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# ANNUAL REPORT – PART 1
# INFORMATION ON FISHERIES, RESEARCH, AND STATISTICS

**WCPFC-SC3-AR PART 1/WP-24**

**REPUBLIC OF THE PHILIPPINES**

# PHILIPPINE FISHERY REPORT UPDATE

Noel C. Barut
Elaine G. Garvilles

## I. INTRODUCTION

The Philippines is among the top fish producing countries in the world. Over 1.5 million people depend on the fishing industry for their livelihood. Philippines is also considered as a major tuna producer in the Western and Central Pacific Ocean (WCPO), both for domestic food security and on an industrial scale. The fishing industry's contribution to the country's Gross Domestic Products (GDP) were 2.1% and 4.3% at current and constant prices, respectively *(Philippine Fisheries Profile, 2005)*.

In 2005, the foreign trade performance of the fishery industry gave a net surplus of 325 million dollars. With a total export value of 457 million US dollars and import value of 132 million US dollars. Tunas remained as one of the top export fishery commodities and are exported fresh/chilled/frozen, smoked/dried and canned. Major export markets are Japan, USA, Canada and Germany *(Philippine Fisheries Profile, 2005)*.

Chilled/frozen fish comprise a bulk of the total import in terms of value. Tuna mackerel and sardines are considered major import fish commodities. Tuna has a share of 75%, mackerel (17%) and sardines (4%). Chilled/frozen fish were mainly supplied by PNG, Taiwan and Indonesia *(Philippine Fisheries Profile, 2005)*.

## II. FLEET STRUCTURE

The fishing sector consists of municipal and commercial components, with the former involving vessels less than 3 GT in size, and under the jurisdiction of the Local Government Units (LGUs). The number of municipal vessels is not well documented in most areas, and also currently includes handline vessels, many of which are considerably larger than 3 GT[1]. While larger commercial vessels (> 3GT) are required to fish outside municipal waters, beyond 15km off the shoreline and are required to secure commercial fishing vessel license (CFVL) at the Bureau of Fisheries and Aquatic Resources which is subject to renewal every three (3) years.

[1] Implementing Rules and Regulations (IRR) for the implementation of RA 9379: Handline Fishing Law: An act defining handline fishing providing effective regulations therefore and for other purposes, is currently undergoing consultations throughout the country.

The Bureau of Fisheries and Aquatic Resources (BFAR) list of registered Philippine vessels operating in the Western and Central Pacific Region is shown in Table 1.

**Table 1. List of Philippine vessels operating in the convention area.**

| Type of Vessel | Number of Registered Vessels |
|---|---|
| Brine boat | 1 |
| Carrier (< 250 GT) | 109 |
| Carrier (>250 GT) | 72 |
| Catcher (< 250 GT) * | 85 |
| Catcher (>250 GT)** | 74 |
| Fish Reefer | 4 |
| Light Boat | 196 |
| Ranger boat | 22 |
| Skiff boat | 1 |
| Sonar boat | 11 |
| Surveyor | 10 |
| Tanker | 2 |
| **Total** | **587** |

* 16 handline, 60 purse seines and 9 ring nets
** 23 longlines and 51 purse seines.

## III. ANNUAL TUNA CATCH IN THE PHILIPPINE EEZ

Since 1987, the official fishery statistics for the Philippines have been compiled by the Bureau of Agricultural Statistics (BAS), based on probability (stratified random sampling by data collectors) and non-probability (interviews by regular BAS staff) surveys, 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 three year time frames, most recently for 2003-2005 inclusive (BAS, 2006), and include volume and value of production by region, information on fish prices and foreign trade statistics.

Catch breakdown by the 30 main marine species is available[2], estimates of annual bigeye and yellowfin catches for the past years have been reported as a combined catch (yellowfin/bigeye tuna) but for 2005 BAS started to separate catches for these two species of tunas with the assistance from the WCPFC. However, there is still a need to improve the identification of these two (2) species to accurately reflect the actual catch of yellowfin and bigeye. The available BAS estimates for the tuna catch by species for the period 2001-2006 are given in Table 2 below.

It should be noted that past statistics (before 2003) was under reported because, the degree of cooperation from the private sector was not that ideal due to the lesser appreciation on fisheries data in fisheries management. The recent cooperation of the fishing sector strengthened the data collection system thus resulting to a better catch level estimate by BAS. The recent increase in catch was in fact not the result of

[2] Around 20% of the municipal catch and 6-8% of the commercial landings are not captured by these 30 species

increased fishing effort but with the support of the fishing sector realizing the importance of accurate catch data in fisheries management. This is shown in the recent study which revalidated the country's annual tuna production. See ***Annex 1*** for the full paper.

The annual tuna catch estimates include all the tuna catch landed in Philippine ports regardless where they were caught and does not separate those catches from foreign waters.

**Table 2. Total tuna catch, by species, for 2001-2006**
Source: BAS Annual Fisheries Statistics; 2006 data are provisional

| Year | Commercial | | | Municipal | | | TOTAL |
|---|---|---|---|---|---|---|---|
| | Skipjack | Yellowfin/ bigeye | Bigeye | Skipjack | Yellowfin/ bigeye | Bigeye | |
| 2001 | 80,766 | 49,055 | - | 24,718 | 34,505 | | **189,044** |
| 2002 | 83,385 | 63,051 | - | 26,592 | 36,743 | | **209,771** |
| 2003 | 114,077 | 87,473 | - | 24,242 | 39,767 | | **265,559** |
| 2004 | 115,739 | 87,095 | - | 27,404 | 42,458 | | **272,696** |
| 2005 | 112, 696 | 69,833 | 11,600 | 30,368 | 44,194 | 10,086 | **278,777** |
| 2006 | 130,930 | 66,334 | 15,334 | 33,396 | 47,063 | 14,137 | **307,193** |

Estimates of the billfish catch are listed below (Table 3). The great majority of the catch is taken by municipal gears (including handline), with sailfish and swordfish as the dominant species. The swordfish catch may include marlins in some cases.

**Table 3. Total billfish catch, by species, for 2001-2005**
Source: BAS Annual Fisheries Statistics

| Year | Marlin (blue and black) | Swordfish | Sailfish | **TOTAL** |
|---|---|---|---|---|
| 2001 | 2,503 | 4,433 | 6,196 | **13,132** |
| 2002 | 2,350 | 4,706 | 6,378 | **13,434** |
| 2003 | 1,742 | 5,236 | 5,178 | **12,156** |
| 2004 | 1,091 | 4,964 | 3,856 | **9,911** |
| 2005 | 926 | 4,389 | 2,957 | **8,272** |

Tuna catch breakdown by gear is not available from the present national statistics publication. The WCPFC Tuna Fishery Yearbook has however provided an estimated breakdown of catch by gear (see Table 4).

No other fishing by foreign flag vessels is permitted in the Philippines EEZ, but a considerable amount of IUU fishing, based on the regularity of apprehensions of vessels illegally fishing in Philippine waters, would seem to occur, much of it involving tuna vessels. A desk study carried out in 1995 (PTRP, 1995) concluded that IUU longline catches of up to 10,000MT (40% yellowfin) may have been taken in some years.

Landings/ transshipments by foreign longline vessels are permitted in Davao (Toril) port, where around 5,000MT of mostly tuna is landed annually (Table 9). Over half is

retained for processing and consumption, with the rest transshipped by air. Most of these retained catch do not pass the export quality standards and import permit is not necessary since the DA Secretary has signed a certificate of necessity. It is also assumed that all of this catch is taken outside Philippine waters.

**Table 4. Estimated catch of oceanic tuna species, by gear type, for 2001 – 2005 in Western and Central Pacific Oceans (in MT)**
Source: WCPFC Tuna Fishery Yearbook 2005

| | Gillnet | Handline (Small) | Handline (Large) | Longline | Purse Seine | Ringnet | Unclassified | TOTAL |
|---|---|---|---|---|---|---|---|---|
| **2001** | | | | | | | | |
| Skipjack | | 4,020 | 7,146 | 724 | 58,614 | 29,857 | 5,123 | 105,484 |
| Yellowfin | | 16,086 | 28,596 | 1,663 | 18,372 | 4,758 | 6,444 | 75,919 |
| Bigeye | | 1,513 | 2,691 | 157 | 2,041 | 523 | 716 | 7,641 |
| Total | | 21,619 | 38,433 | 2,544 | 79,027 | 35,138 | 12,283 | 189,044 |
| **2002** | | | | | | | | |
| Skipjack | | 4,191 | 7,450 | 755 | 61,111 | 31,128 | 5,342 | 109,977 |
| Yellowfin | | 19,210 | 34,152 | 1,990 | 21,941 | 5,683 | 7,696 | 90,672 |
| Bigeye | | 1,808 | 3,213 | 192 | 2,438 | 624 | 856 | 9,131 |
| Total | | 25,209 | 44,815 | 2,937 | 85,490 | 37,435 | 13,894 | 209,780 |
| **2003** | | | | | | | | |
| Skipjack | | 5,271 | 9,370 | 949 | 76,860 | 39,150 | 6,719 | 138,319 |
| Yellowfin | | 24,494 | 43,544 | 2,540 | 27,975 | 7,246 | 9,813 | 115,612 |
| Bigeye | | 2,305 | 4,097 | 248 | 3,108 | 796 | 1,090 | 11,644 |
| Total | | 32,070 | 57,011 | 3,737 | 107,943 | 47,192 | 17,622 | 265,575 |
| **2004** | | | | | | | | |
| Skipjack | | 5,455 | 9,697 | 982 | 79,540 | 40,516 | 6,953 | 143,143 |
| Yellowfin | | 24,939 | 44,336 | 2,579 | 28,483 | 7,377 | 9,991 | 117,705 |
| Bigeye | | 2,346 | 4,172 | 243 | 3,165 | 811 | 1,111 | 11,848 |
| Total | | 32,740 | 58,205 | 3,804 | 111,188 | 48,704 | 18,055 | 272,696 |
| **2005** | | | | | | | | |
| Skipjack | | 5,452 | 9,692 | 981 | 79,496 | 40,494 | 6,949 | 143,064 |
| Yellowfin | | 24,160 | 42,951 | 2,498 | 27,593 | 7,146 | 9,679 | 114,027 |
| Bigeye | | 4,294 | 7,636 | 445 | 5,793 | 1,484 | 2,034 | 21,686 |
| Total | | 33,906 | 60,279 | 3,924 | 112,882 | 49,124 | 18,662 | 278,777 |

## IV. ANNUAL CATCHES IN THE CONVENTION AREA

In addition to the estimated catch by Philippine vessels in the EEZ (see above), to this must be added catches by Philippines flag vessels taken outside the EEZ and elsewhere in the Convention area. The extra - EEZ catches are assumed to include those made by purse seine and ring net vessels in adjacent areas and based in overseas ports, distant water longliners operating in the Convention area, and catches by the wide-ranging handline vessels. There is generally no logsheet coverage for much of this activity, and details of catch, catch rates and catch by area are still inadequate.

Recently, BFAR have already required certain fishing vessels such as purse seine and ringnet to adopt the logsheet system to address the above issue. The handline fishing vessels will soon follow upon finalization of the Implementing Rules and Regulation (IRR) for RA 9379: Handline Fishing Law.

The fisheries data collection system records all catch landed by Philippine registered vessels including those fish caught outside Philippine waters eg PNG, Indonesia and high seas. It is believed that up to 80,000MT of catch are taken outside the Philippine EEZ. This primarily includes catch by small purse seiners and ring netters and catch by handliners fishing outside Philippine waters, and landing their catch in Philippine ports. One lacking component of the Philippine catch statistics would be the catch of the Philippine flagged vessels unloading outside the Philippines (e.g. Indonesia and PNG).

**Purse seine catches in the Indonesian EEZ**

Under an agreement reached with the Republic of Indonesia in 2002, a number of Philippine tuna vessels (75 catcher vessels, 10 single seiners, 20 longlines and support vessels - lightboats and carriers) were allowed access to Indonesian waters and ports, an agreement which already expired last December 2006.

**Purse seine catches in the PNG EEZ**

Data on the catch by PNG-based Philippines flag vessels, and Philippines vessels fishing in PNG under access agreements are available from the SPC Regional Database, and are summarized for the period 2002-2006 below. A small proportion of the catch taken in Indonesia and in other PIN waters eg FSM, Kiribati under access agreements is included in these figures.

**Table 5. Catch by Philippines purse seine bilateral access vessels in PNG waters, 2002-2006**
Source: SPC Regional Tuna Fishery Database

| Year | No. of vessels | Skipjack | Yellowfin | Other | TOTAL |
|---|---|---|---|---|---|
| 2002 | 11 | 18,891 | 6,968 | 778 | 26,723 |
| 2003 | 10 | 24,339 | 7,099 | 487 | 31,926 |
| 2004 | 11 | 27,288 | 5,748 | 817 | 33,853 |
| 2005 | 10 | 14,971 | 6,585 | 506 | 22,062 |
| 2006 | 12 | 20,552 | 6,598 | 258 | 27,408 |

**Table 6. Catch by PNG-based Philippine purse seine vessels in PNG waters, 2002-2006.**
Source: SPC Regional Tuna Fishery Database

| Year | No. of vessels | Skipjack | Yellowfin | Other | TOTAL |
|---|---|---|---|---|---|
| 2002 | 17 | 40,461 | 22,242 | 422 | 63,125 |
| 2003 | 18 | 46,600 | 17,913 | 339 | 64,852 |
| 2004 | 19 | 44,455 | 13,234 | 164 | 57,852 |
| 2005 | 19 | 27,550 | 21,408 | 663 | 49,621 |
| 2006 | 20 | 39,625 | 18,025 | 163 | 57,813 |

**Purse seine and ring net catches in other areas**
No data are similarly available on the catch by Philippines purse seine and ring net vessels in other waters within the Convention area, including high seas areas, the Palau EEZ, South China Sea etc.

**Handline catches** are not covered by logsheet**,** and are not well estimated. Vessels fishing for larger tunas, primarily for export or local processing, are wide-ranging. However, in recent years the actual number of handline vessels have declined due to the high cost of fuel.

The SOCSARGEN Federation of Fishing and Allied Industries, Inc suggested that the Philippine tuna industry has estimated total landings of 400,000MT. Thirty percent (30%) or 120,000MT is caught in Philippine waters and the rest in foreign waters through bilateral access agreements such as in Indonesia. Majority of the catch (70% or 280,000MT) is taken outside the Philippine waters. And of the 280,000MT, fifty four percent (54%) or 150,000MT is caught in Indonesian waters and the rest in other areas where we have access agreements.

**Table 7. Estimated Total Landings of the Philippine Tuna Industry**
(Source: SOCSARGEN Federation of Fishing and Allied Industries, Inc)

| Details | Catch (MT) | Percentage Share (%) |
|---|---|---|
| **Estimated Total Landings** | **400,000** | **100** |
| **A. Caught in Philippine Waters** | **120,000** | **30** |
| **B. Caught in Foreign Waters** | **280,000** | **70** |
| 1. Indonesia | 150,000 | 54 |
| 2. Others | 130,000 | 46 |

## V. MARKET DESTINATION OF CATCHES

Most of the **municipal** tuna catch (95,000MT of oceanic tunas and 89,000MT of neritic tunas in 2006) is landed as wet fish in thousands of landing sites all over the Philippines. BAS suggests that there were over 8,400 municipal landing centers in 2005. Much of the municipal catch is processed by drying, salting, smoking etc. No data are available on the disposal of the municipal catch after landing, but little of the municipal tuna catch would enter large scale commercial processing, the exception being large handline-caught tuna exported as sashimi and marketed either frozen or smoked, mostly in General Santos (see later), and possibly small amounts of tuna sold as wet fish direct to canneries.

The **commercial** domestic tuna catch of oceanic tunas (212,000MT in 2006) is increasingly directed towards processing by domestic canneries, based in the Philippines and elsewhere, with lesser amounts to frozen smoked operations. For 2006, BAS suggests there were 441 commercial landing centers (including PFDA & LGU controlled ports and even private wharfs). The estimated 220,000MT annual output of the 7 canneries is mostly supplied by landings from Philippine purse seiners

and ring netters, both local vessels and via carriers from overseas operations. Overseas operations also supply canneries in PNG (30,000MT p.a.) and Indonesia (currently 20,000MT p.a.); some tuna is imported to supplement cannery supply.

Official figures for **exports of tuna products** for the period 2001-2006 are tabulated below. The first category includes chilled sashimi quality fish, frozen whole fish for canning and presumably frozen smoked tuna. The volume of canned exports is somehow fluctuating.

**Table 8. Tuna exports by commodity, 2001 –2006**
Source: NSO data, in BAS Fisheries Statistics for 2001 – 2004;
SOCSARGEN Bureau of Customs for 2005 – 2006

| Tuna commodity, by volume (MT) | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|
| Fresh/chilled/frozen | 21,649 | 22,496 | 27,206 | 23,347 | 13,080* | 11,168* |
| Dried/smoked | 771 | 705 | 228 | 137 | | |
| Canned | 33,909 | 47,970 | 56,854 | 53,873 | 50,629 | 91,778 |
| TOTAL VALUE (million USD) | 115.25 | 139.05 | 153.10 | 150.78 | 116.83 | 196.61 |

* includes dried/smoked tuna commodity

## VI. ONSHORE DEVELOPMENTS

**Transshipment** by foreign vessels is permitted in only one port in the Philippines - Davao (Toril), as noted earlier. Table 9 below lists the details of these unloading.

**Table 9. Vessel Arrivals and Unloading Volumes by Foreign Longline Vessels, Davao Fish Port**
Source: PFDA, 2006

| Year | Port Calls | Volume of Unloadings (MT) | Transhipped (MT) | Retained (MT) |
|---|---|---|---|---|
| **2001** | 932 | 5,318 | 3,069 | 2,249 |
| **2002** | 786 | 5,146 | 2,255 | 2,891 |
| **2003** | 643 | 5,065 | 1,884 | 3,181 |
| **2004** | 621 | 4,210 | 1,797 | 2,413 |
| **2005** | 661 | 5,198 | 2,406 | 2,792 |
| **2006** | 974 | 5,811 | 2,901 | 2,910 |

### Harbor infrastructure

The General Santos Fish Port Complex (GSFPC), the country's major tuna unloading port, with 102,729MT total fish unloadings in 2006, has undergone significant expansion and improvement. Major components of the said expansion/improvement project includes 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. GSFPC port facilities have already met international standards for HACCP GMP-SSOP and accredited by the European

Union (EU), Japan and United States. As of July 2007, 99% of the expansion project has been completed. Several of the six other major fish ports in the country are proposed for rehabilitation in the near future. Navotas, in Metro Manila, remains the largest fish port, with 112,878MT total fish unloadings for 2006. Upgrading, rehabilitation and improvement of Navotas Fish Port Complex (NFPC) will soon be realized. Rehabilitation project for NFPC includes upgrading of port facilities *(such as roads, electrical and power system, landing quay and west breakwater)*, construction of cold storage and processing plant, and waste water treatment facilities.

**Processing plants**

There are currently 7 tuna canneries operational in the Philippines, 6 in General Santos and 1 in Zamboanga, although there have been eight or more in the past. The other cannery (Miramar Fishing Corp.) in Zamboanga has temporarily stopped its operation since the last quarter of 2005. The total pack in 2003 was reportedly 10.5 million cases (Tuna Canners Association of the Philippines (TCAP)), the equivalent of 250,000MT of raw product, virtually all of which is oceanic tunas. Several canneries have recently announced plans to expand plants and others are committed to the development of new product lines eg pouch packs. Over 90% of the product is exported, with a small amount (<10%) for local consumption.

There is also a Philippine-owned and operated cannery in Madang, Papua New Guinea processing around 30,000MT per year, and two Philippine-operated canneries in Bitung, Indonesia, processing around 20,000MT of tuna per year.

Most of the handline catch supply fresh and frozen sashimi processors and domestic market. There are more than 15 frozen tuna processors in the Philippine, 80% if which are located in General Santos City and supports about 12,000 jobs. Majority of its production is exported to US and European countries.

## VII. TUNA STATISTICS AND RESEARCH

The Indonesia and Philippine Data Collection Project (IPDCP), is already on its 3rd year of implementation. This project was developed to help reduce uncertainty on tuna stock assessments in WCPO. Funding and technical support was committed to Bureau of Agricultural Statistics (BAS) and the National Fisheries Research and Development Institute (NFRDI) / Bureau of Fisheries and Aquatic Resources (BFAR).

Aside from the monthly monitoring conducted by the Provincial Operation Center (POC) staff of BAS, BAS also conducted surveys in 30 sampled landing centers (15 municipal and 15 commercial) and recruited additional data collectors to collect actual unloading observations particularly on tuna. Starting 2005 there was a separate data for yellowfin and bigeye in the catch statistics.

The National Stock Assessment Programme (NSAP) continued to collect port sampling data (species composition, length frequency and vessel catch and effort information). The SPC Database manager visited the NFRDI Office last January to provide technical support on the NSAP Database System. As result, NSAP National Reporting System was developed to compare NSAP and BAS data gathered through the IPDCP.

A catch and effort logsheet system, initially for the 50 plus large purse seine vessels which may account for around 200,000MT of catch, is already on the initial stage of implementation. Hopefully, in the coming year, the TUFMAN system will be utilized to process the data collected on the logsheets.

Implementing Rules and Regulations (IRR) for RA 9379: Handline Fishing Law is currently undergoing consultation meetings around the country, before it will be entered into force.

There is no observer programme for the Philippine tuna fishery, although some observer coverage of vessels fishing in the PNG EEZ is provided by PNG NFA. The Bureau of Fisheries and Aquatic Resources is also in close collaboration with the private sector for the development of the national VMS.

A study on the recalculation of the Philippine tuna production from WCPO was initiated by BFAR and the industry. This study aims to make an independent estimate of the country's annual tuna production, which mainly uses historical catch data from the Philippine tuna industry, previous researches conducted and existing fisheries database like NSAP. The objectives of this study were: 1) to estimate the historical tuna fisheries production of the Philippines and 2) to revalidate the country's tuna production from the WCPO region. See ***Annex 1*** for the full paper.

## VIII. FUTURE PROSPECT

A UNEP-GEF funded project entitled "Reversing Environmental Degradation Trends in South China Sea and Gulf of Thailand" initiates the establishment of fish *refugia* in identified sites in South China Sea to address the issue of growth over-fishing and recruitment over fishing. Fish *refugia* is defined in the ASEAN context as " *Spatially and geographically defined, marine or coastal areas in which specific management measures are applied to sustain important species [fisheries resources] during critical stages of their lifecycle, for their sustainable use."*

Fisheries *Refugia* should:

- *NOT be "no take zones",*
- Have the objective of sustainable use for the benefit of present and future generations,
- Provide for some areas within *refugia* to be permanently closed due to their critical importance [essential contribution] to the life cycle of a species or group of species,
- Focus on areas of critical importance in the life cycle of fished species, including spawning, and nursery grounds, or areas of habitat required for the maintenance of broodstock,
- Have different characteristics according to their purposes and the species or species groups for which they are established and within which different management measures will apply,
- Be sub-dividable to reflect the differing importance of sub-areas to the species or species groups for which they are established.

Management measures that may be applied within fisheries *refugia* may be drawn from the following [non-exhaustive] list:

- Exclusion of a fishing method (e.g. light luring purse seine fishing),
- Restricted gears (e.g. mesh size),
- Prohibited gears (e.g. push nets, demersal trawls),
- Vessel size/engine capacity,
- Seasonal closures during critical periods,
- Seasonal restrictions (e.g. use of specific gear that may trap larvae),
- Limited access and use of rights-based approaches in small-scale fisheries.

The illustration below will show a clearer picture of the *refugia* concept.

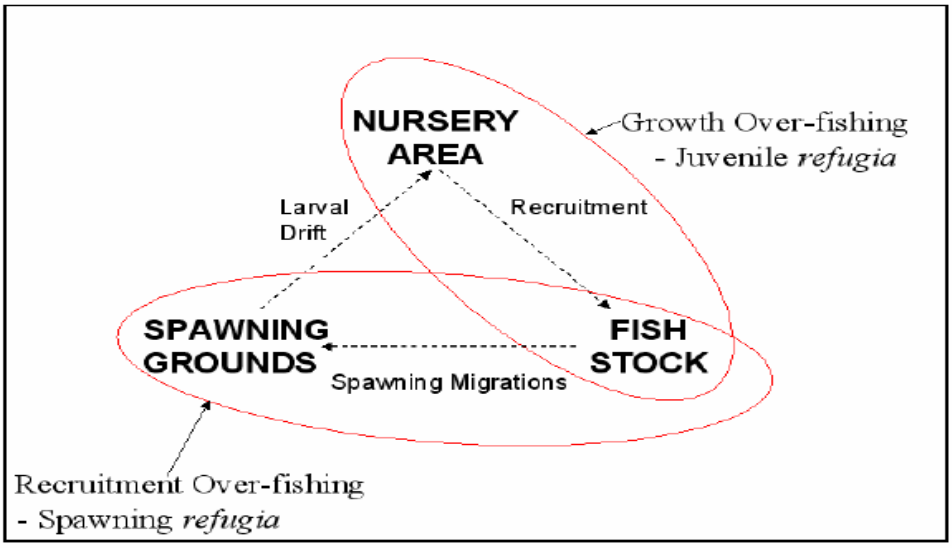


**Figure 1** **Generalised life-history triangle for fished species, highlighting the problems of growth and recruitment over-fishing.**

Several sites in the Philippines have already been identified for this particular project. In the recent Tuna Industry Council meeting, the fishing industry has strongly supported the adoption of this concept to address the issue of growth over-fishing in the tuna fishery.

A Philippine National Tuna Management Plan was developed during 2004, and has been approved by the National Tuna Industry Council. Although the Plan was expected to be implemented in 2006, it should be approved by the National Fisheries and Aquatic Resources Management Council (NFARMC) first before its implementation, in which at the moment there is no NFARMC constituted or has yet to be convened which somehow delays the implementation of the said plan. But BFAR and other concerned sectors are already formulating actions to address the above issue.

A new Fisheries Administrative Order (FAO) on mesh size regulation for the tuna fishery has been prepared but is yet to be fully implemented due to some government requirements to fulfill.

**SOURCE DOCUMENTS**


Anon. (2003) Proposal for Monitoring the Catches of Highly Migratory Species in the Philippines and the Pacific Ocean Waters of Indonesia. Prepared for the Preparatory Conference for the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific. OFP, SPC, Noumea, New Caledonia.

Babaran, R. (2007). Recalculation of the Philippine Tuna Production from WCPO. CFOS – UPV, Miag-ao, Iloilo, Philippines.

BAS (2006) Fisheries Statistics of the Philippines. 2003-2005. Fisheries Statistics Division, BAS, Dept, of Agriculture, Quezon City, Philippines. 138 p.

Barut, N. and E. Garvilles. 2006. Philippine Fishery Report. National Fisheries Research and Development Institute, Bureau of Fisheries and Aquatic Resources. 2nd Meeting of the WCPFC Scientific Committee (WCPFC-SC2), 7-18 August 2006, Manila, Philippines.

Barut, N. (2003) National Tuna Fishery Report – Philippines. Working Paper NR-22, SCTB 16, Mooloolaba, Australia, July 2003.

BFAR (2006) Philippine Fisheries Profile 2005. Fisheries Policy and Economics Division, BFAR, Dept, of Agriculture, Quezon City, Philippines. 70 p.

Lawson, T.A. and P.G. Williams (1998) Review of annual catch estimates for tuna fisheries of the Philippines. Internal Report 34. OFP, SPC, Noumea, New Caledonia. 15pp.

Lewis, A.D. (2004) Review of tuna fisheries and the tuna fishery statistical system in the Philippines. OFP, SPC, Noumea, New Caledonia

PTRP (1995) Distant Water Fishing Nation (DWFN) activity in the Philippines EEZ - a review. Desk study by OFP/SPC for the Philippines Tuna Research Project (PTRP), 55pp.

SPC (2005a) Tuna Fishery Yearbook 2004. T.A.Lawson (ed.), OFP, SPC, Noumea.

SPC (2004b) Report of the Philippines Tuna Fishery Data Collection Workshop 20-21 October 2004. OFP, SPC, Noumea. November 2004

Vallesteros, C.C. (2002) Data systems for fisheries. Paper presented at the 12th Agricultural Policy Forum (“Agricultural Statistics”), Makati City, January 2002.

WCPFC(2006) Tuna Fishery Yearbook 2005. T.A.Lawson (ed.), OFP, SPC, Noumea.

Williams, P. (2004) Preliminary review of data collection forms used in the Philippines tuna fishery. Working paper SWG-7, SCTB 17, Majuro, RMI, August 2004.

Williams, P. (2004) A summary of tuna fishery data collected from the Philippines National Stock Assessment Project (NSAP), 1997–2002. Draft report to BFAR/NFRDI, October 2004.

# Recalculation of the Philippine tuna production from the WCPO

Ricardo P. Babaran

*College of Fisheries and Ocean Sciences*
*University of the Philippines in the Visayas*
*Miagao, Iloilo 5023 Philippines*

## Introduction

The Philippines is considered one of the major tuna producing countries in the Western and Central Pacific Ocean (WCPO) region. Official records from the Western and Central Pacific Fisheries Commission (WCPFC) indicate that the country's tuna fishing fleet contribute a total of 306,512 MT in 2004, roughly 15% of the total tuna production from the WCPO region. The catch is mainly composed of 170,431MT (55.6%) skipjack tuna, 122,858 MT (40%) yellowfin tuna and 13,223 MT (4.3%) bigeye tuna.

Recently, the Bureau of Agricultural Statistics (BAS) estimated the country's total annual tuna production in 2006 at approximately 560,000 MT, which includes neritic species. BAS' estimates apparently also show a progressively increasing annual production trend but with a sudden increase starting in 2002. From 2002 to 2004, this marked change in production was allegedly due to higher contribution of the commercial fisheries sector, meaning purse seines and ringnets. The handline municipal fisheries sector meanwhile accounted for the rising annual tuna production from 2005 to 2006, largely due to an increase in bigeye tuna catch from about 10,000 MT in 2005 to about 29,000 MT in 2006. It is important to clarify this finding because the information could be misused to indicate the impact of the Philippine fishing fleet on the major tuna species (skipjack, yellowfin and bigeye) in the WCPO region. Unless clarified, this result implies that overfishing of these tuna resources is taking place, which could be used as leverage against the Philippines' fishing fleets in the allocation of declining harvestable resources from the WCPO region. Naturally, this condition does not augur well for the country's position in a regime that is regulated by the WCPFC, because these are sensitive issues that could again be linked to the traditional use of payaos as an auxiliary device for capturing tuna and small pelagic fish.

Indeed, the Philippine tuna fishing fleet had been a dominant player in the WCPO region since the early 1970s. It has been a major exporter of tuna since the late 1980s, or years before the formal grouping of countries under the WCPFC. However, unless the impact of the Philippine tuna fleet is properly considered, this could be a reason for proposals to cut back on the country's tuna fishing fleet in the coming years, which could have dire implications on the local economy. This concern is particularly true in

Mindanao where economic and security issues are closely linked. It is quite likely that concerns about sampling in fisheries, which have made the estimation of tuna production, difficult during the past several decades is just coming to the fore, and that the marked increase in fisheries production is likely due to better estimates of production recently.

This study aims to make an independent estimate of the annual production of large tuna species (skipjack, yellowfin and bigeye) by the Philippine tuna fishing fleet, including domestic fleets operating within Philippine territorial waters. It relies on historical catch data still available from the Philippine tuna industry, additional data from previously conducted research and even normal outputs of existing fisheries database like NSAP. The objectives of the study are a) to estimate the historical tuna fisheries production of the Philippines and b) to validate the country's production of skipjack, yellowfin and bigeye tuna from the WCPO region.

## Materials and Methods

### *Data requirements and sources*

The data requirements for this study to calculate production are a) catch rates of fishing vessels; b) number of fishing vessels operating per year; and, c) number of fishing days per year. Catch per unit effort (CPUE) is also necessary to preliminarily classify the different vessels into similar groups before estimating production; together with data on the number of fishing days, it is also used alternatively to calculate production when catch rates are unknown. The fishing vessels of interest are purse seine, handliners and ringnet because these are the major fishing gears that target tuna. In this study, only the production of the major tuna species (skipjack, yellowfin and bigeye) are calculated.

The main sources of data for this study are 1) the members of the fishing industry, particularly members; 2) the Bureau of Fisheries and Aquatic Resources (BFAR) and 3) MARINA.

### *Period covered*

The main focus of this research is to recalculate historical tuna catch data, that is, covering periods before 2000. The year 2000 is of special interest because according to the recent report by BAS, it marks the end of a production trend that seems distinct from the trend after this year. However, the calculations extend beyond 2000 up to 2006 because data are more readily available; the calculation of annual production for this period allows the use of data that are regularly gathered by BFAR, through its National Stock Assessment Program (NSAP), and readily provides a means to verify the estimates recently given by BAS. The baseline year for the 'historical' period was arbitrarily set at 1990, not because it marks the beginning of the tuna fishing in the Philippines, but rather because it is the year for which data is still available from cooperating members of the tuna fishing industry. Filipino fishermen were already fishing for tuna before the 1970s, which marked the early years of the tuna industry that exists to this day.

***Initial classification of fishing gears***

A classification of purse seines is imperative due to the large variability in the size of catchers. Samples of catch data from fishermen, fishing corporations and unpublished data were gathered and categorized by gross tonnage according to their CPUE. This classification of the data set is necessary because the catching ability of fishing gears depends on net size of the net, which, in turn, may be related to its gross tonnage. Purse seine vessels were classified into the following groups based on gross tonnage: <30, 30 - <50 GT, 50 - <250 GT, 250 – 500 GT, >500 GT. It is not necessary to apply a similar classification of handline fishing vessels because CPUE is not dependent on gross tonnage but probably by the number of fishermen in a given fishing vessel, or of ringnet vessels because these are generally less than 30 GT.

***Calculation of production***

Production is calculated in two ways, depending on the types of data available. It is calculated from

$$P = \Sigma(CPUE_{i,j}N_{i,j}D), \quad i=1, 2, \ldots, 5 \text{ boat classes; } j = 1, 2, 3 \qquad (1)$$

where CPUE = catch per trip; N = number of operating vessels, D = number of fishing days, i = index for the boat classes, j = index for fishing gears (i.e., purse seine, ringnet, handline).

In cases where catch rates data are available, total production was alternatively estimated using

$$P = \Sigma(C_{ri,j}N_{i,j}) \ , \ i=1, 2, \ldots, 5 \text{ boat classes; } j = 1, 2, 3 \qquad (2)$$

where $C_r$ = catch rate.

In this study, Equation (1) is applied to handline and ringnet data because landed catch data by each vessel represents the catch for the trip, which is defined here as the unit of effort. Equation (2), meanwhile, is used for purse seine data that came from industry, which are not segregated in terms of catch per cast of the purse seine gear but instead are tallied based on the cumulative catch of a given vessel for the entire year, irrespective of the number of actual sets during a given trip. Moreover, for purse seine data, Equation (1) is not applicable for the catch landed by carriers because this represents the combined catch of one or more catchers over a period of several days.

The resulting value for P sums up the estimated tuna production from both the commercial and municipal sectors from all sources. However, since some vessels of the country operate in other countries that require their catch to be credited to their host

countries, as the case is with Papua New Guinea, these should be excluded from this estimate. Moreover, some vessels operate in non-WCPFC covered areas, such as the Indian Ocean. The corresponding catch from these fishing grounds should also be excluded from this estimate. However, it may be difficult to get an estimate of the latter, unless members of the tuna fishing sector report where they derive their catch.

## Results and Discussion

### *Ringnet*

Ringnet fishing is commonly used within Philippine archipelagic waters to target small pelagic species like sardines and carangid species. Skipjack and yellowfin are only included in the catch at certain times of the year. Since the 1980s, the number of ringnet vessels had been increasing progressively, and in 1986, the estimated number of ringnet vessels reached 386. This figure increased further to 531 in 1997, and 943 in 2006 (*unpublished data*). Based from a separate analysis of empirical data, ringnet vessels operate over a period of 266 days annually. The remaining days of the year are used for maintenance while no operations are scheduled whenever a typhoon approaches or actually enters the country's area of responsibility.

Figure 1 presents the estimated total annual production of large tuna species by the Philippine ringnet fleet from 1993 to 2006. In making this estimate, the number of vessels in operation per year was derived by assuming that the increase in the number of vessels follows a linear trend. On the average, the total catch of all species by a ringnetter per fishing day ranged from 0.5 MT to 2.76 MT between 1997 and 2006. The percentage occurrence of large tuna species in the catch was only about 10%, while the proportion of all tuna of the total catch is only about 55%, which is divided into skipjack tuna (33%) and yellowfin tuna (22%). Catch of bigeye tuna by ringnet is practically nil. This is probably due to the proximity of their areas of operation near coastal areas where salinity

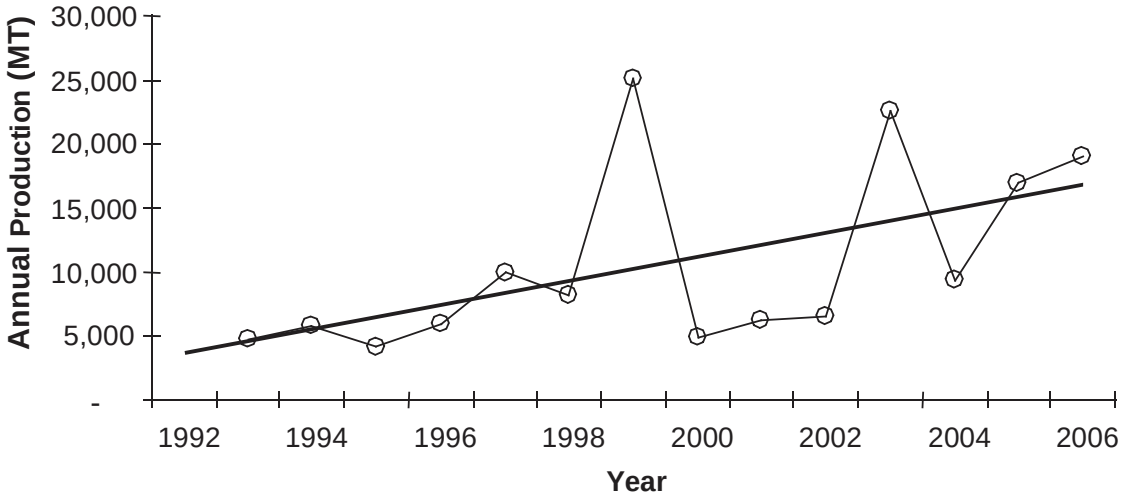


Figure 1. Estimated production of skipjack and yellowfin tuna of the Philippine ringnet fleet (1992-2006). The proportion of bigeye tuna is practically nil.

is generally lower compared to open oceanic waters. Ringnet catch shows a gradually increasing trend. The highest production of slight over 25,000 MT was attained in 1999 after an extended El Niño event in 1997/1998. The increasing catch trend apparently reflects the progressive increase in the number of vessels in operation.

***Purse seine***

The total number of purse seiners operating in 1994 was 569 (NCSO, 1994), with the majority operating out of General Santos City (431) to capture the major tuna species. This number essentially remained the same (567) (*unpublished data*) in 2006 but the number of vessels for tuna fishing declined to 309. The other 258 vessels operate in internal waters and mainly target small pelagic species. The fleet structure did not vary much between these two periods (Fig. 2). Majority of the vessels had displacements less than 250 GT, with the smaller sized vessels usually made of wood.

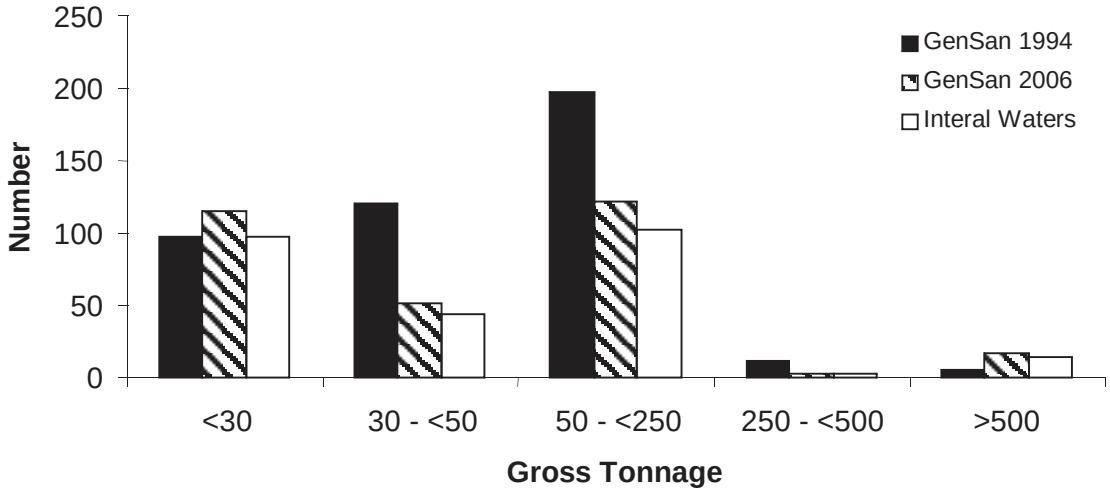


Figure 2. Structure of the Philippine purse seine fleet operating in WCPO area (solid and hatched) and internal waters (open).

The average annual catch rates of purse seine catchers by vessel size are different (ANOVA, $p<0.05$). Mean catch rates generally increase with vessel size (Fig. 3). Mean catch rates of vessels less than 30 GT, which were calculated based from the catch per unit of effort (CPUE) and the total number of fishing days with set due to the absence of actual data, generally landed from 500 to 700 MT annually. Meanwhile, vessels with displacements between 30 and 50 GT landed on the average 1114 MT annually. These groups include "baby purse seines" that are rigged just like ringnets. Larger vessels landed over 1200 MT annually.

In estimating the total annual production from the Philippine purse seine fleet using Equation (2), it is assumed that the number of vessels operating out of General Santos City declined linearly and that the number of vessels operating within internal waters did not change from 1994 to 2006. The result shown in Figure 4 consolidates the

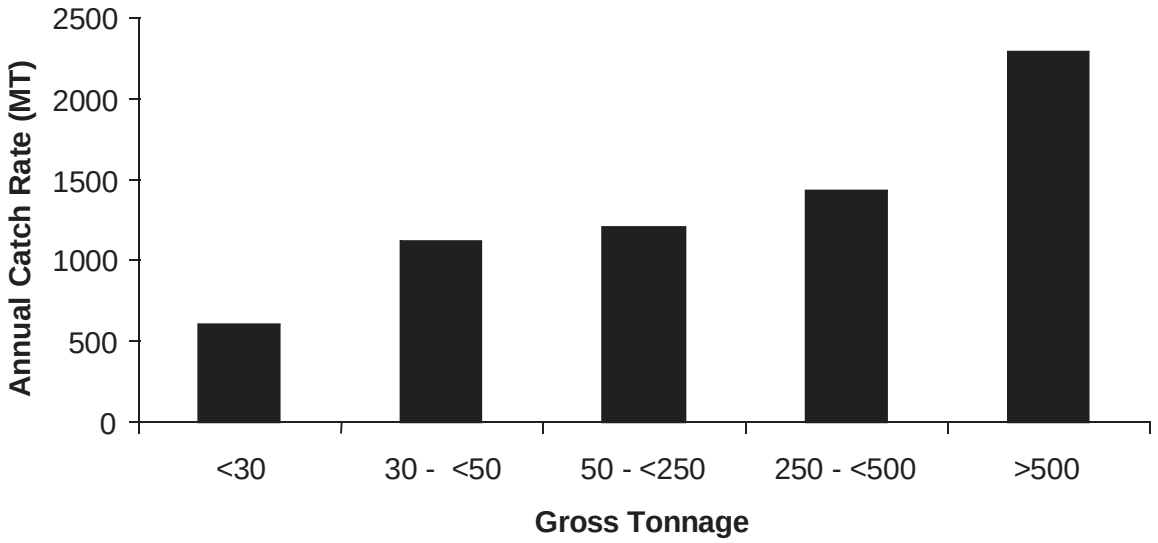


Figure 3. Annual catch rate of large tuna (skipjack, yellowfin and bigeye) by Philippine purse seine vessels (1990 - 2006).

contribution of purse seine catchers operating in the WCPO region and internal waters. Production from the latter are was very minimal, ranging from about 19,000 MT to 28,600 MT, due to the low occurrence rate (10%) and almost the same proportion of the tuna species (55%) when they form part of the catch. Moreover, the result reveals fluctuations, reflecting periods of good and bad fishing years. Higher catch was realized in 1999/2000, 2002 and 2004 while low catch was realized in 1997/1998, 2003 and 2005. These fluctuations seem to follow El Niño/La Niña events. This result also indicates that traditionally the level of fishing by the Philippine purse seine fleet was already at a high level before 1991. This finding is important because it would provide new inputs that may be useful to assess the impacts of purse seine fishing on tuna stocks in the WCPO region. Finally, Figure 4 shows a declining trend, apparently due to the decline in the number of purse seines targeting tuna. It suggests that the production of tuna peaked sometime in the late 1980s.

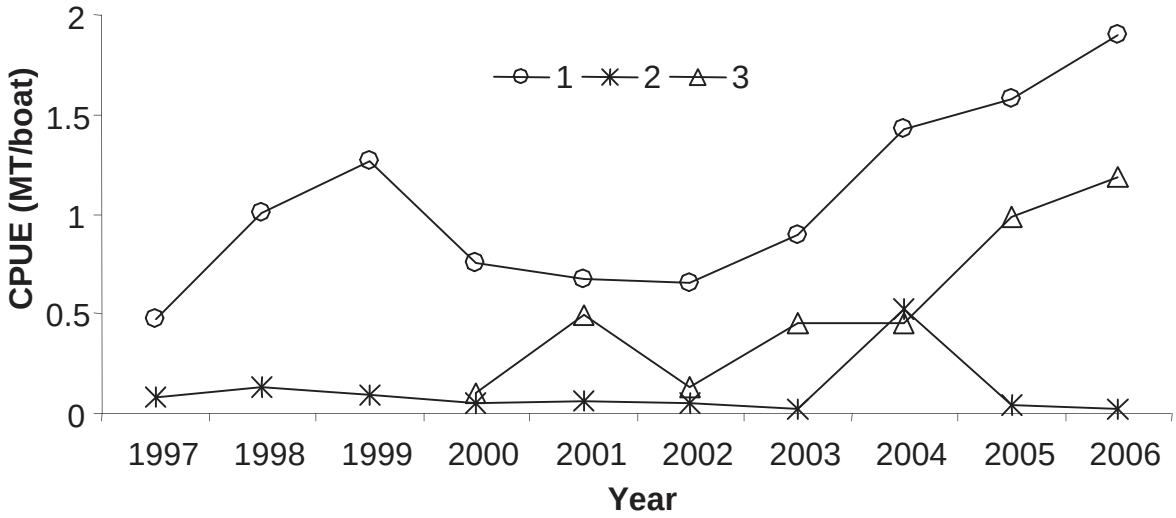


Figure 5. CPUE of handline fishing vessels operating in Celebes Sea (1), Sulu Sea (2) and coastal waters of Davao and China Sea off Zambales (3).

***Handlines***

The most critical data gap in estimating tuna production by handline fishermen is the unreliability of data on the number of operating fishing boats. Because of this uncertainty, it may be difficult to get a good estimate of their contribution to the country's total tuna production. Most of the tuna handliners in the Philippines are based in General Santos City and target yellowfin and bigeye tuna in Moro Gulf, Celebes Sea and Indonesian Waters. Industry estimates suggest that the number of boats landing their catch in General Santos City is currently about 2000 units. Members of the industry believe this number was about 500 in the 1970s, reached its maximum at about 5000

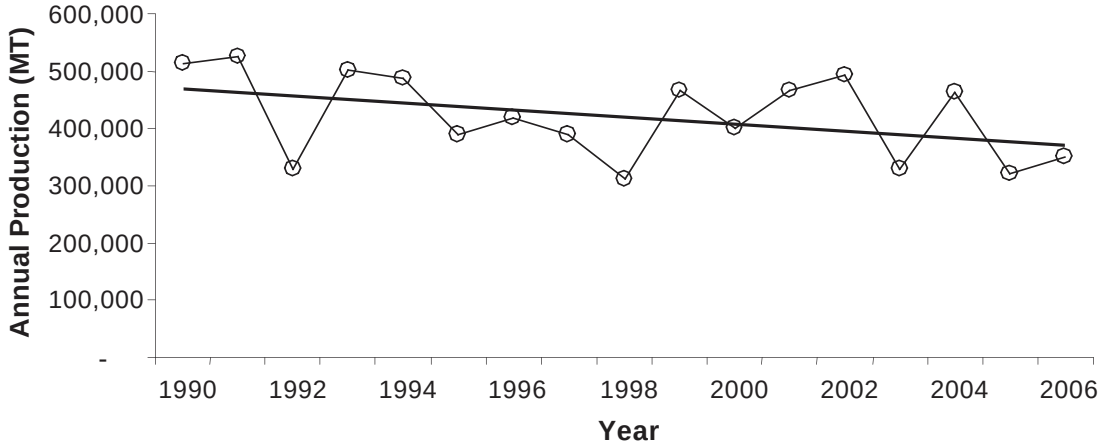


Figure 4. Annual production of skipjack, yellowfin and bigeye tuna by the Philippine purse seine fleet (1990 - 2006)

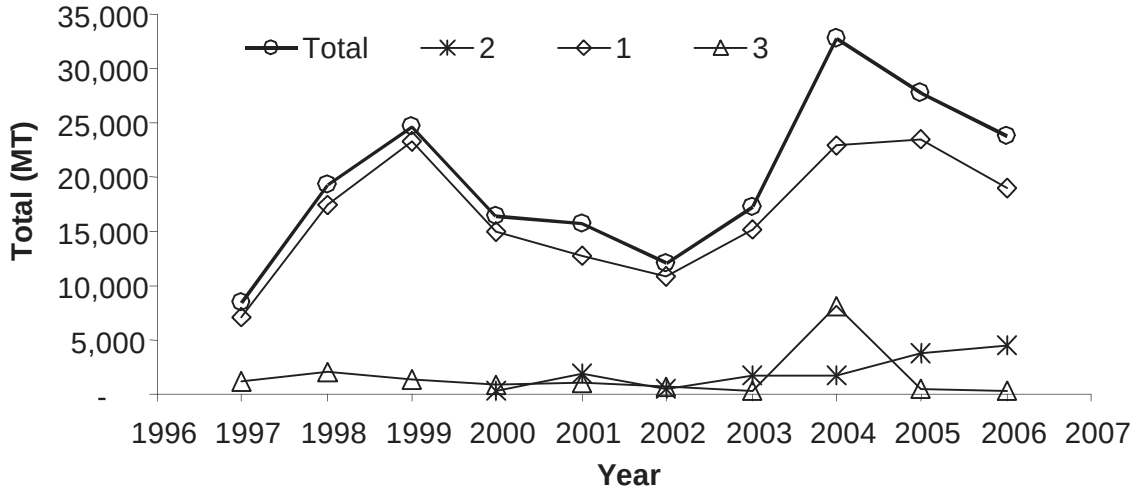


Figure 6. Tuna production of handline fishing vessels operating in Celebes Sea (1), Sulu Sea (2) and coastal waters off Davao and South China Sea off Zambales Coast (3).

between 1991 and 1995, which marked the massive influx of new entrants into the fishery, before declining to this level. These estimates apparently included unregistered vessels because published estimates put the number of boats in the early 1970s through the 1980s at about 100 (BFAR, 1976-1986). In this study, compiled data by the industry on the number of vessels, which stands at slightly over 1,200 in 2006, was used.

A smaller number of vessels using the fishing technique of General Santos-based handliners operate in other parts of the country, also targeting tuna species in coastal waters. About 172 vessels are based in Regions 3, 4 and 11, and another 42 units have their base operations in Region 6. Handline fishermen from Regions 3 derive their catch from China Sea while those in Region 4 and 6 conduct their operations in Sulu Sea.

It is not possible to estimate tuna production by handline fishing vessels using Equation (2) because data is available only for one year (2005) involving 48 vessels. Instead, CPUE from this data set was determined and combined with the landed catch data of BFAR. Figure 4 presents the catch rates of handliners operating in different fishing grounds in the Philippines and neighboring waters. The average CPUE of the vessels operating Celebes Sea, Sulu Sea and coastal waters off Zambales and Davao Gulf are significantly different ($p<0.001$).

The number of fishing days per trip varies with the distance of the fishing ground. In the 1970s, handline fishing vessels could make up to 70 short trips annually due to the proximity of the fishing ground. However, apparently with declining catch rates from traditional fishing grounds, handline vessels were forced to move much farther. Currently, large handline vessels can now only make about 8 trips per year. The duration of each trip is about 30 days. For smaller handliners operating within archipelagic waters, the duration of each trip is usually smaller (typically 5 days), reflecting the closer distance of the fishing grounds, and the target species is not always tuna.

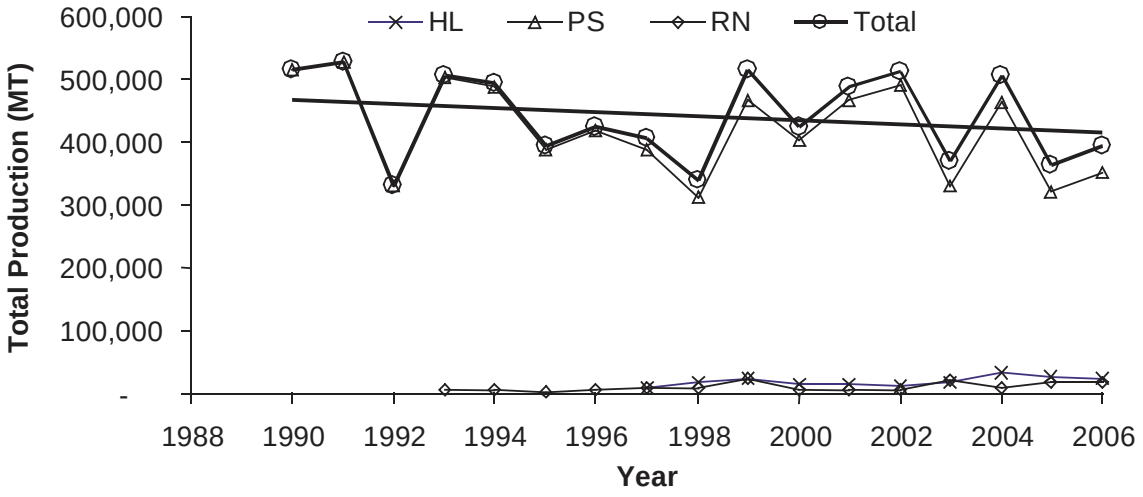


Figure 7. Total production of skipjack, yellowfin and bigeye tuna by the Philippine tuna fishing fleet from 1990 to 2006. Linear fit shows stable but slightly declining trend. (PS = purse seine; RN = Ringnet; HL = Handline).

Figure 6 presents the tuna production of handline fishermen from 1997 to 2006. The plot of cumulative tuna production reflects the dominance of the handline fleet operating out of General Santos. Overall handline production shows an increasing trend but total catch declined after 2004, when total production was about 32,759 MT. The estimated total production in 2006 is 23,819 MT, which is slight lower than the estimate of BAS (29,000 MT). The proportion of bigeye tuna in the handline catch was previously estimated at about 6% (Babaran 2006).

***Overall tuna production***

Figure 7 shows the consolidated production of skipjack, yellowfin and bigeye tuna by the Philippine commercial and municipal fishing fleets. The contribution of the purse seine fleet is more dominant than both ringnet and handliner fleets. For 2006, the estimated total production was 393,526 MT; this is consistent with the estimate by BAS totaling 630,000 MT that includes neritic tuna species. The total production is relatively stable from the 1990s up to the present with overall production apparently showing a slightly declining trend despite the increasing contributions of the ringnet and handline fishery sectors. Relative to official production figures used by the WCPFC, tuna produced by the Philippine tuna fleet is higher (Figure 8). The difference between these estimates would be lower if the catch landed in other countries were excluded.

**Conclusions**

This study presents overall estimates of tuna production by the Philippine tuna commercial and municipal fisheries sectors. The results show a relatively stable production trend from the 1990s to the present, indicating the long tradition of tuna fishing in the Philippines. Variability in the tuna production is attributed to changing

weather patterns associated with El Niño/La Niña events. The declining production trend reflects the reduction in the number of purse seine catchers.

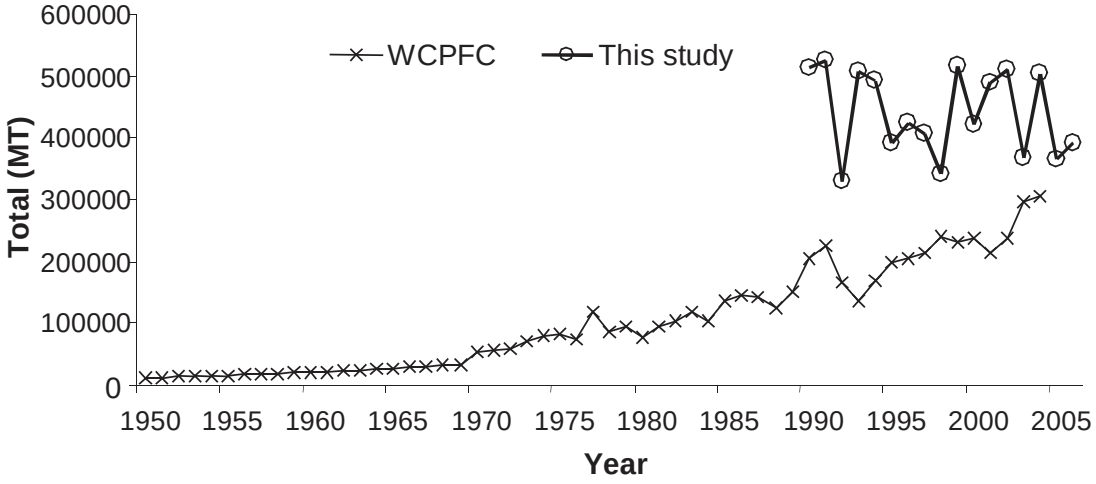


Figure 8. Philippine tuna (skipjack, yellowfin and bigeye) production from the WCPO region.

**Acknowledgment**

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**References**

Babaran, R. 2006. Impacts of payao fishing on tuna stocks in the WCPO Region. SC2. WCPFC, Manila.

BFAR. 1976-1987. Philippine Fisheries Statistics. Bureau of Fisheries and Aquatic Resources. Manila.

NCSO. 1994. Census of Agriculture and Fisheries. National Census and Statistics Office. Manila.