates the use of increased penalties and sanctions for greater deterrence, regulates the licensing of fishery activities according to harvest control rules and reference points, and affirms the strategic value of both the precautionary principle and the ecosystem-based approach to fisheries management.
- The **Local Government Code of 1991** provides the local government units (i.e. municipal and city governments) the jurisdiction and responsibility to manage fisheries within their jurisdiction (i.e. municipal waters- within 15 km from the shoreline). It also grants preferential use of municipal waters to municipal fisherfolks.
- The **Agriculture and Fisheries Modernization Act of 1997** provides measures to modernize the fisheries sector particularly with respect to credit and extension service.

Supplementing these pieces of legislation are **Republic Act No. 9379** (otherwise known as the Handline Fishing Law, which regulates handline fishing (a traditional fishing method that uses the hook and line, a passive fishing gear with a single vertical line carrying one hook and used by simply dropping the line into the water and waiting for the fish to bite) and the **Comprehensive National Fisheries Industry Development Plan (CNFIDP)**, which stipulates the policy thrusts (and corresponding initiatives) of the government with respect to the development and management of the entire fisheries sector.

Fisheries management in the Philippines including tuna is primarily governed by the national government through the BFAR and the local government units. The BFAR is tasked to manage, conserve, develop, protect, utilize, and dispose of all fisheries and aquatic resources beyond municipal waters. In contrast, municipal and city governments are essentially tasked to do the same thing but only within municipal waters of up to 15 kilometers from the shoreline.⁴

Aside from the BFAR and local government units, other government agencies have also mandates relating to tuna fisheries management, and in this sense, they can be said to perform a supplemental function. These supporting institutions include the Maritime Industry Authority (MARINA), Philippine Fisheries Development Authority (PFDA), Department of Environment and Natural Resources (DENR), Philippine Ports Authority (PPA), Department of Trade and Industry (DTI), and Department of Foreign Affairs (DFA). The functions of these agencies include the registration of fishing vessels, operations and management of fish ports, protection of fish habitat, regulation of fish trade, and fisheries negotiations.

³ The implementation of the Code is effected through its Implementing Rules and Regulations (IRR) and the Fisheries Administrative Orders (FAOs) issued by the Department of Agriculture (DA).

⁴ More specifically, the CNFIDP sets out the targets, strategies, and actions to attain the following objectives: (1) sufficient contribution to national food security, (2) inclusive growth within the fisheries industry, (3) sustainable, science-based fisheries and aquatic resource management practices, (4) compliance with international laws, policies, and standards, and enforcement of local laws and regulations, (5) strengthened capacities in infrastructure, technologies, human resource and information sharing, and (6) resilience to environmental hazards.

There are also a number of other supporting institutions that provide key research and policy assistance such as the National Fisheries Research and Development Institute (NFRDI), Philippine Statistics Authority (PSA), and select units in the academe.

There are still other supporting institutions that complement the enforcement functions of the BFAR. The Philippine Coast Guard, Philippine Navy, and Philippine National Police - Maritime Group are involved in the enforcement of fisheries laws.

In view of the constellation of government agencies involved in fisheries management, coordinating mechanisms are a necessity especially insofar as policy formulation and policy implementation are concerned. These coordinating mechanisms include the Philippine Council for Agriculture and Fisheries (PCAF), Fisheries and Aquatic Resource Management Councils (FARMCs), Philippine Council for Agriculture and Aquatic Resources Research and Development (PCAARRD), National Committee on Illegal Entrants (NCIE), Monitoring Control and Surveillance Coordinating and Operations Centers (MCSCOCs), Bantay Dagat (Sea Watch) Program, and National Tuna Industry Council (NTIC).

International Agreements / Instruments and Membership in tuna Regional Fisheries Management Organizations (tRFMOs)

The international legal basis for the management of tuna fisheries in the Philippines are the major agreements/instruments that the Philippines has adopted, ratified, or acceded to. These include the United Nations Convention on the Law of the Sea (UNCLOS, ratified on 08 May 1984), UN Fish Stocks Agreement, and FAO Compliance Agreement.⁵

Aside from such major agreements/instruments, there are other instruments of interest that the Philippines has committed to abide by. The first set are the **environmental treats that impact fisheries** such as the Convention on Biological Diversity (CBD) and Convention on the International Trade in Endangered Species (CITES) of Wild Flora and Fauna, Convention on Migratory Species (CMS), World Trade Organization/General Agreements on Tariffs and Trade (WTO/GATT), Technical Barriers to Trade and Sanitary and Phytosanitary (TBT/SPS) Measures and Codex Alimentarius. On the other hand, the second set is comprised of non-binding international instruments such as the FAO Code of Conduct for Responsible Fisheries and the International Plan of Action to Prevent, Deter, and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU).

Concomitant to its interest in subscribing to international agreements/instruments, the Philippines has shown enthusiasm for joining or engaging international policy-making bodies on fisheries management – the so-called Tuna Regional Fisheries Management Organizations (tRFMOs), which have emerged as a consequence of the felt, widespread need to co-manage targeted oceanic tuna stocks and deter escalating catch levels in the WCPO (WWF, 2015). Specifically, it is a member and signatory to the Western and Central Pacific Fisheries Commission (WCPFC), Indian Ocean Tuna Commission (IOTC) and International Commission for the Conservation of Atlantic Tunas (ICCAT). In addition, it is a cooperating non-member to the Commission for the Conservation of Southern Bluefin Tuna (CCSBT). On account of its involvement in these tRFMOs in its capacity as a coastal, flag, and port state, the Philippines is duty-bound to adopt and comply with the increasing number of Conservation and Management Measures (CMMs) being issued.

⁵ The Philippines has recently acceded to the Agreement, which seeks to promote compliance with the International Conservation and Management Measures by Fishing Vessels on the High Seas.

Tuna Regional Fisheries Management Organizations (tRFMOs)

With the rise of tuna fishing as a resource-generating enterprise, the need for transnational fishery cooperation has become all the more critical and urgent, and as previously stated, this exigency has led to the the establishment of tRFMOs, namely:

- Established in 1950, the **Inter-American Tropical Tuna Commission (IATTC)** ushered the beginning of a scientific approach to YFT management. The IATTC is responsible for the conservation and management of tuna and other marine resources in the eastern Pacific Ocean.
- Moving towards the 70's, the **South Pacific Commission** established the **Expert Committee on Skipjack Tuna** and subsequently, the **Skipjack Tagging Program**. The results⁶ of its initiatives spurred interest among the US and Asian countries to access tuna resources in the Pacific.
- In 1976, the US Government and private sector established the **Pacific Tuna Development Foundation (PTDF)** to expand US purse seine operations in the western and central Pacific. The PTDF funded the development of the fast-sinking purse seine and exploratory fishing in the central Pacific.
- In latter 1970s, the South Pacific Forum established the **Forum Fisheries Agency (FFA)** to help Pacific Island members benefit from the rich tuna resources in their waters.
- In mid and late 2000s, **WCPFC** held its inaugural meeting in December 2004. Fisheries Scientists warned that WCP BET and YFT stocks were in trouble.

⁶ The results indicated that the maximum sustainable yield of SKJ in the WCPO exceeded one million MT, three times higher than the 1972 catch.

STOCK STRUCTURE, STATUS, & BIOLOGY

The stock of oceanic tunas is mainly considered part of the WCPO stocks. For this reason, the usual assessment covers WCPO-wide fish stocks, rendering research studies on these oceanic tuna species very limited.

Skipjack tuna (SKJ)

Skipjack is the main species among the four (4) tropical tuna species, occurring in large surface schools year round in the equatorial zone (10°N-10°S). The horizontal distribution of SKJ is approximately limited by the 15°C isotherm, resulting in its distribution being extended seasonally into temperate waters. Within these overall limits, oxygen concentration and the availability of forage are the key determinants of vertical and horizontal distribution (OFP-SPC, 1997). The SKJ has the highest metabolic requirements of all the tunas (Brill 1994), and is, thus, limited to oxygen-rich waters near the surface and to productive areas where baitfish, small crustaceans, and other prey are available (OFP-SPC, 1997).

Skipjack spawning occurs year round in the equatorial zone, with seasonal extensions to the north and south limited by the 25°C surface isotherm, with density larvae decreasing from west to east across the Pacific (OFP-SPC, 1997).

Skipjack tagging data indicate unrestricted zonal movement between 120°E and 160°W as well as seasonal movements into and out of the higher latitudes. Significant amount of tagging carried out in the WCPO also indicate no reported recoveries by the eastern Pacific purse seine fishery. Similarly, few eastern-Pacific tagged skipjack have been recaptured west of 150°W (OFP-SPC, 1997).

Skipjack tuna in the WCPO is considered a single stock for assessment purposes (Wild and Hampton, 1994, OFP-SPC, 1997). Surface-schooling, adult SKJ (greater than 40 cm fork length; FL) is highly abundant in tropical and subtropical waters of the Pacific Ocean. In the western Pacific, warm, poleward-flowing currents near northern Japan and southern Australia seasonally extend its distribution to about 40°N and 40°S. These limits roughly correspond to the 20°C surface isotherm (McKechnie et al, 2016). SKJ movement is highly variable (Sibert et al., 1999) and is thought to be influenced by large-scale oceanographic variability (Lehodey et al., 1997).

SKJ growth is rapid compared to YFT and BET (McKechnie et al, 2016). Commensurate with its fast growth and relatively short lifespan, SKJ also matures at an early age when it reaches a length of around 40 cm FL (Wild and Hampton, 1994).

Approximate age estimates may vary between areas of the Pacific with faster growth estimates close to the equator compared with the northern Pacific (Leroy 2000, Tanabe et al 2003). Estimates of natural mortality rate were also substantially larger for small SKJ (21-30 cm FL, $M=0.8$ mo⁻¹) compared to larger SKJ (51-70 cm FL, $M=0.12-0.15$ mo⁻¹) (Hampton 2000). The longest recorded lifespan for a tagged SKJ to date has been 4.5 years.

In the stock assessment done in 2016, it was pointed out the SKJ stock was not overfished; that catches were lower than, but were approaching, the MSY; and that fishing mortality remained below the MSY (McKechnie et al, 2016).

Yellowfin tuna (YFT)

Yellowfin tuna has a similar distribution to SKJ as small juveniles (<70 cm FL), and frequently occur in mixed schools with SKJ of the same size. Yellowfin has less demanding metabolic requirements than SKJ. Unlike SKJ, it develops a swim bladder and large pectoral fins at larger size, which affords it greater buoyancy and hydrodynamic lift. Slower basal swimming speeds are therefore possible. With somewhat lower oxygen requirements, YFT can inhabit deeper waters, particularly as adults, where its large size and some ability to physiologically thermos-regulate provides a buffer against the lower ambient temperatures. However, it appears to spend most of its time in the mixed layer above the thermocline. Yellowfin tuna tends to increase in average size from west to east (OFP-SPC, 1997).

For stock assessment purposes, YFT stock in the WCPO, west of 150°W, has been considered as a discrete stock unit (Langley 2007, 2009, 2011). This area has been disaggregated into model regions so as to describe to some effect spatial processes (such as recruitment and movement) and fishing mortality within regions.

Yellowfin tuna is distributed throughout the tropical and sub-tropical waters of the Pacific Ocean (Davies et al, 2014). There is some indication of restricted mixing between the western and eastern Pacific varieties based on analysis of genetic samples (Ward et al, 1994) and tagging data. Adults (larger than about 100 cm) spawn, probably opportunistically, in waters warmer than 26°C (Itano, 2000) where juvenile YFTs are first encountered in commercial fisheries (mainly surface fisheries in the Philippines and eastern Indonesia) at several months of age. Yellowfin tuna is relatively fast-growing, and has a maximum fork length (FL) of about 180 cm (Davies et al, 2014). It is also recognized there are possibly regional differences in growth rate for YFT.

However, there are indications (provided through analysis of DNA microsatellite data) that the YFT population in the Philippines' EEZ is separate from the Bismarck Sea (Papua New Guinea) population, suggesting 2 sub-populations that call for further studies or validation (Aguila et al, 2015). DNA profiling also has demonstrated heterogeneous population structure for YFT across the Pacific basin (Grewe et al, 2016).

There is some indication that the young YFT may grow more slowly in the waters of Indonesia and the Philippines than in the wider area of the WCPO (Yamanaka, 1990). This is further supported by the comparison between the growth rates derived from WCPO YFT stock assessment (Hampton et al. 2006)



and the growth rates derived from a MFCL model that included only the single western, equatorial region (region 3) (Langley et al. 2007). The growth rates from the western equatorial region alone were considerably lower than from the WCPO, with the former growth rates more consistent with the growth of YFT in the southern Philippines waters (Yamanaka 1990) and growth increments from tag release/recovery data. On the other hand, the growth rates from the WCPO MFCL model are more consistent with the growth rates determined from daily growth increments from a collection of otoliths ('earstones') collected from a broad area of the equatorial WCPO (Lehodey and Leroy 1999).

The annual YFT catch in the WCPO increased from 100,000 t in 1970 to about 550,000 t in recent years, with a record catch of 650,000 t in 2008. Purse seiners harvested the majority of the YFT catch (61% in 2012) while the longline fleet accounted for 16-20% of the catch. The remainder of the catch was dominated by the domestic fisheries of the Philippines and Indonesia. (Davies et al 2014).

The latest assessment of this species was also done in 2017. The stock was not considered overfished as recent spawning biomass in the absence of fishing was above the limit reference point ($SB_{2012-2015}/SBF=0$) = 0.33 with 92% probability. The ratio F_{recent}/F_{MSY} (for the period 2011-2014) was estimated to be 0.74, indicating with 96% probability that overfishing was not occurring (WCPFC-SC13, 2017).

Bigeye tuna (BET)

Bigeye tuna is distributed throughout the tropical and sub-tropical waters of the Pacific Ocean, and mtDNA and DNA microsatellites studies and tagging experiments suggest that there is only one unit Pacific-wide stock (OFP-SPC 1997, Harley et al 2014), (Grewe and Hampton 1998; Schaefer and Fuller 2002; Hampton and Williams 2005).

Bigeye tuna is relatively fast-growing, and has a maximum fork length (FL) of about 200 cm (Harley et al 2014). Juvenile growth rate appears to depart somewhat from the van Bertalanffy type growth as it slows down between 40 and 70 cm FL (Lehodey et al. 1999). Mean lengths-at-age also indicate larger BET varieties in the Eastern Pacific Ocean compared to those in the WCPO (Aires-da-Silva et al. 2014, Harley et al, 2014).

Available data for the WCPO indicate that BET begins to be reproductively active from about 100 cm FL and that 100% of individual BETs >120 cm FL are reproductively mature. The same data indicate that the longest recorded lifespan for a recaptured BET tagged in the western Pacific at about 1-2 years of age is currently 14 years (SPC unpublished data; Harley et al, 2014).

According to the stock assessment in 2017, the BET stock was not in an overfished state as recent spawning biomass in the absence of fishing was above the limit reference point ($SB_{2012-2015}/SBF=0$) = 0.32 with 85% probability. The ratio F_{recent}/F_{MSY} (for the period 2011-2014) was estimated to be 0.83, indicating with 77% probability that overfishing was not occurring (WCPFC-SC13, 2017). As previously mentioned, this latest stock assessment was considered a significant improvement compared with the one undertaken in 2014 although its results contained higher uncertainty due to the inclusion of new information on BET growth and regional structures.

Bigeye tuna is caught mostly as a juvenile by surface gears and as a valuable adult fish by longline gear. It is a principal target species of both the large, distant-water longline fleets of Japan, Korea, China and Chinese Taipei and the smaller, fresh sashimi-quality specialized longline fleets based in several Pacific Island countries and Hawaii. Bigeye tuna in purse seine catches is taken almost exclusively from sets on natural and artificial floating objects (such as FADs) (Harley et al, 2014).

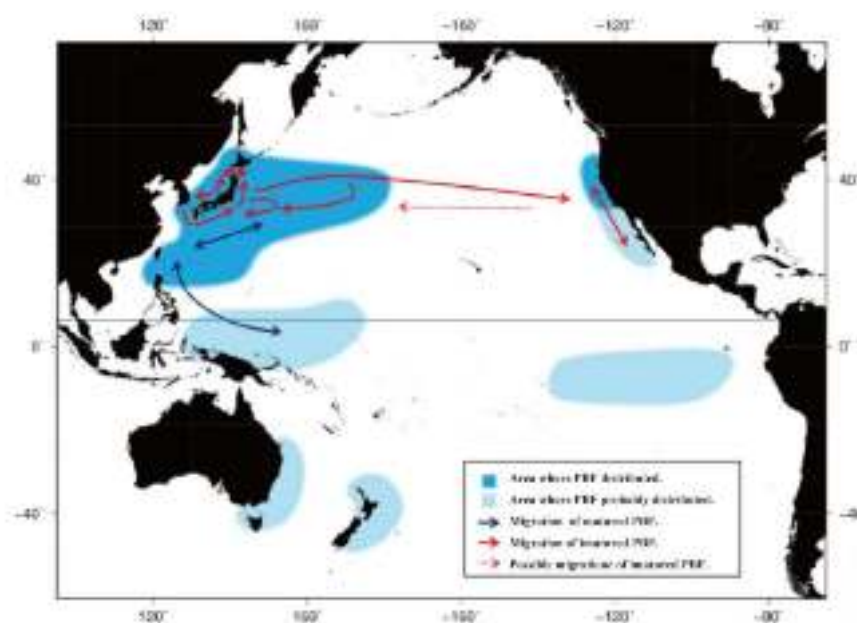
Pacific Bluefin tuna (PBF)

The Pacific bluefin tuna (PBF otherwise known as *Thunnus orientalis*) has a single Pacific-wide stock throughout the North Pacific Ocean (in the western part of which it is believed to spawn) and is managed by both the Western and Central Pacific Fisheries Commission (WCPFC and the Inter-American Tropical Tuna Commission (IATTC) (ISC-PBFTWG 2016).

Spawning generally occurs from April to July in the waters around the Ryukyu Islands and off the east coast of Taiwan, and from July to August in the Sea of Japan (Yonemori 1989, Ashida et al. 2015) (Figure 2-1). A recent histological study showed that 80% of the fish ca. 30 kg (corresponding to age 3) caught in the Sea of Japan from June to August were mature (Tanaka 2006, Okochi et al. 2016). Almost all of the PBTs caught off the Ryukyu Islands and east of Taiwan were above 60 kg (> 150 cm fork length (FL)). These fish were at least 5 years old and were all mature.

The indicated main area of distribution includes the northern portion of the Philippine Pacific seaboard as part of the main fishing and spawning area for the PBT (Fig 2).

Figure 2. Generalized distribution of PBF. Darker areas indicate the core habitat (ISC-PBTWG, 2014)



Annual catches fluctuated widely from 1952 to 2014, which peaked at 40,383 t in 1956 and reached a low of 8,653 t in 1990 and about 15,000 t in 2014. Catches were mainly juvenile. The PBF is primarily caught by purse seine and longline. Other gears used include troll line, pole and line and set net (ISC-PBTWG, 2014).

According to the stock assessment in 2014, the PBT stock was seriously overfished stock with the ratio of SSB relative to the theoretical unfished SSB at 2.6%. For this reason, WCPFC CMM 2016-04 was issued. This remedial measure defines the interventions to rebuild the stock with the initial goal of rebuilding the SSB to the historical median (the median point estimate from 1952 to 2014) within 10 years with at least 60% probability. It likewise mandates the reduction of all catches less than 30 kg to 50% of the 2002–2004 annual average levels and the maintenance of all catches of 30kg or larger within the 2002-2004 annual average.

North Pacific Albacore (NPALB)

The albacore tuna in the Pacific Ocean consists of the north Pacific stock and the south Pacific stock. It is assumed to be a discrete, reproductively isolated stock, with no internal sub-group structure within both stocks on the strength of fishery data (lower catch rates in equatorial regions; Suzuki et al. 1977), tagging data (fish tagged in the north Pacific have not been recovered in the south Pacific Ocean; Ramon and Bailey 1996), ecological data (albacore larvae are rare in samples from equatorial waters; Ueyanagi 1969), and genetic data (showing differentiation between north and south Pacific albacore; Takagi et al. 2001). The north Pacific albacore tuna (*Thunnus alalunga*) stock area consists of all waters in the Pacific Ocean north of the equator, and it is assumed that there is instantaneous mixing of albacore tuna throughout the stock area on a quarterly basis, resulting in a single well-mixed stock (AWG, 2014).

The albacore tuna is a batch spawner, shedding hydrated oocytes, in separate spawning events, directly into the sea where fertilization occurs. Spawning frequency is estimated to be 1.7 d in the western Pacific (Chen et al. 2010), and batch fecundity ranges between 0.17 and 2.6 million eggs (Ueyanagi 1957; Otsu and Uchida 1959; Chen et al. 2010). A female albacore matures at lengths ranging from 83 cm FL in the western Pacific (Chen et al. 2010) to 90 cm FL in the central Pacific (Ueyanagi 1957) and 93 cm FL north of Hawaii (Otsu and Uchida 1959). The north albacore tuna presents intra-stock geographical differences in the size at which 50% maturity is reached.

Spawning occurs in tropical and sub-tropical waters between Hawaii (155°W) and the east coast of Taiwan and the Philippines (120°E) and between 10 and 25°N latitudes at depths exceeding 90 m (Ueyanagi 1957, 1969; Otsu and Uchida 1959; Yoshida 1968; Chen et al. 2010). Although spawning probably occurs over an extended period from March to September in the western and central Pacific Oceans, recent evidence based on a histological assessment of gonadal status and maturity (Chen et al. 2010) shows that spawning peaks between March and April in the western Pacific Ocean, and this finding is consistent with evidence from larval sampling surveys in the same region (Nishikawa et al. 1985). In contrast, studies of reproductive biology in the central Pacific have concluded that there was a probable peak spawning period between June and August (Ueyanagi 1957; Otsu and Uchida 1959), but these studies are based on indirect observation methods, are more than 50 years old, and have not been updated using modern histological techniques (e.g. see Chen et al. 2010).

Stock Status in the Indian Ocean (IO)

In the Indian Ocean, the BET stock is not overfished and does not appear to be in danger of being overfished. Its MSY is estimated at 104,000 t and the average catch from 2011 to 2015 was 101,515 t. Similarly, the SKJ stock is not overfished and is not in danger of being overfished in view of its median MSY value of 684,000 t and the average catch thereof of about 402,000 t from 2010 to 2014. The catch of SKJ in 2014 was 432,500 t.

Unlike the BET and SKJ stocks, however, the YFT stock in the IO is overfished and is in serious danger of being overfished. Its MSY is estimated at 421,000 t and the catches in 2014, 2013 and 2012 were 430,327 t; 2013=407,633 t; 2012 = 400,322 t, respectively.

A satellite-style aerial photograph of the Philippines, showing the archipelago's green and brown landmasses surrounded by deep blue ocean waters with scattered white clouds. The image is oriented vertically, with the top of the page at the top of the image.

MANAGEMENT FRAMEWORK FOR SUSTAINABLE TUNA FISHERIES IN THE PHILIPPINES

Current conservation and management measures/regulations on tuna fisheries

1) Registration and licensing policy (conditions and limits on licences/capacity)

- a. FAO 198-1 Series of 2018. Amended Rules and Regulations on Commercial Fishing in Philippine waters and Distant Fishing
- b. BAC No. 253: Series of 2018 - Moratorium on the issuance of Commercial Fishing Vessel and Gear License and Other Clearances
- c. FAO 254 Series of 2014 and FAO 254-1 Series of 2018 – Regulation and implementing guidelines on group handline fishing operation in the high seas of the WCPFC Convention area
- d. FAO 245 Series of 2012 and FAO 245-1 Series of 2018 – Regulations and Implementing Guidelines on Group Tuna Purse Seine Operations in High Seas Pocket Number 1 as a Special Management Area
- e. FAO 246-1 Series of 2018 – Moratorium on the Issuance of Commercial Fishing Vessel License

2) Limitations on fishing operations (closed/restricted areas/seasons, prohibited fishing gears)

- a. FAO 226 Series of 2015 - Regulation on the Mesh Size of Tuna Purse Seine Nets and Trading of Small Tuna
- b. FAO 245 Series of 2012 - Regulations and Implementing Guidelines on Group Tuna Purse Seine Operations in High Seas Pocket Number 1 as a Special Management Area (including VMS and Observer requirement, FADs closure for 3 months in the high seas)
- c. FAO 236 Series of 2012 - Rules and Regulations on the Operations of Purse Seine and Ring Net Vessels Using Fish Aggregating Devices (FADs) locally known as Payaos during the FAD Closure Period as Compatible Measures to WCPFC CMM
- d. FAO 236-5 Series of 2018 - Extension of 236-4 on the Rules and Regulation on the Operations of Purse Seine and Ringnet Vessels using Fish Aggregating Devices locally known as Payao during the FAD closure period as compatible measures to WCPFC CMM 2017-01
- e. FAO 244 Series of 2012 - National Tuna Fish Aggregating Device (FAD) Management Policy
- f. FAO 258, Series of 2018 – Establishment of Tuna Conservation and Management Zones (TCMZ) in Mindanao/Celebes Sea

3) Data collection policy (log sheets, landing declarations, port sampling, and observers)

- a. NSAP-expanded data collection for tuna in collaboration with WPEA project
- b. Catch logsheet requirements for all vessels
- c. Stowage plans for carrier vessel
- d. PFDA landing reports
- e. Observer reports (which is expected to be more substantial in view of the 100% Observer coverage for PH vessels in the high seas and other coastal states; training of 464 Observers and 90 Debriefers)

4) Total allowable catches (TACs) for commercial fishing vessels etc.

- a. BAC No. 253: Series of 2014 (due for extension) - Moratorium on the issuance of Commercial Fishing Vessel and Gear License and Other Clearances

- b. Ongoing process for the Establishment of Fisheries Management Areas (FMA) and respective Reference Points and Harvest Control Rules

5) Monitoring Control and Surveillance (MCS) and IUUF

- a. Traceability
 - i. BAC 251 Series of 2014 - Traceability system for fish and fishery products
 - ii. Implementation of Electronic Catch Documentation and Traceability System (eCDTS).
 - iii. Implementation of Electronic Catch Documentation and Traceability System (eCDTS).
- b. Catch Certification
 - i. FAO 238, Series of 2012 – Rules and Regulations Governing the Implementation of Council Regulation EC No. 1005/2008 on the Catch Certification Scheme
- c. Inspections
 - i. FAO 227 Series of 2008 – Rule and regulations governing the export of fish and aquatic products to European Union member-countries
 - ii. FAO 228 Series of 2008 - Rules governing the organization and implementation of official controls on fishery and aquatic products intended for export to the EU market for human consumption
 - iii. National Plan of Control and Inspection (NPCI)
- d. Enforcement
 - i. SO 486 dated July 15, 2011 and FOO 241 dated July 18, 2011 – Creating the BFAR Fishery Resources Protection and Law Enforcement Section/Quick Response Team (now FPLEG)
 - ii. Acquisition of multi-mission vessels (14 units Monitoring, Control and Surveillance (MCS) vessels; 2 units 50m-Multi-Mission Offshore Vessels (MMOVs); 70 units 30-footers multi-purpose vessels;
 - iii. Regularization of 778 Fishery Regulatory Officers (RFOs);
 - iv. Training of 343 Law Enforcement Officers
- e. Adjudication
 - i. Establishment of Adjudication Committees at the national and regional levels effective 2017
 - ii. Hiring of hearing officers and legal assistants
 - iii. Conduct of capacity-building for hearing officers
 - iv. Investigation of 218 cases (2017)
 - v. Resolution of 184 cases (2017).
 - vi. Fines and penalties collected
- f. Training and awareness-raising measures
 - i. National capability-building program for Fishery Law Enforcers
 - ii. Training for Fish Examiners
 - iii. Seafood Safety Training
 - iv. Fisheries Observers Training
 - v. Bantay Dagat
 - vi. Operation and maintenance of MCS vessels
- g. PHILO Project Phase 1 – Integrated Marine Environment Monitoring System
- h. PHILO Project Phase 2 – Integrated Marine Environment Monitoring System

Capacity and catch limits

As the oceanic tunas in the Philippines is considered as part of the WCPO-wide stock, measures to manage these stock are guided by the Conservation and Management Measures (CMMs) that are adopted by the WCPFC. The CMM 2017-01 provides the guidelines that cooperating member and non-member countries and territories (CCM) member countries should take in managing their respective tuna fisheries.

As an active member of good standing of the Commission, the Philippines should be guided by the said measure and abide by the following conditions in managing its tuna fisheries:

- 1) High seas purse seine effort control. The level of purse seine effort on the high seas, particularly in the HSP1 is in accordance with Attachment 2 of the CMM. The measure apply to Philippine traditional fresh/ice chilled fishing vessels operating as a group, with a maximum of 36 purse seine/ringnet catcher vessels not more than 250 GT. As the vessels are dependent on FADs for their operation, their operation is limited to nine (9) months annually, being July-September each year is a close season for the use of FAD for purse seine.

A Fisheries Administrative Order 245-4, which regulates the fleet in HSP1, sets the annual total catch per vessel at a threshold not exceeding an equivalent to 273 high seas fishing days in the HSP1-SMA ($4,923 \times 2 = 9,846$ days, divided by 36).

- 2) Zone-based management for purse seine. Coastal CCMs within the Convention Area will restrict purse seine effort and/or catch of SKJ, YFT, and BET within their EEZs in accordance with the effort limits established and notified to the Commission. The Philippines is one of the five countries that have yet to notify the Commission about its limits by 31 December 2018. The submission of the Philippines will become an integral part of this plan.
- 3) Longline. WCPFC member-countries will restrict the level of BET catch to the levels. For its part, the Philippines, having caught less than 2,000 tons in 2004, will ensure that its BET catch does not exceed 2,000 tonnes annually.
- 4) Freezing Capacity Purse Seine and Longline Vessel Limits. The country will also keep the number of Philippine-flagged purse seine vessels larger than 24m with freezing capacity (LSPSV-Large Scale Purse Seine Vessels) operating between 20°N and 20°S to the applicable level (under CMM 2013-01).

The country will not increase the number of its longline vessels with freezing capacity targeting BET above the applicable level under CMM 2013-01.

- 5) Other commercial fisheries. This refers to fisheries that catch more than 2,000 tons of SKJ, YFT and BET. For the Philippines, this includes mainly ringnet and handline (or hook and line). The limit should not exceed either the average level for the period 2001-2004 or the level of 2004. (Table below).

**Table 8. Average tuna production of the Philippines from 2001 to 2004 and tuna production in 2004 in metric tons
(Source: WCPFC Tuna Yearbook)**

	Ave 2001-2004				2004			
	BET	YFT	SKJ	TOTAL	BET	YFT	SKJ	TOTAL
PH	7,188	80,548	125,134	212,870	7,870	89,873	138,598	236,341
Handline	355	11,124	-	11,479	263	13,099	-	13,362
Hook and line	3,825	40,647	25,420	69,892	3,870	41,137	24,993	70,000
Longline	59	484	-	543	59	484	-	543
Others	155	1,576	612	2,343	174	1,849	704	2,727
Ringnet	255	3,287	12,154	15,696	311	4,560	13,399	18,270
Purse seine	2,539	23,430	86,948	112,917	3,193	28,744	99,502	131,439
DW				-				-
Purse seine	2,342	11,094	17,074	30,509	2,288	10,106	23,025	35,419
Grand Total	9,529	91,642	142,208	243,379	10,158	99,979	161,623	271,760



Major Issues

Issues related to the tuna fisheries cover the entire supply chain. The inputs from consultations during the 18th National Congress in 2016 and the regional cluster consultations conducted in 2017 and 2018 were incorporated and summarized as follows:

1) Sustainability of tuna resources

Current indicators on the main oceanic tuna species (SKJ, YFT, BET) provide optimism to improve the resources in the WCPO. However, there are uncertainties and risks recognized particularly for BET. Concerns arise from the increasing catch and fishing mortality on the key tuna species require careful management.

Overall, a sustained compliance with the increasing management measures and other requirements of tRFMOs is important. While the country has been exerting efforts to fulfill its obligations to the tRFMOs, and as flag-state, it still has to address on its own priority concerns relating to sustainability of tuna resources.

The plan seeks to maintain the catch level of Philippine-flagged vessels through science- and rules-based management under the guidance of the conservation and management measures of tRFMOs, equitably distribute fishing access to various resource users, and establish management measures to protect spawning and breeding grounds.

2) Resource Use conflict (between commercial and municipal fisheries)

Competition between the various fisheries and sectors has caused issues on equitable distribution of fishing access. For instance, the use of payao by commercial purse seine and ringnet vessels resulted in handliners moving farther away and eventually losing fishing ground in the municipal waters.

3) Limited post-harvest facilities resulting in high post-harvest losses

It is well recognized that economic benefits from fish produce are significantly reduced due to high post-harvest losses. In order to optimize such benefits, there is a need to establish requisite facilities and/or infrastructure.

In 2014, the BFAR initiated the program to provide air blast freezers, stainless fish stalls, and community fish landing centers in strategic areas. These are intended to help reduce fish post-harvest losses and minimize wastage, ensure safety supplies, contribute to food security and provide livelihood opportunities and help in poverty alleviation of the fisherfolks.

Based on the CNFIDP (2016-2020), a 10% reduction of post-harvest losses from 25% is targeted by 2020. These losses are attributed to improper handling practices on board commercial fishing vessels, lack of ice, lack of ice plant and cold storage, inappropriate containers used at landing sites, fish ports and wet markets.

4) Limited socio-economic benefits and alternative livelihood opportunities to tuna fishers

Continuous capacity-building/technical assistance and IEC are vital in improving socio-economic status of tuna stakeholders to include proper handling of tuna products for an improved market price. In addition, livelihood assistance through the provision of appropriate fishing gears/paraphernalia is necessary to improve the income of tuna fisherfolks/fish workers.

5) Limited market and stringent trade/market/credit requirements (including EU and US market standards)

Stringent set of food safety requirements are being imposed on tuna canneries/local manufacturers but not on imported products.

There is minimal market information available, and in other cases, there is lack of data access specific to trade and marketing. As it is, information is necessary for the expansion of trade partnerships covering non-traditional areas for the tuna market.

The tedious processing for credits and loans has to be remedied to provide credit as mode to give players better credit access that will allow them to expand their business.

6) Need to strengthen governance on tuna fisheries management

Proper management of tuna fisheries is necessary but there are factors that militate against it. Fragmented mandates and weak institutional mechanisms to address illegal, unreported, and unregulated fishing (IUUF) are a problem. And so is the unsustainable science-based management owing to limited human resources and financial capacity. At the very least, industry support and improved government interventions are necessary to deal with these problems.

7) Illegal Unreported Unregulated (IUU) Fishing

To avoid the tragedy of the commons, there is need for regulation, compliance, restraint, and cooperation in effective tuna fisheries management. But IUUF still does persist, as evidenced by reports of poaching by foreign vessels, poaching by Philippine vessels in neighbouring countries, unauthorized commercial fishing in municipal waters, the use of unregistered/unlicensed/undocumented fishing boats, inadequate implementation and surveillance capacities to deter fishing violations

Goals and Objectives

Specific goals and objectives have been formulated in accordance with the Ecosystem Approach to Fisheries Management (EAFM), which is underpinned by the principles of Ecosystem Well-Being, Human Well-Being, and Good Governance.

The specific measures, actions, timelines, and responsibilities for each of the following objectives are indicated in the annexed Implementation and Monitoring Plan of the NTMP.

Goal 1: Sustained Level of Production

- 1) By 2023, achieve the catch level through science- and rules-based management under the guidance of the WCPFC CMM;
- 2) By 2021, equitably distribute fishing access to stakeholders by providing zones for exclusive use of each fishing sector; and
- 3) By 2023, establish management measures to protect identified spawning and breeding grounds.

Goal 2: Improved socio-economic condition of fisherfolks by ensuring equitably-accessed tuna resources

- 1) By 2023, improve municipal production by 1% annually by enhancing management; improve commercial fisheries production by 5% annually by improving fishing in the Philippines Rise and West Philippine Sea; and acquisition of better fishing access to other coastal states in the western and central Pacific Ocean and the Indian Ocean;
- 2) By 2023, reduce post-harvest losses from 25% to 15%; and
- 3) By 2023, improve harvest-to-market efficiency by reducing/ minimizing/ streamlining the key players in the supply chain.

Goal 3: Strengthened governance/management of tuna fisheries

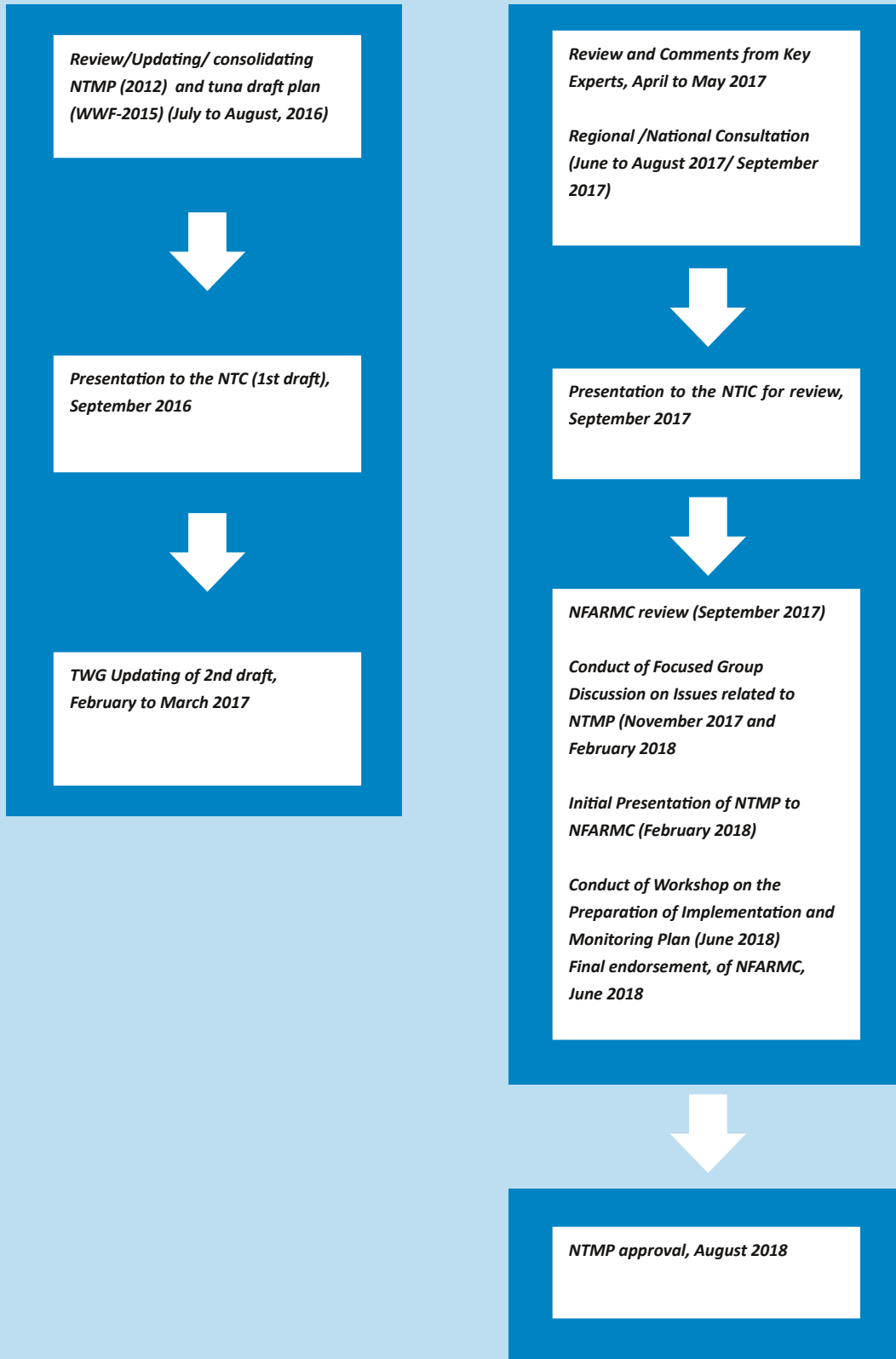
- 1) By 2019, strengthen science-based decision-making process and support while ensuring compliance with CMMs;
- 2) By 2019, institutionalize timely and accurate data collection programs to ensure availability and access to scientific information in aid of management decisions;
- 3) From 2018 to 2021, improve monitoring, control, and surveillance measures to prevent, deter, and eliminate IUUF for tuna stocks;
- 4) By 2019, expand market access and product competitiveness for export for the benefit especially of MSMEs; and
- 5) By 2019, ensure compliance with food safety and quality standards and by 2023, reduce post-harvest losses by 10%.

The adoption of the National Tuna Management Plan has involved the following process:

DRAFTING AND PREPARATION



CONSULTATIVE PROCESS



MANAGEMENT AND INSTITUTIONAL FRAMEWORK

The BFAR is mainly responsible for commercial fishing in national waters and the EEZ and as the representative and recognized (flag-state) fisheries authority for the Philippines, it is also in charge of managing the high seas/distant water tuna fishing fleet. On the other hand, the LGUs have the authority to manage fishing and fishing activities in municipal waters, and can adopt regulations for the conservation, management and exploitation of tuna in municipal waters.

To give full form and substance to this Plan and ensure follow-through, a specific implementation monitoring, and evaluation plan was prepared and agreed upon in a national workshop involving relevant agencies, industry players, and other key stakeholders.

Regular annual reviews of the national tuna fisheries management plan will be prepared by the BFAR for the NFARMC, and these reviews will be incorporated into the annual reports on the Plan. To ensure objectivity and prompt administration of remedial actions on any identified deviations or any signs of implementation failure, the implementation of the Plan at the municipal and national levels will be subject to external review.

AMENDMENT

Any need to amend the Plan will be determined accordingly by the BFAR and the LGUs upon prior consultation with the NTIC and FARMCs.

Any amendment will necessarily entail corresponding modification of the regulations previously enacted to give legal effect to the implementation of this Plan.



IMPLEMENTATION PLAN

GOAL 1

Sustained Level of Production

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget
	<i>What is to be done?</i>	<i>What are the specific tasks?</i>	<i>Who is responsible?</i>	<i>Who should support implementation and how?</i>	<i>By what time should the measures be completed?</i>	<i>Which personnel and financial resources are assigned?</i>
1. By 2023, achieve the catch level through science-and rules- based management as guided by the WCPFC CMM	1. Implement Harvest Strategy (includes reference points and harvest control rules by FMA) for tuna fisheries	1. Adoption of FAO on Establishment of FMAs (framework), including creation of a Science Advisory Group	BFAR-AdHoc-TWG, (NFRDI), NFARMC	Industry, stakeholders	2018	BFAR
		2. Consultation/workshop to identify Reference Points (RP), Harvest Control Rules (HCR) and Performance Indicators (PI) for oceanic tunas	BFAR RFO, LGU, FMA Council, Science Advisory Group (NSAP, Academe, research institution)	NFRDI, BFAR CO and stakeholders	2019	BFAR
		3. Set RP, HCR and PI for each of the species of oceanic tunas	BFAR RFO, LGU, FMA Council, Science Advisory Group (NSAP, Academe, research institution)	BFAR-Stakeholders	2020	BFAR/NFRDI
		4. Conduct a national assesemnt of tuna stocks every 2 years	NFRDI-NSAP	BFAR, Academe, stakeholders	2019, continuing every 2 years	NFRDI/BFAR
		5. BFAR in consultation with stakeholders to develop a mechanism of allocation of tuna catch based on estimate of fishable biomass every two years	NFRDI-NSAP	BFAR, Academe, stakehodlers	2019	NFRDI/BFAR
		6. Review and assess the performance of the fishery against the target reference point and recommend management action(s) per FMA	NFRDI-NSAP	BFAR, Academe, stakehodlers	2020, continuing every 2 years	NFRDI/BFAR
		7. Organize a science working group (SWG) dedicated to tuna research that will work with tuna scientists (academe, SPC, etc) on stock assessment and related activities and develop an updated research needs for tuna of each FMA.	NFRDI-NSAP	BFAR-Stakeholders	2020	NFRDI/BFAR

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget
<p>1. By 2023, achieve the catch level through science-and rules- based management as guided by the WCPFC CMM (cont.)</p>	<p>1. Implement Harvest Strategy (includes reference points and harvest control rules by FMA) for tuna fisheries</p>	<p>8. While NFRDI is still developing capacity, organize a yearly conference as a capacity building program by inviting scientist including those that are from from SPC to discuss and help in the evaluation of stocks.</p>	<p>NFRDI-NSAP</p>	<p>BFAR-Stakeholders</p>	<p>2020</p>	<p>NFRDI/BFAR</p>
		<p>9. Hold regular data consolidation workshops to review, assess tuna science information and data collection schemes that will feed into the national and regional stock assessment</p>	<p>NFRDI-NSAP</p>	<p>BFAR-Stakeholders</p>	<p>2019, continuing</p>	<p>NFRDI/BFAR</p>
		<p>10. Ensure information collected by NSAP are immediately verified, encoded, analyzed and results generated for use in the stock assessment.</p>	<p>NFRDI-NSAP</p>	<p>BFAR-Stakeholders</p>	<p>2018, continuing</p>	<p>NFRDI/BFAR</p>
		<p>11. Enhance NFRDI capacity and capability to undertake tuna assessments through continuous training and formal studies. Capacity needs for each FMA to be determined and filled up.</p>	<p>NFRDI-NSAP</p>	<p>BFAR-Stakeholders</p>	<p>2019, continuing</p>	<p>NFRDI/BFAR</p>
		<p>12. Review regularly the methods and sampling scheme of NSAP to ensure reliability of data and adjust to the dynamics of fleet operation and necessities of management.</p>	<p>NFRDI-NSAP</p>	<p>BFAR-Stakeholders</p>	<p>2019, continuing</p>	<p>NFRDI/BFAR</p>
		<p>13. Conduct study to reduce catch of small/juvenile tunas (major tuna Fishing ground)</p>	<p>NFRDI-CFRRDD, BFAR</p>	<p>stakeholders</p>	<p>2019 (continuing and for recommendation every 2 years)</p>	<p>BFAR, NFRDI</p>
		<p>14. Review and improve the FAD policy that regulates the number, deployment, distribution and access of FADs in every Fishery Management Area through registration and licensing</p>	<p>BFAR-FRLD/CFD, FMA Council, NFARMC</p>	<p>stakeholders</p>	<p>2018</p>	<p>BFAR</p>
		<p>15. Strict enforcement of FAD Management measures (Note: IEC on all existing policies)</p>	<p>BFAR-RFOs/FRLD/FPLEG</p>	<p>stakeholders</p>	<p>2018</p>	<p>BFAR</p>

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget	
1. By 2023, achieve the catch level through science-and rules- based management as guided by the WCPFC CMM (cont.)	2. Extension of Moratorium of building of new commercial fishing boat for catchers (purse seine and ringnet)	Review and amend existing FAO on moratorium	BFAR-FRLD, NFARMC	stakeholders	2019	BFAR	
	3. Regulate density of payao in terms of depth and distance of payao in municipal waters	1. Consultation with the LGU and stakeholders(fisherfolk)	BFAR-(FRLD/CFD), LGU, stakeholders fisherfolk	MFARMCs	2019	BFAR	
		2. Review of catch and production data	BFAR (NFRDI), LGU	MFARMCs	2018	BFAR, LGU	
		3. Implementation of Fisheries Office Order on Payao in municipal waters)	BFAR RFOs, BFAR-FRLD; LGU	LGU	2018	BFAR	
	4. Implement section 118 of amended fisheries code on adopting implementation of tuna RFMOs CMMs or implementation of compatible measures	1. Review the current adopted CMMs by RFMOs	BFAR TWG-tuna, NFARMC	stakeholders	2019	BFAR	
		2. Consultation with the stakeholders including IEC	BFAR TWG-tuna, NFARMC	stakeholders	2019	BFAR	
		3. Formulation of FAO or compatible measures	BFAR, NFARMC	stakeholders	2019	BFAR	
	5. Strengthen compliance on catch reporting	Monitor to increase compliance on catch reporting	BFAR TWG-tuna	industry	2018	BFAR	
	2. By 2021, equitably distribute fishing access to stakeholders by providing zones for exclusive use of each fishing sector	Formulate program in the Philippine Rise with preference to handline and municipal fishers	Establishment of tuna conservation and management Zone (TCMZ) In Consultation with stakeholders	BFAR-CFD, BFAR RFOs	Industry, stakeholders	2018	BFAR
	3. By 2023, establish management measures to protect identified spawning and breeding grounds	Declaration of closed season for identified hotspots spawning and breeding areas	Conduct study to identify hotspots spawning and breeding areas in consultation with stakeholders and other concern agencies	NFRDI-CFRDD, BFAR, LGU	BFAR-RFOs Stakeholders	continuing	BFAR
2. Conduct regular monitoring and surveillance activities in spawning and breeding areas			BFAR-RFOs/FPLEG, PCG, NFRDI	Industry, stakeholders	continuing	BFAR, PCG	

GOAL 2

Improved socio-economic condition of fisherfolk and equitably accessed tuna resources

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget
1. By 2023, improve municipal production by 1% annually by enhancing management and commercial fisheries production by 5% annually by improving fishing in the Philippines Rise and West Philippine Sea, as well as better fishing access with other coastal states in the western and central Pacific Ocean and the Indian Ocean	1. Promote fishing access in the Indian Ocean & encourage and support new bilateral cooperation	1. Gather baseline information	DA-BFAR-TWG Tuna	BFAR, DFA, SFFAII, PIDS	2018-2022	DA-BFAR, SFFAII, and Other
		2. Forge agreements with IOTC and other coastal states				
		3. Maintain active participation in IOTC meetings and other Fora				
	2. Establish/implement a Special Fisheries Management for Philippine Rise, West Philippine Sea (WPS) and other possible tuna fishing grounds	1. Generate baseline info	BFAR, NFRDI, DENR, MSI, IMALOS (UP)z	PCG, AFP, NCWC, DFA	June-Dec 2018	BFAR
		2. Formulate a special mgt plan (SMP) (Phil. Rise and other areas)			2019	
		3. Conduct consultation and adopt for SMP(FAO)			2019	
		4. Implementation of the SMP			2021	
	3. Ensure continued access and optimize production in the High Seas Pocket 1(HSP1) (Tuna Handliners and Purse Seiners) and access to other Philippine flagged distant water fishing fleets in the Western and Central Pacific Ocean (WCPO)	1. Continuous and improve compliance to the WCPFC-CMM	Fishing Industry; BFAR TWG-tuna	BFAR, PFDA other NGAs	continuing	1. Industry, BFAR and other NGAs
		2. Sustain representation in the WCPFC THL	BFAR, NFRDI	BFAR, NFRDI	continuing	
		3. Implement FAO 254	BFAR and stakeholders	MARINA, PCG, PNP	2018	
	4. Provide appropriate fishing gear and paraphernalia to fisherfolk beneficiaries	1. Conduct assesment and consultation with fisherfolk beneficiaries	BFAR, NFRDI, PFDA, NGOs	LGUs, Pos	2018	1. BFAR, NFRDI, PFDA, NGOs
	5. Establish enabling mechanism to optimize the use of payao.	1. Provide zoning system for payao as source of livelihood for municipal handliners	BFAR-CFD/FRLD, LGU	FARMC, POs	continuing	BFAR and LGU
		2. Guidelines on the use of Payao for Commercial (PS) and Tuna Handliners	BFAR-CFD/FRLD, NFARMC	Industry, other NGAs		

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget
2. By 2023, reduce postharvest losses from 25% to 15%	1. Establishment of fish ports, fish landing facilities, Community Fish Landing Centers (CFLCs) and ice plant and cold storage, where appropriate.	1. Identify and prepare Feasibility Study (FS) to validate/assess the need	PFDA, BFAR-FPED	LGUs, NGOs. Industry, POs	2023	PFDA, BFAR GAA
		2. Implementation				
	2. Establish and upgrade existing testing laboratories and recognition scheme	1. Inventory of existing laboratories to identify what equipment are needed	BFAR-FLD	Industry/ LGUs	2018	BFAR
		2. Identify the areas that need laboratories			2018	
		3. Upgrade existing labs			2023	
		4. Establish laboratories where needed			2023	
	3. Improve postharvest handling techniques (onboard, landing, etc.)	1. Capacity building on tuna grading and fish handling for the fisherfolk	BFAR-PHTD	1. Japanese Thru SEAFDEC and BFAR (onboard)	continuing	BFAR (GAA)
		2. Introduction of improve fish hold and provision of containers		2. Industry/ Fisherfolk		
	4. Utilization of waste and tuna by-products	1. Capacity bldg on Value-adding for fishers and women (existing technologies)	BFAR-PHTD, NFRDI-PHTFRRD and Academe	Industry, LGUs, POs, NGOs	continuing	BFAR, Academe, BAR, DOST
		2. Research and Development				

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget
3. By 2023, improve harvest to market efficiency by reducing/ minimizing/ streamlining the key players in the supply chain	1. Access of fishermen to processors/exporters	1. Access to credit financial institutions (accredited by DA, easy access and low interest)	DA-ACPC, ACEF, LBP, DBP	BFAR, LGUs, NGOs, DTI	Continuing	DA-ACPC, ACEF, LBP, DBP
		2. Institutionalize middlemen/ graders/Jambolers (accredited)	PFDA, BFAR-FIDSSD/PHTD	Exporters, Industry (operators), POs		PFDA, BFAR
	2. Provision of incentives to fisherfolk who are compliant to national/ local fishery laws/regulations and other requirements	1. Prepare a policy guideline to provide incentives/premium price to fisherfolk who are compliant to national/ local fishery laws/regulations	BFAR-FRLD/FPED/CFD	PFDA, exporters, Fisherfolk and LGUs	2019	BFAR
		2. Establish a multi-agency certifying body (BFAR, MARINA, PCG, NTC, LGU)	Multi-Agency	Industry	2019	Multi-Agency
		3. Develop a special program to incentivize fisherfolk	Multi-Agency	NGAs, LGUs	2019	Multi-Agency
		<i>3a. provide Priority access to certain fishing grounds</i>				
		<i>3b. Extended validity of license (3-5 years)</i>				
	3. Improve financial literacy	Conduct Capacity building for operators and fisherfolk on financial stewardship and entrepreneurship	DTI, ATI and other GFIs	BFAR/ LGUs	Continuing	DTI, ATI and other GFIs

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget
4. Ensure equitable allocation of tuna resources and improve benefits to all stakeholders	Fishery Management Area (FMA) as tuna management unit	Set catch limits for tuna at each FMA and allocate the same to the stakeholders using the area.	NFRDI/BFAR	Industry/FARMC/ Stakeholders	2023	
		Identify and establish fishing zones for different fishing sectors/ fleets as recommended by science.	NFRDI/BFAR	Industry/FARMC/ Stakeholders	2023	
		Policies on licensing and registration, FAD management, and other measures as appropriate, shall be FMA-specific.	BFAR-FRLD	Industry/FARMC/ Stakeholders	2020	
5. Fishers follow best practices to maximize revenues	Increase quality of handline caught tunas to get to 50% grade A	Training on proper post handling among fishers and buyers	BFAR-FPHTD	Fishers, Industry	2019-2021	
		Train fishers on how to properly grade quality of their fish	BFAR-FPHTD	- do -	2019-2023	
		Develop, disseminate best practices in handling , storage and transport of tunas.	BFAR-FPHTD	- do -	2019-2023	
	improve trade practices	Make the practice of buying ungraded tuna illegal.	FRLD/FIDSSD/-BFAR FPHTD	- do -	2021	
		Encourage companies and buyers to go for a Fair Trade Certified product	BFAR-FIDSSD	- do -	2019	
		Apps-baased system to provide current prices to fishers	BFAR-FIDSSD/FIMC	- do -	2019	
6. Business provide continued livelihood to many people	Government support expansion of businesses	Build more storage facilities to support processors	BFAR-FPHTD/RFOs	- do -	2019-2023	
		Encourage R&D on product development such as ready to eat products for domestic and export markets	NFRDI/FPHTD	- do -	2019	

GOAL 3

Strengthened governance / management
of tuna fisheries

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget
1. By 2019, strengthen science-based decision making process and support while ensuring compliance to CMM	1. Establish a dedicated Highly Migratory Stock and Distant Water/ High Seas Management Support Office in BFAR	1. Update personnel complement to compose the TWG to include newly trained personnel/designated RDs (publish/ updating of TWG directory on website)	BFAR-TWG-tuna / AdminDiv/FPED/CFD		3rd quarter of 2018	BFAR-CFD
		2. Update and publish TWG directory on BFAR website	BFAR-TWG-tuna		3rd quarter of 2018	BFAR-CFD
	2. Establish clear guidelines on the use of science in tuna fisheries management process	Drafting of policies and conduct specific studies, guidelines and process for adoption of closed-fishing season and other measures, including FADS, juveniles, mesh size regulations and harvest strategies	Multi-sectoral body TWG	BFAR/NFRDI Designated personnel including stakeholders representatives	3rd quarter of 2018	BFAR-DO
	3. Capacitate policy/decision-makers on Science-for-Management	1. Dialogue with fisheries managers and scientists	BFAR-TWG Tuna /NFRDI Top Management	BFAR/NFRDI	3rd quarter of 2018	BFAR and NFRDI Designated Personnel/Office of the Director
		2. Orientation on science-based decision making	BFAR/NFRDI Top Management		3rd quarter of 2018	
		3. Establish science advisory group indicated in FMA governance structure	TWG-tuna Existing Members	BFAR Designated personnel including stakeholders representatives	2019	BFAR Designated personnel/Office of the Director
	4. Strengthen the National Tuna Industry Council (NTIC)	1. Review the operations and composition of NTIC	BFAR-TWG tuna	Industry, Fisherfolk/supply chain players	3rd quarter of 2018	

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget
2. By 2019, institutionalize timely and accurate data collection programs to ensure availability and access to scientific information to support management decisions	1. Improve data collection on target species, catch and effort, including by-catch (billfish, sharks, dolphins/ whales, sea turtles, etc.) according to relevant CMMs requirements	1. Skills training/re-training of data enumerators and data analysts	NFRDI and experts (as necessary)	FIMC, FRLD, CFD and Regional Offices	1st quarter of 2019	NFRDI (Resource and ecological Assessment Team, NSAP), FIMC, FRLD (Licensing Section), CFD
		2. Conduct gear and boat inventory	BFAR Regional Offices	BFAR CO	2020	Regional Offices
		3. Improve Turnover of NSAP staff through team building, review of compensation package and secured tenure and request for plantilla for data analysts from DBM	NFRDI, BFAR Regional Offices, NSAP Project Leaders	BFAR HRMS Admin Division, NFRDI	Last quarter of 2018	BFAR RFO, NFRDI
		4. Review and enhancement of database and reporting system	NFRDI FIMC	CFD, NFRDI, NMFDC, FRLD, FRMD, PSA	Last quarter of 2018	FIMC, CFD, NFRDI, NMFDC, FRLD, FRMD
		5. Continue to conduct data reconciliation of tuna production	NFRDI FIMC	CFD, NFRDI, NMFDC, FRLD, FRMD, PSA	Last quarter of 2018	FIMC, CFD, NFRDI, NMFDC, FRLD, FRMD
	2. Issue and implement by-catch management measures for tuna fisheries according to national regulations and to RFMO CMMs	1. Drafting of FAO	CFD, NFARMC	NFRDI, FRLD, FRMD, Stakeholders	2019	CFD, NFARMC, NFRDFI, FRLD, FRMD, Stakeholders
		2. Consultation of Draft FAO	CFD, NFARMC	NFRDI, FRLD, FRMD, Stakeholders	2019	CFD, NFARMC, NFRDFI, FRLD, FRMD, Stakeholders
		3. NFARMC recommendation and Sec Approval	CFD, NFARMC	NFRDI, FRLD, FRMD, Stakeholders	2019	CFD, NFARMC, NFRDFI, FRLD, FRMD, Stakeholders
		4. IEC on FAO	BFAR-CFD, NFARMC	NFRDI, FRLD, FRMD, Stakeholders	2019	CFD, NFARMC, NFRDFI, FRLD, FRMD, Stakeholders

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget	
2. By 2019, institutionalize timely and accurate data collection programs to ensure availability and access to scientific information to support management decisions (cont.)	3. Strengthen FOP and implement Rule 116.1 (Observer coverage) for tuna fleet	1. Review and Amend FAOs relating to ROP coverage	BFAR-NMFDC	BFAR HRMS Admin, Stakeholders, FRLD, CFD	First Quarter of 2019	NMFDC, BFAR HRMS Admin, FRLD, CFD	
		2. Hiring of ROPs with BFAR fully covering compensation	BFAR-NMFDC	BFAR HRMS Admin, Stakeholders, FRLD, CFD	First Quarter of 2019	NMFDC, BFAR HRMS Admin, FRLD, CFD	
		3. IEC	NMFDC	BFAR HRMS Admin, Stakeholders, FRLD, CFD	First Quarter of 2019	NMFDC, BFAR HRMS Admin, FRLD, CFD	
		4. Continuous ROP Trainings	NMFDC	BFAR HRMS Admin, Stakeholders, FRLD, CFD	First Quarter of 2019	NMFDC, BFAR HRMS Admin, FRLD, CFD	
	4. Expand VMM; Rule 119.1 (VMM coverage) for tuna fleet	1. Review, amend and FAOs relating VMM	NMFDC, FIMC	Stakeholders, FRLD, CFD, FRMD	2019-2023	NMFDC, FRLD, CFD, FRMD, FIMC	
		1.2. Implementation of PHILO-2 project	BFAR	Stakeholders, Industry	2019	FIMC, NMFDC D.O.	
	3. From 2018-2021, improve monitoring, control and surveillance measures to prevent, deter and eliminate illegal, unreported and unregulated (IUU) fishing for tuna stocks	1. Strengthen BFAR human resources, facilities and equipment	1. Assess the number of BFAR-HFE capabilities	BFAR	DBM/ Congress (Approval)/ DA	2 years at most	
			2. Review Scope/Area of TOR				
3. Identify HFE that needs improvement							
4. Conduct Recruitment of new personnel							
5. Purchase/ Canvassing program procurement of F/E							

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget
3. From 2018-2021, improve monitoring, control and surveillance measures to prevent, deter and eliminate illegal, unreported and unregulated (IUU) fishing for tuna stocks (cont.)	2. Procurement of multi-mission boat	1. Assess the existing floating assets available	BFAR-top management/FPLEG, DBM, Congress, DA, DOTr, PCG and DND	DBM	2021	BFAR
		2. Identify areas that needs new equipment (aircraft and drone) and immediate deployment				
		3. Identify and contact manufacturers that will provide best equipment				
		4. Program budgeting and procurement				
	3. Strengthen mechanism for coordination/ collaboration of coastal state that has Philippine Flagged Vessel	1. Identify or review any MOA/MOC between coastal states and BFAR	BFAR-FRLD, PCG, DFA, DA	DFA	2019	BFAR, International Organizations
		2. If none, identify coastal states where Philippine Flagged Vessels operate				
		3. Contact and draft MOC between coastal state and BFAR			2020	
		4. Identify areas of cooperation and collaboration			2020 onwards	

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget
<p>3. From 2018-2021, improve monitoring, control and surveillance measures to prevent, deter and eliminate illegal, unreported and unregulated (IUU) fishing for tuna stocks (cont.)</p>	<p>4. Develop Capacity for offshore and high seas Boarding Inspection</p>	<p>1. Review existing policy on boarding inspection at high seas</p>	<p>BFAR-TWG tuna/FPLEG</p>	<p>TRFMOs, PCG, PN</p>	<p>within 2 years</p>	<p>BFAR</p>
		<p>2. If none, develop rules and regulation, including guidelines for Boarding inspection</p>				
		<p>3. Conduct Training Needs Analysis for boarding inspection</p>				
		<p>4. Develop Training Program for boarding Inspection</p>				
		<p>5. Provide Funding for training</p>				
	<p>5. Implementation of Port State Measure (PSM)</p>	<p>1. IEC and orientation</p>	<p>BFAR-FRLD/RFOs, PFDA, Private sector</p>	<p>Stakeholders, Industry</p>	<p>2019</p>	
		<p>2. Capacity building for implementing agencies-BFAR,PCG,PFDA,BOC, etc.</p>	<p>BFAR-FRLD/RFOs,PCG,PFDA,BOC, etc.</p>			
		<p>3. Establishment of facilities and equipment</p>	<p>BFAR,PCG,PFDA,BOC, etc.</p>			

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget
3. From 2018-2021, improve monitoring, control and surveillance measures to prevent, deter and eliminate illegal, unreported and unregulated (IUU) fishing for tuna stocks (cont.)	6. Comprehensive National Plan of Control and Inspection	1. Develop a Comprehensive National Plan of Control and Inspection	BFAR-FIQD, Multi Agency - NGAs, Private Sector, Industry		2018 -	
		2. Evaluate resources available and needed			2018	
		3. Capacity building of inspectors and control officers			2019 onwards	
		4. Undertake control activities i.e documentation, catch monitoring, aerial surveillance, inspection at sea, inspection on landings/marketing and processing plants, desk control etc.			2018 onwards	
	7. Coordination and collaboration with BFAR RFOs, PCG etc, (NALECC)	1. Review if there is existing EOs, SOs	BFAR-FPLEG	MARINE, PCG, DBM	4th quarter 2018	BFAR
		2. Continuous coordination meetings				
	8. Enforcement of vessel registration and fishing licenses and updating of database for commercial and municipal fishing boats	1. Review Existing policy on vessel registration and issuance of fishing licenses	BFAR-FRLD, MARINA, LGU, MFARMC	MARINA (to provide list of vessels issues with safety certificates)	continuous, with review every 3 years	BFAR
		2. Assess current database				
		3. Regular on-board inspection of vessel documents		MARINA (to join during mobile registration)		

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget	
3. From 2018-2021, improve monitoring, control and surveillance measures to prevent, deter and eliminate illegal, unreported and unregulated (IUU) fishing for tuna stocks (cont.)	9. Implementation of Boat R (municipal)	1. Re-orientation for the implementation of Boat R	BFAR-FRMD, LCEs, MAOs, MFARMC, BFARMC	BFAR RFO	4th quarter 2018	BFAR	
		2. Conduct Boat R (provide gadgets with wifi access and load)	MAO	BFAR	1st and 2nd quarter 2018	LGU	
	10. Strengthen BFAR LGUs law enforcement capacities and coordinating/support mechanisms		1. Organize/train bantay Dagat	BFAR-FPLEG, BFAR RFO, Maritime, MAO and staff	Fisherfolk Organizations	2018 onwards	BFAR
			2. Provision of logistic support	BFAR RFO			Patrol Boats, Diesel, Gadgets, Honorarium
			3. Regular Seaborne Patrol	PNP, Bantay Dagat			Honorarium, Diesel
			4. Conduct regular meeting of the team	Peace and Order Council, LCE, MAO, PNP, Bantay Dagat	Budget on Meeting		
			5. Provide alternative livelihood to bantay dagat	BFAR, LGU, Finance Institutions, NGO, Funders	NGO, Funders		
			6. Create M&E team and focal person on livelihood program	BFAR, LGU, NGO, Funders			

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget
3. From 2018-2021, improve monitoring, control and surveillance measures to prevent, deter and eliminate illegal, unreported and unregulated (IUU) fishing for tuna stocks (cont.)	11. Improve and standardize catch documentation & inter-operable traceability systems	1. Implement e-CDTS	BFAR-FRLD/RFOs, LGU	Industry, Fisherfolk/supply chain players	2018-Pilot 2019-roll-out	BFAR
		2. Conduct orientation	BFAR-FRLD/RFOs	BFAR, LGU, Fisherfolk		
		3. Provide tools and supplies				
		4. Designate focal persons	BFAR-RFOs, LGU			
	12. Strengthen implementation of the law on poaching	1. Deputize fisherfolk as intel officer in reporting poaching activities	BFAR-RFOs/FPLEG and other law enforcement agency	Fisherfolk, LGU, Industry	2019	BFAR
		2. Establish anti-poaching report mechanism (hotline) and quick response team				
		3. Provision of Rewards and incentive system for reporting poaching activities				
		4. Conduct Regular MCS activities in identified areas with high poaching and other illegal fishing activities				
		5. Document cases and actions taken involving IUUF				

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget
<p>3. From 2018-2021, improve monitoring, control and surveillance measures to prevent, deter and eliminate illegal, unreported and unregulated (IUU) fishing for tuna stocks (cont.)</p>	<p>13. Develop one (1) catch share program for at least six (6) fishery management areas (FMAs) for tunas</p>	<p>1. Review the system on licensing for possible corrective measure</p>	<p>BFAR-FRLD/FRMD NFRDI</p>	<p>FARMC, Industry, Fishers</p>	<p>2019</p>	
		<p>2. Develop enabling policies that mainstream application of secured tenure rights for all FMAs where tunas are caught</p>			<p>2021</p>	
		<p>3. Develop a mechanism of allocation of tuna catch based on Estimate of fishable biomass every two years</p>			<p>2023</p>	
		<p>4. Develop and implement secured tenure rights for recognized fisher / boat owners associations for each Fishery Management Area</p>			<p>2023</p>	
		<p>5. Strengthen/ reinforce the implementation of the registry of tuna boats ((mun and comm'l) fishers and associations membership</p>	<p>BFAR/ MARINA/ LGU/ NTC</p>	<p>PCG,</p>	<p>2019</p>	<p>BFAR/ MARINA/ LGU/ NTC</p>
		<p>6. Recommend appropriate labor/Manpower related policies taking into account established best practices for the fishing sector</p>	<p>UP/ MSU / Research institution (check w/ OCEANS)</p>	<p>BFAR/ MARINA/ DOLE/ Industry/</p>	<p>2018</p>	<p>UP/ MSU / Research institution / industry/ stakeholder (check w/ OCEANS)</p>

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget
4. By 2019, expand market access including product competitiveness for domestic and export, especially for MSMEs	1. Increase Participation of women, IPs, differently-challenged groups in tuna trading and marketing	1. Conduct training for women sectors and IPs on the specific roles in trading and marketing	BFAR-SC, DTI	LGU	2019	BFAR
	2. Increase R& D efforts on the use of new fish processing technologies	1. Strengthening R&D efforts and awareness on the use of new fish processing technology	NFRDI, Academe	DA-BFAR, DOST	2019	NFRDI, DA-BFAR, DA-BAR, DOST, Private sectors and other concerned offices
	3. Provide policy support to mainstream Certification Initiatives and Fishery Improvement Programs of the private sector towards certification of tuna fisheries	1. Conduct scoping and Gap analysis	DA-BFAR, LGU, NGOs and Donor Agencies, Industry	BFAR, LGU	2018 onwards	BFAR, LGU
		2. Formulate FIP in consultation with stakeholders				
		3. Implement FIP				
		4. Adopt relevant Policies				
	4. Develop and Implement a comprehensive market information system (to address trade concerns of primary and emerging markets in both domestic and foreign sectors)	1. Develop market research and training program	DTI	BFAR	2019	BFAR
5. Develop Information, Education, and Communication (IEC) Program for market information and marketing of fishery products (tri-media, social and digital media)	1. Production of pamphlets	BFAR, LGU, Stakeholders	Stakeholders	2019	BFAR, LGU	
	2. Installation of sign boards					
	3. Publication in the social media					
6. Develop and establish Information and Communication Technology (ICT) in Fisheries	1. Timely reporting of accurate data by the stakeholders and BFAR	BFAR, Stakeholders	Stakeholders	2019	BFAR, LGU	

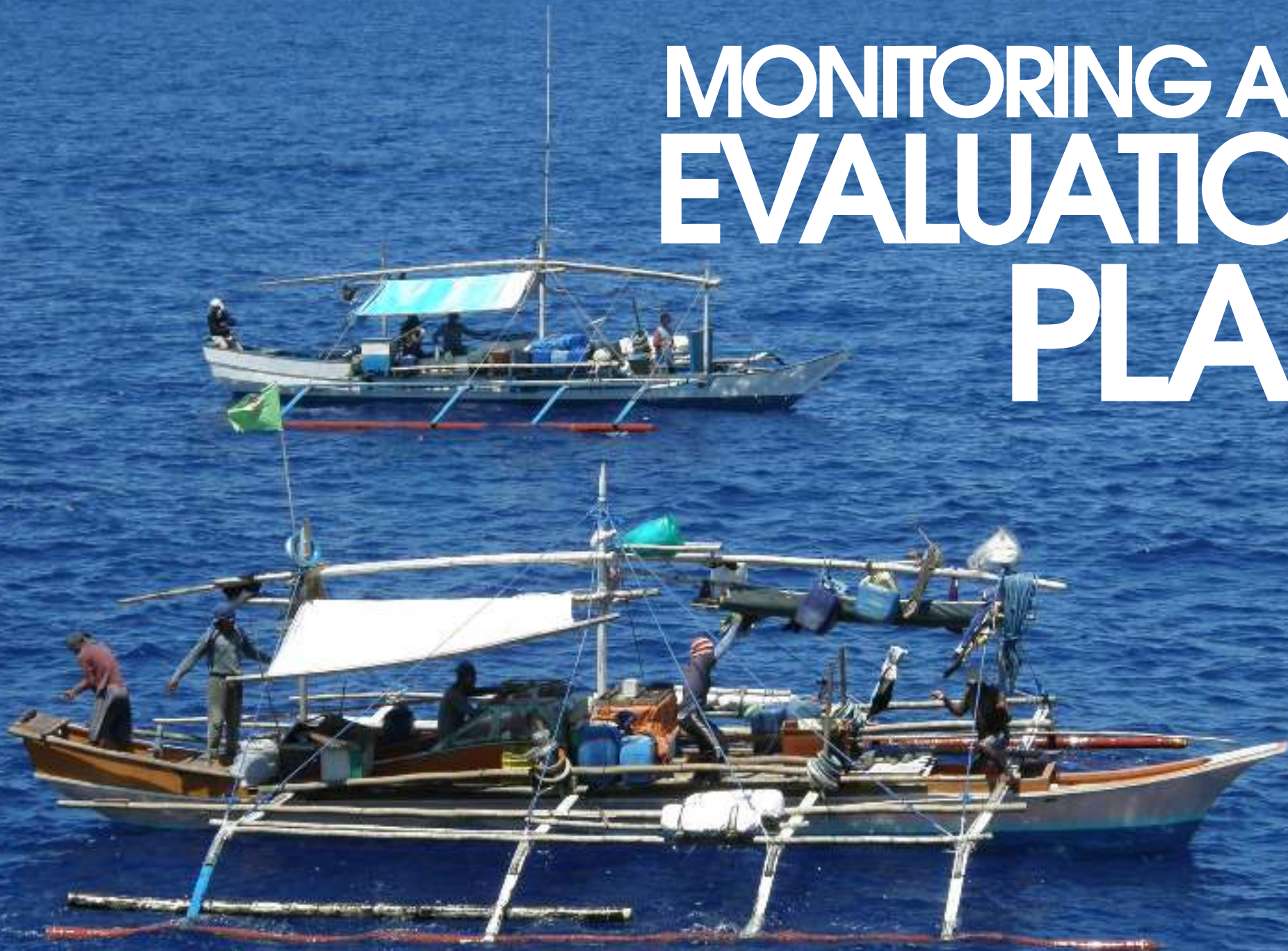
Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget
<p>5. By 2019, ensure compliance on food safety and quality standards and by 2023, reduce post-harvest losses by 10%</p>	<p>1. Improve compliance to GMP, HACCP and other established quality and safety standards</p>	<p>1. Development of appropriate onboard and transport handling techniques</p>	<p>DA-BFAR Post-Harvest Division</p>	<p>LGUs</p>	<p>3rd quarter 2019</p>	<p>Php5M</p>
		<p>2. Capacitate stakeholders on handling techniques (on board and during transport) grading of tuna GMP, HACCP and maintenance of facilities based on CODEX and appropriate standards</p>				
		<p>3. Trainings on handling and grading of tuna compliant with GMP and HACCP</p>			<p>4. Maintenance of facilities based on CODEX and appropriate standards</p>	
		<p>2. Improve fisheries post harvest and cold chain technology and facilities, including carrier vessels</p>			<p>1. Establishment baseline for the assessment losses on tuna products including processing waste and byproducts</p>	
	<p>2. Develop electronic system losses (workshop on the development of monitoring system and program/app development</p>		<p>2023</p>	<p>DA-BFAR/ Php 5M</p>		
	<p>3. Capacitate assessors (3-5 day training)</p>		<p>DA-BFAR c/o personnel services budget for FLDTs and LGU budget for AT-fisheries</p>			
	<p>4. Provision of incentives to assessors and monitoring tools such as tablets, and other supplies</p>					
	<p>5. Conduct regular (as agreed during the workshop) monitoring at the point of landing and processing facilities</p>		<p>DA-BFAR/Php500k</p>			

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget
5. By 2019, ensure compliance on food safety and quality standards and by 2023, reduce post-harvest losses by 10% (cont.)	2. Improve fisheries post harvest and cold chain technology and facilities, including carrier vessels (cont'd)	6. Data processing/ analysis and development of recommendations/ and corrective actions	DA-BFAR, PFDA	LGUs	2019 onwards	DA-BFAR and PFDA Php 100K (travel expenses as need DA-BFAR and PFDA Php 5M per facility DA-BFAR and PFDA Php 100 B
		7. Provide feedback to the tuna industry players and the LGUs for appropriate actions				
		8. Inventory, rehabilitation, and improvement and establishment of regional, municipal and private fish ports and other existing facilities				
		9. Require Request PFDA and LGUs to submit updated inventory of existing fish ports and facilities, respectively (with validation as needed)				
		10. Rehabilitate/improve/upgrade existing fish ports and facilities				
		11. Establishment of icing, cold storage and other facilities to ensure good quality systems before bringing tuna in processing plants				
	3. Incentivize good handling practices	1. Promotion/information dissemination to buyers/traders on the benefits of quality-buying practices	DA-BFAR, DA-AMAS	DTI, LGUs		
		2. Develop monitoring guidelines on good handling practices of landed and traded catch				

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget	
5. By 2019, ensure compliance on food safety and quality standards and by 2023, reduce post-harvest losses by 10% (cont.)	4. Facilitate compliance of fish processing establishments with requirements for approval of these establishments for exports	1. Identification of potential markets for exports	DA-BFAR	DA-AMAS, DTI		DA-BFAR, DA-AMAS Php 5B annually	
		2. Market matching of potential importer (foreign) with local processor and provision of technical guidance to the suppliers to ensure full compliance with the international standards					
	5. Maintain the compliance to EU and other market requirements	1. Establishment of compliance monitoring of local suppliers with EU and other markets requirement	DA-BFAR, DA-PRS				DA-BFAR Php 500K
		2. Monitoring and information dissemination on any changes on the requirements/ preferences of EU and other markets					DA-BFAR, DA AFID Php 1M
		3. Delegation of personnel during International Negotiations/Fora to convey the interests of the PH tuna industry					DA-BFAR, DA-PRS Php 500K
	6. Monitor and assess the levels of chemical and microbiological hazards in fish and fishery products in different steps of the supply chain	Establishment/maintenance of laboratories for the testing of samples for levels of chemical and microbial hazards	BFAR			2018 onwards	External funding sources (international financing institutions) Php 5B
	7. Promote fair and transparent prices among buyers and sellers	1. Continuous evaluation of the tuna value chain to determine the cost structure of the commodity to be used as basis for the prices	DA-BFAR		LGU	2019	
		2. Development of mechanisms/ for posting of Price Estimate of Unloading (PRES-U)	LGUs		BFAR		LGUs
		2.1 Provision of bulletin boards and TV screens					Php 3M
		2.2 Link with PFDA website					

Objectives	Management Actions/Measures	Programs/Projects/Activities	Person/Agency/ Stakeholder	Person/Group/ Organization	Timetable/Date of Realization	Staff and Budget
6. Improve tuna management through improved policies	Review tuna related national policies to effectively align with the WCPFC CMMs	Review, update FAO on FADs, Traceability, Mesh size regulation and others to assess its relevancy and effectiveness		BFAR	2019	
		Fill up policy gaps to align and comply with the requirements of the WCPFC, IOTC, IATTC, etc. Use the TCC report on what the country needs to address (e.g. reportorial requirements, etc)		BFAR	2019	
	Create a permanent set of representatives of Philippines to the tuna RFMOs	BFAR to create Tuna delegation with alternates from major stakeholders including DFA, Trade, Tuna Business.	Private Sector and other NGAs	BFAR	2019 onwards	
	Improve transparency in the decision making process by improving the flow of information from national to local and vice versa	Activate and operationalize FARMCs at major tuna sites to enable the flow of information	LGUs	BFAR	2019 onwards	
		Strengthen National Tuna Council that discuss position of the country to the issues of the RFMOs	Private Sector	BFAR	2019	
	Accessibility and availability of information in almost real time	Operationalize, secure a digital-database platform for the country that support the needs of science, trade, policy.	DTI	BFAR		
7. Ensure completion of Tuna life cycle	Protect key life stages and habitat of tunas in Philippine waters	Identify hotspots for critical life stages and habitats for each FMA and develop appropriate protection through policy			2020	
		Regulate fisheries provides the natural diet of tunas at each life stage			2020 onwards	
		Assess regularly the potential impacts of other fisheries on the completion of tuna life cycle	NFRDI		2020 onwards	
		Using science based information, develop strategy to minimize take of juvenile tunas.			2019	

MONITORING AND EVALUATION PLAN



GOAL 1

Sustained Level of Production

Objectives	Benchmarks		Indicators (Quality/Quantity/Relative)	Monitoring methods or source of data	Monitoring Frequency and who is in charge	Evaluation (notes on progress)
	Baseline	Target				
1. By 2023, achieve the catch level through science-and rules-based management as guided by the WCPFC CMM	Current catch/effort/capacity level(average for 5 years)	Catch/effort/capacity level as guided by WCPFC CMM (e.g. CMM 2017-01)	Annual catch by species, gear and size Number of boats/gear by sector Fishing days	Logsheet/E-reporting Observer data NSAP data VMS data PSA PFDA Industry Record LGU-Auxiliary invoice BFAR	Logsheet/E-reporting- Every landing Observer data-Observer trip NSAP data-sampling day VMS data-vessel trip PSA-quarterly PFDA-every landing/unloading Industry-Quarterly LGU-every trip BFAR-Local transport permit	Annual data reconciliation workshop-BFAR, PSA, PFDA, industry Annual Report submitted to WCPFC
			Relative biomass / effort; indicators	NSAP data; tuna stock assessment	NFRDI - every 2 years	
2. By 2021, equitably distribute fishing access to stakeholders by providing zones for exclusive use of each fishing sector	Current TCMZ: (7)	35 Zones in 5 years (7 zones/year)	No. of Tuna Conservation and Management Zones(TCMZ) established	FAO on Establishment of TCMZ	Annual- BFAR and NFARMC	
	0	No. of MOA/Certificate awarded -1400 (20 Payaox2 beneficiaries x35 zones (approx. 112.5 sq. NM per zone)	No. of MOA signed/Certificate awarded	BFAR	Annual	
3. By 2023, establish management measures to protect identified spawning and breeding grounds	No existing measure on the protection of spawning and breeding grounds (closed season)	2 management measures on identified spawning and breeding grounds	Number of management measures to declare closed season on identified spawning and breeding grounds based on scientific studies conducted	BFAR Records-FAO adopted	Annual	
	7 Tuna Conservation and Management Zones(TCMZs)	35 Tuna Conservation and Management Zones(TCMZs)	Number of Tuna Conservation and Management Zones(TCMZs) established	BFAR Records-FAO adopted	Annual	

GOAL 2

Improved socio-economic condition of fisherfolk and equitably accessed tuna resources

Objectives	Benchmarks		Indicators (Quality/Quantity/Relative)	Monitoring methods or source of data	Monitoring Frequency and who is in charge	Evaluation (notes on progress)
	Baseline	Target				
1. By 2023, improve municipal production by 1% annually by enhancing management and commercial fisheries production by 5% annually by improving fishing in the Philippines Rise and West Philippine Sea, as well as better fishing access with other coastal states in the western and central Pacific Ocean and the Indian Ocean	Based from average of last 5 years Reconciled data-PSA and BFAR (NSAP), PFDA, Data (Municipal and Commercial)	1% annual increase for municipal, 5% annual for commercial until 2023	Volume of Production (MT)	PSA PFDA BFAR (NSAP) Logsheet Observer Data	Quarterly	
			Value of production			
			Number of Policy guidelines formulated			
			Number of Bilateral agreement forged			
			Number of Special management plan formulated			
			Number of assessment and consultation conducted			
		Number of policy guideline on the use of payao				
100% attendance	Number of WCPFC meetings attended					
2. By 2023, reduce postharvest losses from 25% to 15% (from boat to processing plant)	25% PHL (FAO)	10% reduction	% reduction of PHL (Quality and Value)	Surveys and assessments in top tuna producing regions along the supply chain	Annually	
				Classification on the quality of fish		
			Number of PH facilities provided			
		Number of capacity building activities conducted				
3. By 2023, improve harvest to market efficiency by reducing/minimizing/streamlining the key players in the supply chain	Results of the value chain analysis of tuna from USAID-Oceans Partnership, UP-Mindanao	1 channel reduced/minimized	Number of channels reduced/ minimized	PFDA GenSan, Industry, Catch Validators	Annually	

GOAL 3

Strengthened governance / management
of tuna fisheries

Objectives	Benchmarks		Indicators (Quality/Quantity/Relative)	Monitoring methods or source of data	Monitoring Frequency and who is in charge	Evaluation (notes on progress)
	Baseline	Target				
1. By 2019, strengthen science-based decision making process and support while ensuring compliance to CMM	C/o NFRDI	5	Number of studies conducted: 1. Mesh size 2. Juveniles 3. Payao/FADs 4. Closed-fishing season 5. Harvest strategies	Academe, NFRDI, Research Institutions	Quarterly	
	4 FAOs	5	Number of studies translated to policies	NFRDI BFAR	Annually	
	1	3	Number of TWG, council and advisory groups formed and strengthened	BFAR		
2. By 2019, institutionalize timely and accurate data collection programs to ensure availability and access to scientific information to support management decisions			timely submission			
		2 per year	Number of trainings/capacity buildings		annually	
		3 per province	Number of plantilla for NSAP data analysts/team leader positions created	BFAR, NFRDI, PSA	every 3 years	
		3 (by-catch, observer, VMM)	Number of policy drafted and submitted		annually	
			Number of policy approved		every 2 years	
			Upgraded equipment/facilities		every 3 years	
		3	Number of MOAs, SOs reviewed	NGAs	annually	
		2	Number of FishR/BoatR system maintained	BFAR	annually	

Objectives	Benchmarks		Indicators (Quality/Quantity/Relative)	Monitoring methods or source of data	Monitoring Frequency and who is in charge	Evaluation (notes on progress)	
	Baseline	Target					
3. From 2018-2021, improve monitoring, control and surveillance measures to prevent, deter and eliminate illegal, unreported and unregulated (IUU) fishing for tuna stocks		5 per Tuna fishing ground	Number of trainings on FLE on Tuna	BFAR	annually		
		3 per region	Number of deputized BD team by LCE	LGU	annually		
	1	5	Number of pilot orientations and trainings on e-CDTS	BFAR	annually		
		14	Number of actual orientations and trainings on e-CDTS	BFAR	annually		
			Reduced incidence of IUUF	BFAR, LGU, NALECC	annually		
		Current (average of last 5 year poaching data) c/o PCG/BFAR records	100% elimination of poaching incidence within 5 years (20% reduction/year)	Poaching incidence eliminated	BFAR, PCG, DFA	annually	
		No catch share program	6 programs	Number of catch share programs developed	Industry/ Local FARMCs and BFAR RFOs, Interviews/FGD/KII, Regional reports	quarterly	
				Number of Tuna FMAs established	BFAR, CSO, NAMRIA		

Objectives	Benchmarks		Indicators (Quality/Quantity/Relative)	Monitoring methods or source of data	Monitoring Frequency and who is in charge	Evaluation (notes on progress)
	Baseline	Target				
4. By 2019, expand market access including product competitiveness for domestic and export, especially for MSMEs		25% in 5 years	% of women, IPs, differently-challenged groups participated in trading and marketing of tuna	BFAR	Annually	
	2	3/year	Number of new products developed	BFAR	Annually	
	3	11	Number of consultations/workshops on tuna fisheries improvement program	BFAR, Industry	Annually	
		5 types/media/year	Number of IEC materials developed and disseminated		Annually	
		1,000 likes/yr 200 shares/yr	Number of audience reached/benefited		Annually	
		500	Number of signboards installed in CFLC		Annually	
		1	Number of ICT established		Annually	
		1	Volume and value of export products	PSA, BFAR	Annually	

Objectives	Benchmarks		Indicators (Quality/Quantity/Relative)	Monitoring methods or source of data	Monitoring Frequency and who is in charge	Evaluation (notes on progress)
	Baseline	Target				
5. By 2019, ensure compliance on food safety and quality standards and by 2023, reduce post-harvest losses by 10%		10% increase of certified established in 5 years	Number of certified establishments	BFAR	Annually	
		100% compliance of all registered establishments				
		10% reduction in 5 years	% reduce in post-harvest losses		every 3 years	
			Number of monitoring guidelines implemented		Annually	
			Number of participation in in expo/trade fairs		Annually	
			Number of negotiations for tuna trade marketing		Annually	



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