REPORT OF

REGIONAL TECHNICAL CONSULTATION ON FISHERY STATISTICS AND INFORMATION IN SOUTHEAST ASIA

Bangkok, Thailand
15 - 18 August 2017

THE SECRETARIAT

SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER

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CONTENT

ANNEXES

Annex **Page**

REGIONAL TECHNICAL CONSULTATION ON FISHERY STATISTICS AND INFORMATION IN SOUTHEAST ASIA

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The SEAFDEC staff and representatives from ASEAN Member Countries, together with the Secretary-General at the Regional Technical Consultation on Fisheries Statistics and Information in Southeast Asia

REPORT OF THE REGIONAL TECHNICAL CONSULTATION ON FISHERY STATISTICS AND INFORMATION IN SOUTHEAST ASIA
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INTRODUCTION

1. The "Regional Technical Consultation on Fishery Statistics and Information in Southeast Asia" was organized in Bangkok, Thailand from 15 to 18 August 2017. The Consultation was attended by members of the ASEAN Network on Fishery Statistics and/or their representatives representing the ASEAN Member States (AMSs), namely: Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, and Thailand. The Consultation was also attended by a representative from the Food and Agriculture Organization of the United Nations (FAO), the SEAFDEC Secretary-General, and Senior Officials of the SEAFDEC Secretariat, staff of the SEAFDEC Secretariat and Departments working on fisheries data/information collection and utilization, and members of the Regional Fisheries Policy Network (RFPN). The List of Participants appears as **Annex 1**.

I. OPENING OF THE CONSULTATION

2. The SEAFDEC Secretary-General *Dr. Kom Silapajarn* welcomed the participants to the Meeting. He reiterated the importance of fishery statistics as basis for management of the fisheries, and expressed the appreciation to countries in the Southeast Asian region for submitting their respective national fisheries statistics data to SEAFDEC Secretariat throughout the past years for regional and global compilation. Considering that there could be several issues and challenges faced by countries in the collection and submission of such statistics data, it is timely that these issues be thoroughly reviewed and addressed. Furthermore, as SEAFDEC has undertaken several initiatives to improve the collection of data and information on several aquatic species that are economically important for the region, this is also the most opportune time to discuss these initiatives particularly their long-term contribution to the improved compilation of statistics in the future. In addition, there are additional/emerging standards and requirements for statistics that could be used as basis for fisheries development and management, thus these also need to be discussed and taken into consideration in improving the regional framework that had been used for the compilation of regional fishery statistics. After encouraging the participants to provide inputs during the discussion during this very important Consultation to pave the way towards the improved management of fishery resources in the region for sustainability, he then declared the Consultation opened. His Remarks appears in **Annex 2**.

II. BACKGROUND AND OBJECTIVES OF THE CONSULTATION

3. The Consultation took note of the works undertaken by SEAFDEC in relation to the compilation of regional fishery statistics since 1978, as well as the objectives of the Consultation, which are to: 1) update on the progress made and difficulties faced by the ASEAN Member States in reporting fisheries statistics based on the Framework of Fishery Statistics of Southeast Asia; 2) raise awareness on the emerging requirements for fishery statistics data to support sustainable development and management of fisheries in Southeast Asia; 3) discuss the ways and means of improving the reporting of fishery statistics from the ASEAN Member States; and 4) discuss the ways and means of improving the SEAFDEC Database of fishery statistics as this serves as a tool for enhancing the utilization of fishery statistics. The Prospectus including Agenda of the Consultation appears in **Annex 3**.

III. REVIEW ON REPORTING OF STATISTICS BASED ON THE FRAMEWORK OF FISHERY STATISTICS OF SOUTHEAST ASIA

3.1 Introduction to the Framework for Fishery Statistics of Southeast Asia

4. The Consultation took note of the presentation made by the Senior Information Officer of SEAFDEC Secretariat *Ms. Saivason Klinsukhon*, on the "Regional Framework for Fishery Statistics of Southeast Asia and Streamline Reporting" which appears as **Annex 4**. Specifically, the Consultation was informed that the Regional Fishery Statistics Framework, which was developed by SEAFDEC in close coordination with the Southeast Asian countries and endorsed by the SEAFDEC Council, has been used

for the compilation of regional fishery statistics from 2008 until the present. In addition, the Streamlined Reporting System using questionnaires that have been harmonized and shared by SEAFDEC and FAO, has also been used for the compilation of the statistics of 2008 and onwards to reduce the burden of Southeast Asian countries in submitting similar data to two organizations, and minimize certain overlapping of data compiled by these two organizations. The Consultation was also informed that the inputs from the countries have been compiled by SEAFDEC into the current structure of the "Fishery Statistical Bulletin of Southeast Asia".

3.2 Country Presentations

5. The The Consultation took note of the presentations made by the representatives from the ASEAN Member States (AMSs), namely: *Mr. Hem Rady* from Cambodia, *Ms. Rennisca Ray Damanti* from Indonesia, *Mr. Bounthanom Chamsinhg* from Lao PDR, *Mr. Syed Yusuf bin Wan* from Malaysia, *Ms. May Thanda Wint* from Myanmar, *Ms. Elymi-ar-j S. Tunacao* from Philippines, and *Ms. Praewpan Kongprakhon* from Thailand, which appear as **Annexes 5 to 11**. Although the representative from Viet Nam could not make it to the Consultation, the country report of Viet Nam was sent to the Consultation as shown in **Annex 12**.

6. After taking note of the country presentations, the Consultation discussed the common problems encountered by the countries in collecting fisheries statistics and identified the requirements for improvement of the collection, and in reporting the statistics for regional compilation. The problems and concerns, and the requirements for improvement are summarized in the following table.

Common problems	Requirements for improvement
Statistics collection at national level	
o Lack of manpower, budget and other resources required for data collection o Difficulties in data collection for small-scale fisheries especially for inland fisheries and aquaculture	o Methodology and capacity building for countries on data collection that is suitable for small-scale fisheries, especially for countries that have limited human resources and budget. o Sharing of appropriate technologies and techniques related to data collection and analysis among AMSs
o Lack of data on fish price, ornamental fish, aquaculture seed.	o Development of simple form for data collection
o Lack of or outdated data and information on fishers (based on census)	
o Production statistics are collected as total production without detailed data on production at species (or species group) level	o Policy support and allocation of resources for collection of production data by species that are recognized to be important for the regional analysis (*e.g.* tunas, sharks and rays, eels) o Capacity building on species identification for important species
o Non-reporting of production by species by fishing gears	o Should exert effort to improve data collection as data is necessary for management purposes
Reporting for regional compilation	
o Sometimes production by species (or species group) level are available at national level, but not reported to SEAFDEC and FAO	o Countries that have data by species (or species group) available at national level, should try to provide such details when reporting statistics to SEAFDEC and FAO.
o Delay in statistics reporting due to lengthy period for data processing	o Development of database system or electronic program at national level for data input, analysis and reporting
o Institutional/organizational set-up and responsibility, *e.g.* agency responsible for fisheries has data that is not official, or has no authority to give data (*e.g.* Lao PDR, Philippines)	o Countries to take this into consideration in nominating their respective focal points who will be responsible for providing fisheries statistics

	o When reporting statistics data, if there are major changes in fisheries policies, methodologies for data collection in the country, or other situations that may impact its statistics on production, information on such changes or situations should also be provided to facilitate understanding by statistics users.

IV. REGIONAL INITIATIVES IN RELATION TO ENHANCE COLLECTION AND USAGE OF FISHERY STATISTICS DATA AND INFORMATION

4.1 Neritic Tunas

7. The Sustainable Utilization of Neritic Tunas in Southeast Asia based on Fisheries Statistics (**Annex 13**) was presented by *Dr. Somboon Siriraksophon* of the SEAFDEC Secretariat. During the discussion, the Consultation provided the following recommendations:

- In order to enhance the timeliness of the statistics, while the Bulletin is yet to be published, statistics data on neritic tunas that are already available in some countries could be inputted into the SEAFDEC Database of Fishery Statistics of Southeast Asia being developed by the SEAFDEC Training Department (TD), so that such data could be accessible by the users.
- Considering that data on neritic tuna production "by species and by specific fishing areas" are necessary for fisheries management, countries that have such data available at the level of the SEAFDEC sub-areas, should provide such data for inclusion in the Bulletin in the future.
- Indonesia confirmed that data on production by species for specific SEAFDEC sub-areas are available, and Indonesia would internally consult on the possibility of providing the data for the Fishery Statistical Bulletin of Southeast Asia (starting from the statistics of 2016 onwards). For the data on neritic tuna production by species by sub-areas, *i.e.* for the year 2015 and earlier, if countries could provide these to SEAFDEC, such data could also be used to update the SEAFDEC Database of Fishery Statistics of Southeast Asia.

4.2 Pelagic Species

8. The Pelagic Species in Southeast Asia (**Annex 14**) was presented by *Mr. Mohammad Faisal Md. Saleh* of the SEAFDEC Marine Fishery Resources Development and Management Department (MFRDMD). During the discussion, the Consultation provided the following recommendations

- The current Framework for Fishery Statistics of Southeast Asia used by the countries as guide in submitting the production of pelagic species "by species and by fishing areas" and "by type of fishing gear and by species" is sufficient enough to accommodate the data required for fisheries management.
- Although currently, analysis on the status of pelagic species is undertaken based on major fishing areas, *e.g.* the South China Sea and the Andaman Sea; but if data on pelagic species by specific SEAFDEC sub-areas are available, these data should also be reported as these are useful for the management of the species.

4.3 Sharks and Rays

9. The Regional Initiatives in Relation to Enhancing Collection and Usage of Fishery Statistics Data and Information: Sharks and Rays (**Annex 15**) was presented by *Dr. Worawit Wanchana* of the SEAFDEC Secretariat. During the discussion, the Consultation provided the following recommendations

- Countries are encouraged to collect statistics on sharks and rays in more detailed level as much as possible considering that the data could provide the picture of the status and trend of the species that could be under international concern. Referring to the presentation, SEAFDEC encouraged the AMSs to record, report and submit data on sharks/rays landings up to species group. FAO

would provide the updated list of species of sharks based on the ASFIS List to be used as basis for reporting by the countries.

- Considering that SEAFDEC has undertaken several projects that aim to collect data on sharks landing, and provided capacity building on identification of shark species particularly for countries that have significant shark production, in the future planning of such projects, the way by which the project could help enhance statistics collection to ensure long-term availability of data on sharks after the project ends, should take into consideration.
- While catch of rays is banned in some countries, *e.g.* Philippines, and there is also prohibition of some gears that target sharks and rays (*e.g.* gillnet with large mesh size) in other countries, such banning could result in zero reporting of the catch and making it difficult to obtain data to support understanding of the status of the species. Countries should therefore put some notations in the reports that the catching of certain species is banned, as the case may be.

4.4 Catadromous Eels

10. The Regional Initiatives in Relation to Enhance Collection and Usage of Fishery Statistics Data and Information: Angullid Eels (**Annex 16**) was presented by *Ms. Ni Komang Suryati* of the SEAFDEC Inland Fishery Resources Development and Management Department (IFRDMD). During the discussion, the Consultation provided the following recommendations

- While some catadromous eels have already been listed under the CITES Appendices, *e.g. Anguilla anguilla* under the Appendix II, collection of statistics for tropical eel species has become necessary as basis for discussion to prevent possible listing of this species in the CITES Appendices in the future. In addition, data collection on catch of glass eels is also necessary to support the establishment of management plan for the species.
- Statistics on production of catadromous eels in Southeast Asia should be segregated not only by species but also by stages (*e.g.* adult eels and glass eels) considering that this is important for management, and the price for each stage of eels could be very different. Furthermore, countries should distinguish the anguillid eels from paddy eels when reporting the production statistics on eels.

4.5 Inland Capture Fisheries

11. The Regional Initiatives in Relation to Enhance Collection and Usage of Fishery Statistics Data and Information: Inland Capture Fishery (**Annex 17**) was presented by *Dr. Dina Muthmainnah* of the SEAFDEC/IFRDMD. During the discussion, the Consultation provided the following recommendations

- Considering that seasonality is an important characteristic of inland capture fisheries, this should be taken into consideration when collecting and analyzing the statistics at national level.
- Statistics on inland capture fisheries production by species by fishing gears is very useful for management even if the current framework still does not accommodate the compilation of inland capture fisheries production by species by fishing gear, and thus should be collected.

4.6 Other Species Under International Concern

12. The Fishery Statistics for Endangered Species (**Annex 18**) was presented by *Dr. Somboon Siriraksophon* of the SEAFDEC Secretariat. During the discussion, the Consultation provided the following recommendations:

- Countries to record statistics on production by species of aquatic species under international concern (*e.g.* sharks and rays, eels, etc.) including their production as by-catch as detailed classification as possible, so that the data could be reported at regional level to facilitate understanding on the global status of the species for discussion at relevant international fora.
- Catch Documentation Scheme could also be applied to enhance data collection and species identification of the species.

- For significant increase or decrease in the production of particular species that could be due to various factors, *e.g.* changes in conservation/management policies, prohibition of catching and landing, etc., such situations should also be clearly indicated so that any decreasing trend in the production would not be interpreted as decline of the stock.

4.7 Data Collection through Community-Based Fisheries Management

- The Concept and Effective Methodology on Data Collection (**Annex 19**) was presented by *Ms. Thanyalak Sausi* of SEAFDEC/TD. During the discussion, the Consultation provided the following recommendations: Considering that several countries in the region are having difficulties in collecting statistics on small-scale and inland capture fisheries due to shortage of staff and budget, the approach adopted through Community-Based Fisheries Management, which is bottom-up and requires less staff and budget, could be considered to enhance data collection. However, the data collected using such approach should be verified.

V. NEW GLOBAL FRAMEWORKS RELATED TO FISHERY STATISTICS

13. The Consultation took note of the presentation made by *Ms. Stefania Vannuccini* of the Food and Agriculture Organization of the United Nations (FAO) on Fishery and Aquaculture: Overview of the Sector and New Global Frameworks for Statistics (**Annex 20**).

14. Considering that the Southeast Asian region shares significant portion of fisheries production in the global arena, fishery statistics from countries in the region are important and should be accurate, timely, detailed and comparable. The Consultation was informed that FAO has been serving as Secretariat to the Coordinating Working Party on Fishery Statistics (CWP) to enhance the standards and harmonization of fishery statistics. The current version of the CWP Handbook could therefore be accessed through the FAO website, although the CWP is now developing the revised version of the Handbook.

15. The Consultation also noted that the proposed revision of the International Standard Statistical Classification of Aquatic Animals and Plants (ISSCAAP) is still under the process of discussion and would be presented to the 26th Session of CWP in 2019. In order that the specificity and important species group in the region could be accommodated in the revised ISSCAAP, countries should provide comments on the proposed new ISSCAAP Structure to SEAFDEC by the end of December 2017 so that their comments could be conveyed for consideration by the CWP.

16. In relation to the modification of the ISSCAAP, the Consultation asked the CWP through FAO to consider accommodating the classification of anguillid eels which should include the different stages of their life cycle, *e.g.* glass eels and adult eels.

17. With regard to the International Standard Classification of Fishing Gears (ISSCFG), the Consultation was informed that the revised ISSCFG has already been adopted by the CWP at its 25th Session in 2016. Reporting of statistics on production by fishing gears should therefore be done following the component of gears as indicated in the ISSCFG in order that the statistics could be comparable at the global level. However, if countries have more detailed information on gears that are not in the ISSCFG, such details could also be added at the national level under the specific gear in the ISSCFG.

18. On the CWP Handbook on Aquaculture, the Consultation was informed that this is still being finalized for adoption, and a new set of aquaculture questionnaires was developed by FAO to gather minimum data set necessary for management. As the questionnaires would be discussed in 2018 for finalization at the 26th Session of CWP in 2019, the countries were requested to provide comments on the proposed questionnaire to SEAFDEC by the end of December 2017 so that such comments could be conveyed for consideration by the CWP.

VI. DISCUSSION

6.1 Improving Reporting of Fishery Statistics of Southeast Asia

19. The Consultation shared the following information in response to issues faced by SEAFDEC in compilation of fishery statistics from countries (**Annex 21**) as presented by *Ms. Saivason Klinsukhon* of SEAFDEC Secretariat:

- Thailand usually submits statistics on production of inland capture fisheries by waterbodies (based on Q5) to SEAFDEC. However, the submission is done after the Bulletin is already published therefore the data does not appear in the Bulletin but would only be inputted in the Database to make it accessible to users.
- Statistics on production of ornamental fish and seed production are not available for Thailand.
- Indonesia agreed to conduct internal consultation on the possibility of providing statistics on production of marine capture fisheries for neritic tunas and pelagic fish species by SEAFDEC sub-areas for compilation in the Bulletin or for uploading in the Database, starting with the statistics of 2016 onward.
- For statistics on production of *Gracilaria* seaweed from aquaculture, it was confirmed that aquaculture of *Gracilaria* seaweed of Indonesia is undertaken in ponds and should be reported under "brackishwater culture," while in the Philippines, aquaculture of *Gracilaria* seaweed is mostly undertaken in longline in the sea and should be reported under "mariculture."
- On aquaculture of penaeid shrimps which was reported by Myanmar under "mariculture," but since this species is cultured in ponds, this should be reported as "brackishwater culture." In this regard, the representative from Myanmar would consult with the appropriate person in DOF and confirm such concern to SEAFDEC later.
- Cambodia agreed to submit the data that are available but are missing in the Bulletin, for the statistics of 2016 onward, for inclusion in the Bulletin. If data that are earlier than 2016 would also be provided, such information could be used to update the country's data in the Database.
- Regarding the statistics on fishers, Cambodia will submit the data; Lao PDR will check if data is available; and since Philippines has an on-going fisherfolk registration by BFAR, the data could be made available in the future. For Thailand, the question on fishers could be incorporated in the national census in the future.
- Philippines is planning to collect data on marine fishery production by fishing gears starting 2018, and may be able to provide this data in the future, subject to results of internal consultation. However, Philippines does not have data on ornamental fish.
- On fishing boats of Thailand, the data of which were not provided by the National Focal Point but was obtained from the Thai Fishing Vessels Statistics, since the DOF of Thailand is now establishing the database of its commercial fishing boats, the statistics on fishing boats by type and tonnage could be reported in the future.

20. In order to facilitate the improvement of reporting fisheries statistics of Southeast Asia, the Consultation suggested that the list of National Focal Points on Fishery Statistics should be updated. In this connection, SEAFDEC was requested to send letters to the SEAFDEC Council Directors for Cambodia, Indonesia, Lao PDR, Myanmar, Philippines (cc. to participants attending this Meeting), requesting for nomination of the new focal points of their respective countries. The updated list of focal points should be shared with FAO in order that communications from SEAFDEC and FAO in relation to fishery statistics could be made to the same focal points.

21. The Consultation noted that there was also a need for the e-group that had been established for communication among the focal points (aseanstat@seafdec.org) to be updated to comprise the new focal points. This email system could be used to facilitate communication among the network members.

6.2 Improving Fishery Statistics Bulletin Framework

22. In order to address the problems in reporting the statistics based on the current Regional Framework for Fishery Statistics of Southeast Asia, to accommodate the new FAO global framework for fishery statistics including the updated international statistics and classifications as well as to consider the additional statistics data that are useful for the region, the Consultation discussed the areas for future improvement of the Regional Framework for Fishery Statistics of Southeast Asia (**Annex 22**) as presented by *Ms. Saivason Klinsukhon* of the SEAFDEC Secretariat.

23. On the proposed new CWP Standard questionnaire on **Aquaculture Production (A1)**, the Consultation was informed that in the FAO version of the questionnaire, the "Environmental Code" would be maintained in order that aquaculture could be classified into freshwater culture, brackishwater culture and mariculture.

24. The Consultation was also informed that the column on "final use" specified in **A1** aims to assess the use of aquaculture production, *e.g.* for human consumption and non-food use. Although the questionnaire is not yet final, it is likely that a list would be provided to indicate how the production is used. The countries then provided comments on the questionnaire as follows:

- Choosing the "final use" should be optional, or country may specify only the "final use" that is applicable for majority of the production of the species.
- Many countries still do not have this type of data, *e.g.* Thailand, Myanmar, Cambodia. Although Philippines can indicate the final use, it cannot provide the corresponding quantity for each final use.

25. With regards to the proposed new CWP Standard questionnaire on **Input of Seeds (A2)**, the Consultation viewed that A2 is different from the existing Q10 on Seed Production, and provided comments on the questionnaire as follows:

- Input of seeds from "wild" should be segregated into "domestic-wild" and "foreign-wild," which is particularly important for anguillid eels.
- Indonesia currently cannot provide data on input of seeds specifying the source, but will consult with the DG on Aquaculture whether it is possible to include this in the country's statistics questionnaire.

26. On the existing Q10 on Seed Production, the Consultation commented that:

- The column on Hatchery/Nursery Production should be separated into: (1) "seed production" for data on species and total number in pieces; and (2) "usage of seed" for data on seed used either for wild stock enhancement or aquaculture practices.
- In addition, to be consistent with A2 that also include a column for seed from foreign hatchery, the existing Q10, "usage of seed" should also include additional column for seed intended for "export."

27. Observation was made on the proposed new CWP Standard questionnaire on **Artificial Seed Production (A3)** which could be more relevant to Q10, and once A3 is finalized, FAO and SEAFDEC should consider whether these two questionnaires could be harmonized.

28. Countries were also requested to send more comments on the proposed new CWP Standard questionnaires A1, A2, and A3 to SEAFDEC by the end of December 2017 to be conveyed to FAO.

29. With regards to the **proposed new ISSCAAP**, the Consultation provided the following comments:

- **Division 2:** the group names "Herbivorous & omnivorous euryhaline fishes" and "Carnivorous euryhaline fishes" may not be easily recognizable by the users.
- Milkfish is one of the important species with significant production in many countries, and should be distinguished from other groups.
- "River eels" should be changed to "Anguillid eels."
- **Division 4**: additional group of "Euryhaline shrimps" could be considered, *e.g.* comprising *P. monodon*, *P. vannamei*
- **Division 9**: "marine macro green algae" should be changed to "marine green macroalgae"

30. With regards to the **ISSCFG**, the Consultation was informed that the ISSCFG was already adopted by CWP, and that SEAFDEC is currently compiling the statistics on production from marine capture fisheries by fishing gear, and if any elements in the new ISSCFG are applicable for the region, SEAFDEC will propose such changes in the Regional Framework for Fishery Statistics of Southeast Asia as well as in the corresponding questionnaire (Q4). Although this is still subject for further discussion, the countries made the following comments:

- Philippines' production from "Bag net" which is a kind of "Boat-operated lift net" should be reported under "05: Lift net." This should be elaborated in the explanatory note in the future.
- For the new groups in ISSCFG, namely "04: Dredges" and "06: Falling nets," this could be added by SEAFDEC in the Regional Framework for Fishery Statistics of Southeast Asia (as aggregate group without details). Explanatory note should also make link to the sub-group of gears covered under each group based on the new ISSCFG.

31. Regarding the statistics on **Fish Trade (Import-Export)** and **Fish processing,** the Consultation noted that these data were published in the Fishery Statistical Bulletin for the South China Sea Area until 2007, but not included in the Fishery Statistical Bulletin of Southeast Asia from 2008 onwards. Recognizing the importance of these data, the Consultation supported that in the future, statistics on Fish Trade and Fish Processing should also be included when SEAFDEC revise the Regional Framework for Fishery Statistics of Southeast Asia which is used as guide for the compilation of data in the Bulletin.

32. Considering that data on Fish Trade is not collected by agencies responsible for fisheries but by Customs Offices, and the structure of data collected is usually based on the harmonized system (HS) Classification of World Customs Organization (WCO) adopted by the Customs Offices; the questionnaire on fish trade to be developed by SEAFDEC should follow the structure of HS, but should aggregate data and show only selected commodities that are relevant for the region.

33. The Consultation also identified other areas to be considered in modifying the Regional Framework for Fishery Statistics of Southeast Asia in the future:

- Topic 1.4 Unit of measurement – Unit for production in quantity should be changed from "Metric Tons" to "Tonnes"
- Appendix 1 Classification of marine fishing areas
  - Philippines (currently has only SEAFDEC Sub areas 71j): SEAFDEC Sub-areas should be segregated into 16 Regions as demarcated by the Philippines
  - Indonesia: SEAFDEC Sub-areas 71k of Indonesia should be segregated by sub-areas for marine fishery statistics as demarcated by Indonesia
- Appendix 2 Definition for small-scale and commercial fisheries of the respective AMSs – The definition should be updated if necessary
- Appendix 5: Classification of fishing boats by size of boat – Unit for size of boat should be in "Gross Tonnage." However, remarks could be added for countries that still use other units of measurements.

34. On the need to update the members of the ASEAN Network on Fisheries Statistics, the Consultation was informed that once SEAFDEC has the updated the list of National Focal Points on Fishery Statistics, responsible for providing inputs to the Bulletin, SEAFDEC will consult with the ASEAN Secretariat during the forthcoming Meeting of the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership whether the members of the ASEAN Network on Fisheries Statistics should be the same persons as the focal points.

VII. PRESENTATION AND DISCUSSION FOR IMPROVING SEAFDEC DATABASE OF FISHERY STATISTICS OF SOUTHEAST ASIA

35. The Consultation commended the SEAFDEC Training Department for developing the SEAFDEC Database of Fishery Statistics of Southeast Asia (http://map.seafdec.org/NewBulletin/) which was presented by *Ms. Woraluk Meesomwat*, as this would help in facilitating cooperation and sharing of data among the countries in the region.

36. The Consultation suggested that the Database website may also be linked to the websites on fishery statistics of the Member Countries to facilitate users' access to the statistics of the countries. However, the Consultation was informed that SEAFDEC Secretariat would seek the approval of the SEAFDEC Council prior to making link from the Database to the countries' statistics website. The Consultation also took note of the availability of websites on fishery statistics of the ASEAN Member States, such as the following:

- Cambodia: *maff.gov.kh*
- Indonesia: *www.kkp.go.id*
- Lao PDR: *maf.gov.la* and *dlf.maf.gov.la*
- Malaysia: *dof.gov.my*
- Myanmar: no website
- Philippines: *psa.gov.ph* and *bfar.da.gov.ph*
- Thailand: *fisheries.go.th*

37. Furthermore, in order to enhance the use of the SEAFDEC Database of Fishery Statistics, countries should also consider linking their respective websites to the Database.

VIII. OTHER MATTERS

38. The representative from Malaysia informed the Meeting on the landing of *Rastrelliger kanagurta* and *R. brachysoma* in the South China Sea and the Andaman Sea which had significantly decreased from 2012-2015, and inquired on the situation of other countries on these two species. In this connection, it was explained that *R. brachysoma* in the Gulf of Thailand and Cambodian waters also decreased during the recent years. Nevertheless, this could be due to several reasons, *e.g.* high fishing pressure after the end of close season, increasing sea surface temperature in the Gulf of Thailand, etc. After the deliberation, the Consultation was warned that caution should be made on publishing any information on the reducing trend of the catch/landing of these species without obtaining the scientific explanation on the actual cause as this might be interpreted by conservation agencies as depletion of the stocks.

IX. CONCLUSION, POLICY RECOMMENDATIONS AND FOLLOW-UP ACTIONS

39. The Consultation agreed to adopt the recommendations raised during the discussion, as shown in the previous agenda.

40. The Consultation also recommended that in order to strengthen the collection of fishery statistics by the ASEAN Member States (AMSs), the following policy support would be necessary:

- Policy makers of AMSs should give more priority to collection of fishery statistics including allocation of human and financial resources required for the collection of data and information as necessary.

- Efforts should be exerted by countries in collecting statistics for aquatic species recognized by the SEAFDEC Council as important for the region, in order that these statistics could be reported for compilation at regional and global levels, and used as basis for management as well as for discussion and negotiation on the species at the international level.

41. The Consultation agreed on the follow-up actions to be undertaken by SEAFDEC as follows:

- SEAFDEC to send letters to SEAFDEC Council Directors by end of August 2017, to request for nomination of new members of the National Focal Point on Fishery Statistics, and share the updated list with FAO for communication and coordination.
- SEAFDEC to consult with the ASEAN Secretariat during the forthcoming Meeting of the ASEAN-SEAFDEC FCG/ASSP whether the members of the ASEAN Network on Fisheries Statistics should be the same persons as the Focal Points on Fishery Statistics.
- Countries to conduct internal consultation and submit the necessary statistics to SEAFDEC as agreed at this Consultation.
- Countries to send comments on the proposed revision of ISSCAAP and on the CWP Standard questionnaires on aquaculture to SEAFDEC by the end of December 2017, and SEAFDEC to compile all such comments and send to CWP for consideration.
- After the adoption of the new CWP standards, SEAFDEC to organize a meeting among the members of the ASEAN Network for Fishery Statistics to revise the Regional Framework for Fishery Statistics of Southeast Asia, taking into consideration the recommendations at this Consultation, possibly in 2020.

X. CLOSING OF THE CONSULTATION

42. The SEAFDEC Secretary-General, *Dr. Kom Silapajarn* thanked the participants for their active participation during the discussions at this Consultation. He reiterated the need to update the fishery statistics of the countries in order that the region's fisheries could be managed in a sustainable manner. He also commended the participants for their commitment to submit their country's fishery statistics to SEAFDEC Secretariat in a timely manner, for compilation at the regional level. After wishing the participants safe journey back to their homes, he declared the Consultation closed. His Closing Remarks appears as **Annex 23**.

Annex 1

LIST OF PARTICIPANTS

CAMBODIA

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Chief of International cooperation and Statistics Division/ Fisheries Administration

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Annex 2

WELCOME REMARKS

By Dr. Kom Silapajarn

Secretary-General, Southeast Asian Fisheries Development Center

Members of the ASEAN Network on Fishery Statistics,
Representatives from FAO, *Ms. Stefania Vannuccini*,
Officials and staff of SEAFDEC Secretariat and Departments,
Members of Regional Fisheries Policy Network,
Ladies, and gentlemen,

Good morning.

On behalf of SEAFDEC, I am very pleased to welcome you all to this four-day "Regional Technical Consultation on Fishery Statistics and Information in Southeast Asia."

We all recognize that fishery statistics is a very important tool to provide a basis for the formulation of national fisheries policies as well as national management frameworks and actions, and it also serves as a basis for understanding the status and condition of fishery resources in the Southeast Asian region.

SEAFDEC has been regularly compiling for almost five decades the regional fishery statistics Bulletin which since the early establishment covered countries in the South China Sea Areas. However, in 2008, SEAFDEC in consultation with the Member Countries modified the coverage of the Bulletin to cover the Southeast Asian region, and developed the new fishery statistics frameworks based on the international standards, classification and definition. This new statistics framework since then has been serving as skeleton for the Southeast Asian region to provide the respective national statistics for compilation by SEAFDEC, and also by FAO through set of questionnaires that has been harmonized among SEAFDEC and FAO.

I am very grateful that throughout the past years, all ASEAN Member States has exerted efforts and submitted statistics data to us based on the Fishery Statistics Frameworks. From the regional statistics compiled in the SEAFDEC Bulletin, I recognize that there could be several issues and challenges faced by countries in collection and submission of statistics; I therefore think that we should come to sit together again, and revisit these issues faced by Member Countries, as well as the Framework itself whether it could accommodate all requirements for fisheries development and management of the region.

Also, throughout the past several years, SEAFDEC also have been implementing programs and projects that aims to improve gathering of data and information that may contribute to improving statistics data collection by the Member Countries, it is therefore also an opportune time for all relevant departments to share information on these initiatives to statistics focal points of countries, and exchange views on how these initiatives could link with national statistics mechanism, which would assure the long-term availability of data to support understanding on the status of fishery resources and serve as a basis for sustainable fisheries management.

We also have a representative from FAO to serve as a resource person to this RTC and introduce the recent development of global standards in relation to fishery statistics. There are some new standards that has already been adopted at the global level, while some are still under on-going development process. It is therefore timely for countries to take note, and also share view from the countries' perspective on these global developments.

Before we proceed to further agenda, I would like to thank all delegates from the countries, representatives from Departments and FAO for your attendant, and with your insights and inputs, I truly believe that this Consultation would come up with improved fishery statistics, and eventually contribute to the sustainability of fishery resources in our region. I wish all the best, and look forward to a fruitful discussion.

Thank you very much and have a pleasant day.

Annex 3

PROSPECTUS

I. BACKGROUND AND RATIONALE

In Southeast Asia, the importance of fishery statistics has been widely accepted as a tool to provide a basis and being crucial to the formulation of national fisheries policies, as well as national management frameworks and actions or even as a basis for understanding the status and condition of fisheries resources in the region. The "Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020", adopted in 2011 as the regional fishery policy framework and priority actions to ensure sustainable development of fisheries in the region, reiterated the need to "*Strengthen knowledge/science-based development and management of fisheries through enhancing the national capacity in the collection and sharing of fisheries data and information.*"

Since 1978, SEAFDEC has been regularly compiling regional fishery statistics into the "Fishery Statistical Bulletin for the South China Sea Area" in order to provide reliable and comparable fishery statistics with standardized definitions and classification. In addition, the changing situation in fisheries practices in the region and the new geo-political set-up of the ASEAN, of which all ASEAN Member States are becoming SEAFDEC members, make it necessary to revise and improve the compilation and production of the Bulletin. The new Framework of Fishery Statistical Bulletin of Southeast Asia has been proposed in 2004, and was endorsed by the SEAFDEC Council at its 40th Meeting in 2008, and the subsequent 16th Meeting of the ASEAN Sectoral Working Group on Fisheries (ASWGFi) also in 2008. With the new Framework for compilation of Fishery Statistics Bulletin that includes new dimensions for reporting the status of fisheries of the ASEAN Countries, the difficulties faced by the ASEAN Member States in reporting fishery statistics to FAO and to SEAFDEC has also been minimized as substantial overlaps in data items collated by both organizations has been reduced. Streamlined reporting system, using harmonized questionnaires shared by SEAFDEC and FAO, has also lessened the reporting burden of the fishery administrations especially with regards to separated dealing with the requirements of the two organizations.

Nevertheless, it could be observed that the current national fishery statistical systems of the ASEAN countries may have not been given much attention by fisheries administrations due to various constraints; and although there might have been attempts by some countries in the region to improve their respective fishery statistics, such as efforts have not been very successful. Under SEAFDEC, several programs and projects have also been undertaken during the past several years with the aims of improving fisheries data collection that could contribute to improving the sustainability of resources, however, such improvement has yet to contribute to improving long-term data collection as statistics.

Consequently, the region has been facing with continued issues and challenges on quality, availability, reliability and timeliness of statistics data compiled at national levels; and this eventually leads to weak statistics compiled at the regional level. In order to address the aforementioned issued and concerns, it is necessary to: monitor issues and constrains faced by countries in reporting statistics based on the Framework of Fishery Statistic of Southeast Asia, and discuss and find the way to improve fishery statistics and information, taking into consideration emerging needs for improved collection and utilization of statistics for sustainable utilization of fishery resources. The Regional Technical Consultation on Fishery Statistics and Information in Southeast Asia is therefore proposed to be organized with a view of attaining such requirements.

II. OBJECTIVES

The Consultation is tasked with the following objectives:

1. To update on the progress made, and difficulties faced by ASEAN Member States in reporting of statistics based on the Framework of Fishery Statistic of Southeast Asia;
2. To raise awareness on emerging requirements for fishery statistics data to support sustainable development and management of fisheries in Southeast Asia;
3. To discuss ways and means of improving reporting of fishery statistics from ASEAN Member States; and
4. To discuss ways and means of improving SEAFDEC database of fishery statistics in order to serve as a tool for enhancing utilization of fishery statistics.

III. EXPECTD OUTCOMES

The Consultation is expected to come up with:

1. Updates on the progress made and difficulties faced by ASEAN Member States in reporting of statistics based on the Framework of Fishery Statistic of Southeast Asia;
2. Awareness on emerging requirements for fishery statistics data to support sustainable development and management of fisheries in Southeast Asia;
3. Recommendations for improving reporting of fishery statistics, including suggestion for amendment of the Framework of Fishery Statistic of Southeast Asia (if necessary); and
4. Recommendations for improving SEAFDEC database of fishery statistics

IV. DATE AND VENUE

The Regional Technical Consultation on Fishery Statistics and Information will be organized on 15-18 August 2017 in Bangkok, Thailand in August 2017 (4 days).

V. EXPECTED PARTICIPANTS

It is envisaged that participants of the Consultation would be:

1. Members of the ASEAN Network on Fishery Statistics (one from each country);
2. Representative from regional/international organizations *e.g.* ASEAN Secretariat, FAO (Headquarters and/or Regional Office for Asia and Pacific), etc.; and
3. Senior officials from Secretariat, and staff of SEAFDEC Secretariat and Departments working on fisheries data/information collection and usage, and RFPN Members.

VI. AGENDA

Agenda 1. Opening of the Meeting

Agenda 2. Background and Introduction of the Consultation

Agenda 3. Reviews on reporting of statistics based on the Framework of Fishery Statistic of Southeast Asia
- 3.1 Introduction to the Framework of Fishery Statistics of Southeast Asia (by SEAFDEC)
- 3.2 Country Presentations (by respective AMSs)

Agenda 4. Regional Initiatives in Relation to Enhance Collection and Usage of Fishery Statistics Data and Information
- 4.1 Tuna species (Secretariat)
- 4.2 Pelagic species (MFRDMD)
- 4.3 Sharks and rays (Secretariat)
- 4.4 Catadromous eels (IFRDMD)
- 4.5 Inland capture fisheries (IFRDMD)
- 4.6 Other species under international concerns (Secretariat)

Agenda 5. New Global Frameworks Related to Fishery Statistics (FAO)

Agenda 6. Discussion
- 6.1 Improving Reporting of Fishery Statistics of Southeast Asia
- 6.2 Improving Fishery Statistics Bulletin Framework

Agenda 7. Presentation and Discussion for Improving SEAFDEC Database of Fishery Statistics of Southeast Asia

Agenda 8. Other Matters

Agenda 9. Conclusion, Policy Recommendations, and Follow-up Actions

Agenda 10. Closing the Consultation

Annex 4

INTRODUCTION TO THE REGIONAL FRAMEWORK FOR FISHERY STATISTICS OF SOUTHEAST ASIA AND STREAMLINE REPORTING

I. BACKGROUND

In Southeast Asia, the importance of fishery statistics has been widely accepted as a tool in providing the basic foundation that is crucial to the formulation of national fisheries policies as well as national management frameworks and actions or even as a basis for understanding the status and condition of the fisheries resources. As basic structures to facilitate development planning and management of fisheries, the fishery statistical items and data set collected by countries could vary based on the priority needs and objectives of the countries. Although SEAFDEC has been undertaking initiatives in compiling fishery statistics from countries bordering the South China Sea Areas since 1978, but only at the SEAFDEC Council Meeting in 2004 that the Council agreed on the change in geographical coverage of the Bulletin to focus on all ASEAN Member States, and that the classification and definition of fishery statistics should be revised based on international standards, classifications and definitions. Subsequently, SEAFDEC Council at its 37th Meeting in 2005 further agreed that reporting of fishery statistics by ASEAN Member States for ASEAN, SEAFDEC and FAO should also be streamlined using harmonized questionnaires shared by SEAFDEC and FAO in order to reduce the burden of countries in submission of data. In line with the directives of the Council, the new Framework for Statistical Bulletin of Southeast Asia, as well as the Streamlined Reporting of Fishery Statistics from the Member Countries to SEAFDEC and FAO, was developed by SEAFDEC in consultation with the Member Countries and FAO, and the new Fishery Statistics Framework and Streamlined Reporting System was endorsed by the SEAFDEC Council at its 40th Meeting in 2008.

In line with the Council Directives, the new Fishery Statistics Framework and Streamlined Reporting System using new set of questionnaires shared by SEAFDEC and FAO has been used for compilation of statistics of 2008 and onwards until present, and it is anticipated that the new framework and streamlined reporting system would reduce the burden of Southeast Asian Countries, and minimize certain overlapping of data compiled by the two organizations.

1. Regional Framework of Fishery Statistics of Southeast Asia

The new Regional Framework for Fishery Statistics of Southeast Asia developed by SEAFDEC was discussed and supported by the Member Countries at the RTC on Fishery Statistics and Information held in Bangkok in December 2007. The Member Countries also agreed to adopt the new and improved framework as it contains the minimum requirements for collection and production of fishery statistics. The new Framework, which includes major changes in the "area of coverage" and "statistical usage" to be consistent with SEAFDEC's areas of competence as well as on the "standard definitions and classifications" to be consistent with the current regional requirements, has also been harmonized with the international standards. The new Framework is envisaged as a regional collaborative framework on fishery statistics to facilitate wider sharing of data and information, which will also be used as inputs in the compilation of the Fishery Statistical Bulletin of Southeast Asia produced by SEAFDEC in the future.

2. Streamline Reporting System of Fishery Statistics

Streamlined Questionnaires for SEAFDEC and FAO

To streamline reporting of statistics to SEAFDEC and FAO, Member Countries are requested to provide fishery statistics based on two sets of questionnaires: 1) Questionnaires shared by SEAFDEC and FAO; and 2) Questionnaires for additional information required by SEAFDEC. The set of questionnaires comprises 11 forms developed by SEAFDEC in collaboration with FAO, which correspond to the Regional Framework of Fishery Statistics of Southeast Asia, and the "Note of Completion" to facilitate the Member Countries understanding on the provision of inputs to the questionnaire.

The set of questionnaires are as follows:

Item	Questionnaire title	Questionnaire issued by	Questionnaire returned to
Q1	Fishery Production by Sub-sector	SEAFDEC	SEAFDEC
Q2	STAT-SEAFDEC Capture Production by Species and SEAFDEC Sub-areas	FAO	FAO and SEAFDEC
Q3	Producer Prices for Capture Production by Species	SEAFDEC	SEAFDEC
Q4	Marine Capture Production by Type of Fishing Gear and by Species	SEAFDEC	SEAFDEC
Q5	Inland Capture Production by Water Bodies	SEAFDEC	SEAFDEC
Q6	Number of Fishing Boats by Type and Tonnage	SEAFDEC	SEAFDEC
Q7	Number of Fishing Units by Size of Boat	SEAFDEC	SEAFDEC
Q8	AQ-NS1 and 9 Forms for Reporting Statistics on Aquaculture of Fish, Crustacean, Molluscs (NS1), and Aquatic Plans (NS9) by Species, Production, Environment and Fishing Area	FAO	FAO (later shared with SEAFDEC)
Q9	Aquaculture Production of Ornamental Fish	SEAFDEC	SEAFDEC
Q10	Seed Production from Aquaculture	SEAFDEC	SEAFDEC
Q11	FISHSTAT FM: Fishers	FAO	FAO (later shared with SEAFDEC)

The Questionnaires appears as ***Appendix 1a*** to ***Appendix 1k***.

Streamlined Submission Process and Mechanism

The agreed timeframe for reporting of fishery statistics from the Countries in Southeast Asia to SEAFDEC and FAO are:

- End of April: Dispatch of paper and electronic questionnaires (if e-mail address is available);
- 31st August: Deadline to return data to FAO and SEAFDEC; send reminders and contacts with countries which have not submitted their data;
- Beginning of March: Production of the Fishery Statistical Bulletin of Southeast Asia

SEAFDEC and FAO would coordinate and providing support to the Member Countries in reporting their fishery statistics using the agreed questionnaire and streamlined submission process and mechanism. It is envisaged that the use of agreed questionnaire and streamlined submission and process between SEAFDEC and FAO could be enhanced the quality and timeliness of fishery statistics to be compile by the organizations.

3. Fishery Statistics Bulletin of Southeast Asia

Based on the new Fishery Statistics Framework and the Streamlined Reporting System using set of questionnaires shared by SEAFDEC and FAO, SEAFDEC has been compiling fishery statistics from 10 ASEAN Member Countries from 2008 and onwards. The Bulletin comprises data on:

1. Annual Series of Fishery Production – *summarized by SEAFDEC*
2. Fishery Production by Sub-sector – *summarized by SEAFDEC*
3. Marine Capture Fishery Statistics
    - 3.1 Number of Fishing Boats by Type and Tonnage
    - 3.2 Number of Fishing Units by Size of Boat
    - 3.3 Marine Capture Fishery Production by Species and by Fishing Area (Q&V)
    - 3.4 Capture Production by Type of Fishing Gear and by Species

4. Inland Capture Fishery Statistics
    - 4.1 Inland Capture Fishery Production by Species and by Fishing Area (Q&V)
    - 4.2 Inland Fishery Production by Type of Water Bodies (Q&V)
5. Aquaculture Statistics
    - 5.1 Aquaculture Production by Species and by Fishing Area (Q&V)
    - 5.2 Aquaculture Production by Species of Ornamental Fishes (Q&V)
    - 5.3 Seed Production from Aquaculture
6. Price of Fresh Fish
    - 6.1 Producer Price for Capture Fishery Production by Species
7. Fishers
    - 7.1 Number of Fishers by Working Status

II. REQUIRED CONSIDERATION BY THE CONSULTATION

The Consultation is requested to take note of the Regional Framework of Fishery Statistics of Southeast Asia, and the streamlined reporting system including submission process and mechanism of fishery statistics from Member Countries to SEAFDEC and FAO that has been used for compilation of SEAFDEC Statistics Bulletin since 2018 and onwards.

Appendix 1a of Annex 4

Q1 : Fishery Production by Sub-sectors

Country YEAR

	Capture			Aquaculture			
	Total	Marine	Inland	**Total**	Mariculture	Brackishwater	Freshwater
Quantity (t)	0			0			
Value (1,000 USD)	0			0			

Appendix 1b of Annex 4

Q2: STAT-SEAFDEC Capture Production by Species and SEAFDEC Sub-areas YEAR _____

COUNTRY	3-ALPHA	SCIENTIFIC	FAO ENGLISH	FISHING AR	SEAFDEC	Unit	2011	2012	2013	2014	2015	2016	Value
NAME	CODE	NAME	NAME	CODE	Sub-areas								1,000 USD
Indonesia	FCP	Cyprinus carpio	Common carp	04		t							
Indonesia	FCG	Ctenopharyngodon idellus	Grass carp(=White amur)	04		t							
Indonesia	FCN	Osteochilus hoeveni	Hoven's carp	04		t							
Indonesia	FCH	Leptobarbus hoeveni	Hoven's carp	04		t							
Indonesia	MCO	Macrochirichtys macrochirus	-	04		t							
Indonesia	PTG	Barbinymus gonionotus	Silver barb	04		t							
Indonesia	BFS	Barbinymus schwanenfeldii	Tinfoil barb	04		t							
Indonesia	FCY	Cyprinidae	Cyprinids nei	04		t							
Indonesia	BMW	Chromobotia macracanthus	Clown loach	04		t							
Indonesia	HML	Hampala macrolepidota	Hampala barb	04		t							
Indonesia	TLM	Oreochromis mossambicus	Mozambique tilapia	04		t							
Indonesia	TLN	Oreochromis niloticus	Nile tilapia	04		t							
Indonesia	NCG	Chitala lopis	Giant featherback	04		t							
Indonesia	CAG	Kryptopterus spp	Glass catfishes	04		t							
Indonesia	OKB	Ompok bimaculatus	Butter catfish	04		t							
Indonesia	MYN	Mystus nemurus	Asian redtail catfish	04		t							
Indonesia	CTO	Clarias spp	Torpedo-shaped catfishes ne	04		t							
Indonesia	FSI	Siluroidei	Freshwater siluroids nei	04		t							
Indonesia	MWY	Mastacembelus erythrotaen	Fire eel	04		t							
Indonesia	RIS	Pristolepis fasciata	Malayan leaffish	04		t							
Indonesia	FGB	Eleotridae	Gudgeons, sleepers nei	04		t							
Indonesia	FPC	Anabas testudineus	Climbing perch	04		t							
Indonesia	FGG	Osphronemus goramy	Giant gourami	04		t							
Indonesia	FGS	Trichogaster pectoralis	Snakeskin gourami	04		t							
Indonesia	TGH	Trichogaster trichopterus	Three spot gourami	04		t							
Indonesia	FGO	Helostoma temminckii	Kissing gourami	04		t							
Indonesia	FSS	Channa striata	Striped snakehead	04		t							
Indonesia	FIS	Channa micropeltes	Indonesian snakehead	04		t							
Indonesia	FRF	Osteichthyes	Freshwater fishes nei	04		t							
Indonesia	ELX	Anguilla spp	River eels nei	04		t							
Indonesia	CHG	Anodontostoma chacunda	Chacunda gizzard shad	57		t							
Indonesia	CHG	Anodontostoma chacunda	Chacunda gizzard shad	71		t							
Indonesia	TOL	Tenualosa toli	Toli shad	57		t							
Indonesia	TOL	Tenualosa toli	Toli shad	71		t							

Page 1

Appendix 1c of Annex 4

Q3: Producer Prices for Capture Production by Species

Country

YEAR_____

USD/kg.

3-ALPHA CODE	Scientific Name	FAO English Name	2011	2012	2013	2014	2015	2016
FCP	*Cyprinus carpio*	Common carp						
LRH	*Labeo rohita*	Roho labeo						
FCG	*Ctenopharyngodon idellus*	Grass carp						
BIC	*Hypophthalmichthys nobilis*	Bighead carp						
FCH	*Leptobarbus hoeveni*	Hoven's carp						
PTG	*Barbonymus gonionotus*	Silver barb						
CTT	*Catla Catla*	Catla						
TLM	*Oreochromis mossambicus*	Mozambique tilapia						
TLN	*Oreochromis niloticus*	Nile tilapia						
CBT	*Clarias batrachus*	Philippine catfish						
CMC	*Clarias macrocephalus*	Bighead catfish						
-	*Clarias nieuhofi*	Freshwater catfish						
CTO	*Clarias spp.*	Torpedo-shaped catfishes nei						
PGP	*Pangasius pangasius*	Pangas catfish						
PGS	*Pangasius hypophthalnus*	Striped catfish						
PGJ	*Pangasius larnaudii*	Spot pangasius						
PGK	*Pangasius micronemus*	Shortbarbel pangasius						
-	*Pangasius djambal*	-						
PGZ	*Pangasius spp.*	Pangas catfishes nei						
-	*Mystus* spp.	-						
AAT	*Anguilla bicolor*	River eel						
ELJ	*Anguilla japonica*	Japanese eel						
-	*Anguilla anebulosa*	River eel						
ELX	*Anguilla spp.*	River eels nei						
FSS	*Channa striata*	Striped snakehead						
FIS	*Channa micropeltes*	Indonesian snakehead						
-	*Channa lucius*	Snakehead						
FSN	*Channa* spp.	Snakehead(=Murrels) nei						

Appendix 1d of Annex 4

Q4: Marine Capture Production by Type of Fishing Gear and by Species

YEAR 2016

Country

SEAFDEC CODE	3-ALPHA CODE	Scientific Name	FAO ENGLISH Name	SEAFDEC Sub-areas	Quantity by type of fishing gear (t): Purse seine: All purse seines (PS)	Purse seine: Anchovy purse seine	Purse seine: Fish purse seine	Seine Net: All seine nets (SX)	Seine Net: Boat seine (SV)	Seine Net: Beach seine (SB)	Trawl: All trawls (TX)	Trawl: Beam trawl (TBB)	Trawl: Otter board trawl (OT)	Trawl: Pair trawl (PT)	Lift net (LN)	Falling net: All falling nets (FS)	Falling net: Anchovy falling net	Falling net: Squid falling net	Gill net (GN)	Trap: All traps (FIX)	Trap: Stationary trap	Trap: Portable trap	Hook and lines (LX)	Push/Scoop net	Shell fish and seaweed collecting gear	Others (MIS)
24.010	CHG	*chacunda*	Chacunda gizzard shad		0			0			0					0				0						
24.010	HIX	*Hilsa kelee*	Kelee shad		0			0			0					0				0						
24.010	HIL	*Tennualosa ilisha*	Hilsa shad		0			0			0					0				0						
24.010	TOL	*Tenualosa toli*	Toli shad		0			0			0					0				0						
24.010	-	*Tenualosa macrura*	Longtail shad		0			0			0					0				0						
24.010	EIL	*Ilisha elongata*	Elongate ilisha		0			0			0					0				0						
24.010	PEO	*Pellona ditchela*	Indian pellona		0			0			0					0				0						
25.010	MIL	*Chanos chanos*	Milkfish		0			0			0					0				0						
25.020	GIP	*Lates calcarifer*	Barramundi(=Giant seaperch)		0			0			0					0				0						
31.010	FLX	Pleuronectiformes	Flatfishes nei		0			0			0					0				0						
31.011	TOX	Cynoglossidae	Tonguefishes		0			0			0					0				0						
31.012	HAI	*Psettodes erumei*	Indian halibut		0			0			0					0				0						
31.013	-	*Poecilopsetta colorata*	Coloured righteye flounder		0			0			0					0				0						
31.013	UHA	*Pseudorhombus arsius*	Largettooth flounder		0			0			0					0				0						
31.013	-	*Pseudorhombus spp.*	Flounders		0			0			0					0				0						
33.010	BUC	*Harpadon nehereus*	Bombay-duck		0			0			0					0				0						
33.010	LIG	*Saurida tumbil*	Greater lizardfish		0			0			0					0				0						
33.010	-	*Saurida spp.*	Lizard fishes		0			0			0					0				0						
33.010	TCY	*Trachinocephalus myops*	Snakefish		0			0			0					0				0						
33.020	AUX	*Arius thalassinus*	Giant catfish		0			0			0					0				0						

Appendix 1e of Annex 4

Q5 : Inland Capture Production by Water Bodies

Country

YEAR_____

Water Bodies	Quantity (t)	Value (1,000 USD)
Lakes		
Rivers		
Flood plain/rice fields		
Reservoirs		
Others		
Total	**0**	**0**

Appendix 1f of Annex 4

Q6 : Number of Fishing Boats by Type and Tonnage

Country YEAR_____

SEAFDEC Sub-areas	Total	Non-powered boat	Powered boat										
			Sub-total	Out-board powered boat	In-board powered boat								
					Sub-total	< 5 tons	5-9.9 tons	10-19.9 tons	20-49.9 tons	50-99.9 tons	100-199.9 tons	200-499.9 tons	> 500 tons
	0		0		0								
	0		0		0								
	0		0		0								
	0		0		0								
	0		0		0								
	0		0		0								
	0		0		0								
	0		0		0								
	0		0		0								
All SEAFDEC Sub-areas	0	0	0	0	0	0	0	0	0	0	0	0	0

Q7 : Number of Fishing Units by Size of Boat

Country YEAR_____

Type of Fishing Gear		Total	Non-power boat	Powered boat									
				Sub-total	Out-board powered boat	In-board powered boat							
Code	Name of fishing gear					Sub-total	< 5 tons	5-9.9 tons	10-19.9 tons	20-49.9 tons	50-99.9 tons	100-199.9 tons	200-499.9 tons	> 500 tons
PS	**All Purse Seines**	0		0		0								
	Anchovy Purse seine	0		0		0								
	Fish Purse seine	0		0		0								
SX	**All Seines Nets**	0		0		0								
SV	Boat Seines	0		0		0								
SB	Beach Seines	0		0		0								
TX	**All Trawls**	0		0		0								
TBB	Beam Trawl	0		0		0								
OT	Otter Board Trawl	0		0		0								
PT	Pair trawl	0		0		0								
LN	**Lift Nets**	0		0		0								
FS	**All Falling nets**	0		0		0								
	Anchovy Falling net	0		0		0								
	Squid Falling net	0		0		0								
GN	**Gill Nets**	0		0		0								
FIX	**All Traps**	0		0		0								
	Stationary Trap	0		0		0								
	Portable Trap	0		0		0								
LX	**Hooks & Lines**	0		0		0								
	Push/Scoop Nets	0		0		0								
	Shellfish & seaweed collecting gear	0		0		0								
MIS	**Others**	0		0		0								

Appendix 1h of Annex 4

Q8-AQ-NS :Form for Reporting Statistics on Aquaculture of Fish, Crustacean, Mollusc and Aquatic plant by Species, Production, Environment and Fishing Area

YEAR_____

COUNTRY	3-ALPHA	SCIENTIFIC	FAO ENGLISH	ENVIRONMENT	AREA		2010	2011	2012	2013	2014	2015	2016
NAME	CODE	NAME	NAME	CODE	CODE	UNIT							
Indonesia	FCP	Cyprinus carpio	Common carp	IN	04	t							
Indonesia	FCP	Cyprinus carpio	Common carp	IN	04	USD							
Indonesia	FCP	Cyprinus carpio	Common carp	IN	04	IDR							
Indonesia	FCN	Osteochilus hasselti	Nilem carp	IN	04	t							
Indonesia	FCN	Osteochilus hasselti	Nilem carp	IN	04	USD							
Indonesia	FCN	Osteochilus hasselti	Nilem carp	IN	04	IDR							
Indonesia	FCH	Leptobarbus hoeveni	Hoven's carp	IN	04	t							
Indonesia	FCH	Leptobarbus hoeveni	Hoven's carp	IN	04	IDR							
Indonesia	FCH	Leptobarbus hoeveni	Hoven's carp	IN	04	USD							
Indonesia	PTG	Barbonymus gonionotus	Silver barb	IN	04	t							
Indonesia	PTG	Barbonymus gonionotus	Silver barb	IN	04	USD							
Indonesia	PTG	Barbonymus gonionotus	Silver barb	IN	04	IDR							
Indonesia	PTG	Barbonymus gonionotus	Silver barb	BW	04	t							
Indonesia	PTG	Barbonymus gonionotus	Silver barb	BW	04	USD							
Indonesia	PTG	Barbonymus gonionotus	Silver barb	BW	04	IDR							
Indonesia	TLM	Oreochromis mossambicus	Mozambique tilapia	IN	04	t							
Indonesia	TLM	Oreochromis mossambicus	Mozambique tilapia	IN	04	USD							
Indonesia	TLM	Oreochromis mossambicus	Mozambique tilapia	IN	04	IDR							
Indonesia	TLM	Oreochromis mossambicus	Mozambique tilapia	BW	04	t							
Indonesia	TLM	Oreochromis mossambicus	Mozambique tilapia	BW	04	USD							
Indonesia	TLM	Oreochromis mossambicus	Mozambique tilapia	BW	04	IDR							
Indonesia	TLN	Oreochromis niloticus	Nile tilapia	IN	04	t							
Indonesia	TLN	Oreochromis niloticus	Nile tilapia	IN	04	USD							
Indonesia	TLN	Oreochromis niloticus	Nile tilapia	IN	04	IDR							
Indonesia	TLN	Oreochromis niloticus	Nile tilapia	BW	04	t							
Indonesia	TLN	Oreochromis niloticus	Nile tilapia	BW	04	USD							
Indonesia	MYN	Mystus nemurus	Asian redtail catfish	IN	04	t							
Indonesia	MYN	Mystus nemurus	Asian redtail catfish	IN	04	USD							
Indonesia	CTO	Clarias spp	Torpedo-shaped catfishes ne	IN	04	t							
Indonesia	CTO	Clarias spp	Torpedo-shaped catfishes ne	IN	04	USD							
Indonesia	CTO	Clarias spp	Torpedo-shaped catfishes ne	IN	04	IDR							
Indonesia	PGZ	Pangasius spp	Pangas catfishes nei	IN	04	t							
Indonesia	PGZ	Pangasius spp	Pangas catfishes nei	IN	04	USD							
Indonesia	GBM	Oxyeleotris marmorata	Marble goby	IN	04	t							

Page 1

Appendix 1i of Annex 4

Q9: Aquaculture Production of Ornamental Fishes

Country YEAR_____

Ornamental Fish			Quantity (pcs)	Value (1,000 USD)
3-ALPHA CODE	Scientific Name	FAO English Name		

Appendix 1j of Annex 4

Q10 : Seed Production from Aquaculture

Country : YEAR _____

Environment CODE	Hatchery/Nursery Production							Units
	3-ALPHA CODE	Scientific Name	FAO English Name	Total	Wild Stock Enhancement	Aquaculture Practices		Number of operational units or facilitates
				millions pcs	millions pcs	millions pcs		

Appendix 1k of Annex 4

Q12-FISHSTAT FM: Fishers

FISHSTAT FM

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
NUMBER OF FISHERMEN - COMMERCIAL AND SUBSISTENCE

COUNTRY: YEAR _____

		2013	2014	2015	2016
Aquatic-life cultivation					
Full time	M				
	F				
Part time	M				
	F				
Occasional	M				
	F				
Status Unspecified	M				
	F				
Total	M				
	F				
Inland					
Full time	M				
	F				
Part time	M				
	F				
Occasional	M				
	F				
Status Unspecified	M				
	F				
Total	M				
	F				
Marine Coastal					
Full time	M				
	F				
Part time	M				
	F				
Occasional	M				
	F				
Status Unspecified	M				
	F				
Total	M				
	F				
Marine Deep-Sea					
Full time	M				
	F				
Part time	M				
	F				
Occasional	M				
	F				
Status Unspecified	M				
	F				
Total	M				

Annex 5

REVIEW ON REPORTING OF STATISTICS BASED ON THE FRAMEWORK OF FISHERY STATISTICS OF SOUTHEAST ASIA: CAMBODIA

By Mr. Hem Rady

Chief of International Cooperation and Fisheries Statistic Division,
Planning, Finance and International Cooperation Department, Fisheries Administration, Cambodia

I. Introduction

Cambodia has a high diversity of freshwater species. Fish species are complemented by a wide array of other aquatic animals including frogs, snails, and snakes and by aquatic plants. There are over 500 aquatic species recorded in the inland waters of Cambodia (Rainboth, 1996) of which around 200 species are regularly caught. The most commonly caught fish is the small river carp (*CirrhinusLobatus*). Fish are grouped into whitefish (trey sor) and blackfish (trey kmao). The whitefish consist of species of carp and catfish. They are involved in significant migrations and are commercially more important. Blackfish consist of species such as murrel and climbing perch. These are able to survive in swamps and wetlands all the year around and engage in only limited migrations.

The Mekong has a predominance of very small fish with short breeding cycles that make use of the annual floods. It also has some of the largest fish such as the giant freshwater stingray, the giant catfish and the giant river carp. There are also many other aquatic resources such as frogs, crocodiles, water-snakes, turtles, dolphins and snails. In January and February each year the migration of fish from the inundated forest surrounding the Great Lake, and from the lake itself into the Tonle Sap River, reaches its peak.

During the full-moon in these months masses of small fish migrate downstream and into the rivers. It is at this time that the majority of the fish catch in Cambodia is taken.

Government Fisheries Reform:

a) First Fisheries Reform:

Between 2000-2011, the Royal Government of Cambodia has decided to reduce fishing lot areas around the Tonle Sap Great Lake for public access or public fishing household. The benefit of fisheries reform phase I, were the large reduction in industrial fishing, equitable distribution of economic growth, fewer conflicts and better resource management.

As result of the reform, 78 fishing lots around the Great Lake with total areas of 541,206 hectares or equals to 56.74 percent of the total fishing ground were abolished and transferred to local public access or so called community based fisheries management.

b) Second Fisheries Reform (Phase II):

Based on the result of 2011 on the suspending 35 fishing lots around the Tonle Sap Great lake, in 2012 the Royal Government has decided a Fisheries Reform Phase II in order to abolish 80 fishing lots, with total areas 412,654 hectares locates around the Tonle Sap Great Lake and in the Kandal, Prey Veng and Takeo provinces.

It is a new policy of the Royal Government of Cambodia to release fisheries domains for eliminating anarchic fishing activities, providing for public access and empowering fisheries resources to local community, so called community based fisheries management. The abolished fishing areas has been served as fish conservation zone, 97,503 hectares or 23.63 percent and establishing community fisheries, 315,152 hectares or 76.37 percent.

In this regards, the annual total production of inland capture fisheries will significantly change, particularly for large scale fisheries while large scale (abolished fishing) areas have been converted and empowered local community fisheries.

II. Methodology of Fisheries Data Collection

Cambodian fisheries statistic and information data collection are based on Administrative Information System.

In general, this system is commonly used to record official fisheries statistic and information whole out the country. Standardized form or log-book was produced by central FiA, Department of Planning, Finance and International Cooperation. Sub-national fisheries officers/FiA Cantonment officers who are responsible for fisheries statistic were trained by fisheries statistic officer from central level on how to collect data, data entry and report writing. At sub-national level, Division/Sangkat fisheries officers have been appointed to be data collector. Fisheries statistic and information data collection are collected on the monthly basic and the regular meeting is generally conducted monthly in order to check and clean on collected data before entering into database. Monthly report on fisheries statistic and information at all sub-national level/FiA Cantoments is generally sent to Department of Planning, Finance and International Cooperation, Fisheries Administration (FiA).

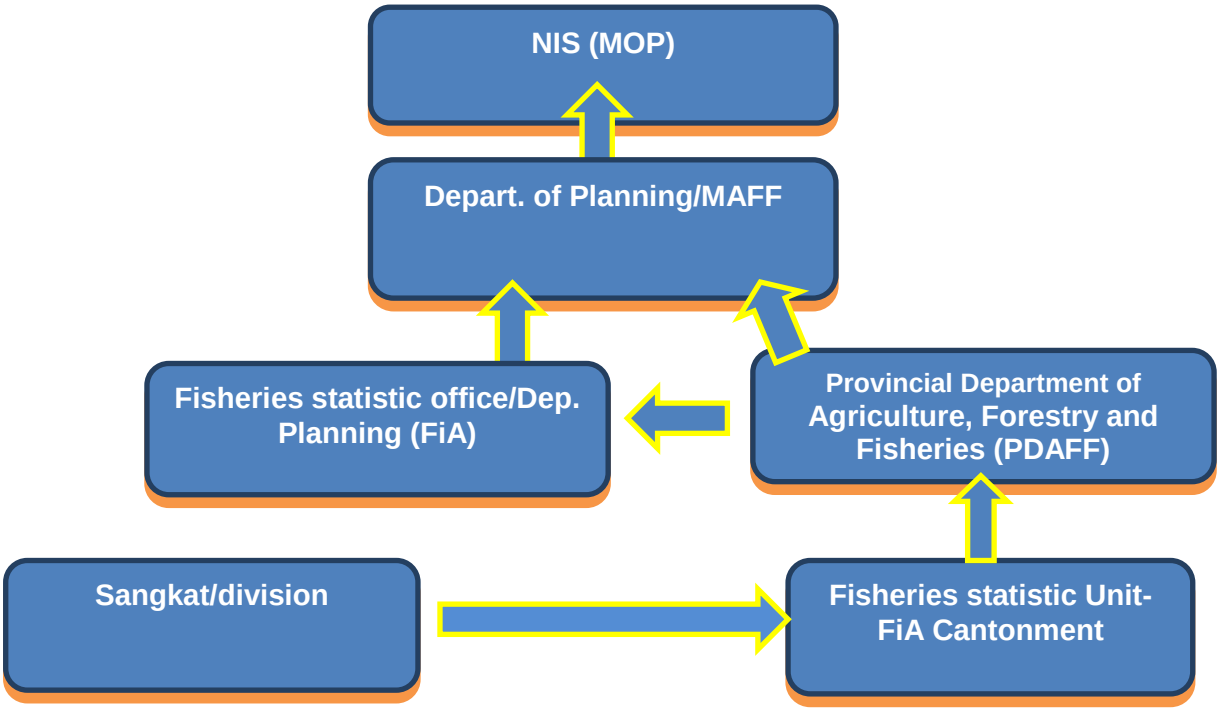

Figure 1: Mechanism for fisheries statistic and information data collection reporting and syste

III. Fisheries Information

3.1. Capture Fisheries

Major supplies of fish come from freshwater capture fisheries, freshwater aquaculture and from imports. The majority of the fish supply in Cambodia is from freshwater capture fisheries. These make up around 79% of the total, with marine capture providing around 15% of the total. It is estimated that total production is between 300,000 and 500,000 tons per year (Nao Thuok *et al.,* 2001) (see Table 1). However, a recent study of consumption of fish in the Lower Mekong basin might suggest an even higher annual catch (MRC, 2007).

Table 1: Estimates of Actual Fish Catch Ranges by Source

Source of Catch	Annual Catch (tones) range in the year 2012-2016
- Large scale	100,000-13,950
- Small-scale/Family Fisheries	131,000-348,600
- Rice field fisheries	108,500-146,800
Total inland fish catch	**339,500-509,350**
- Marine catches	99,000-120,600
- Aquaculture	74,000-172,500
Total all Sources	**512,500-802,450**

Source: Planning, Finance and International Cooperation Department, FiA (2016)

Fisheries statistics suggest that catches fluctuate from year to year, in ways that often closely reflect changes in the annual flooding patterns. Recent annual catch estimates from the freshwater fishery are shown in Table 2. It is likely that even these figures are an underestimate, given their creased population, more effective fishing gear and greater access to fish resource since the fishing lot reforms.

A. Freshwater capture fisheries

Fisheries statistics suggest that catches fluctuate from year to year, in ways that often closely reflect changes in the annual flooding patterns. Recent annual catch estimates from the freshwater fishery are shown in Table 2. It is likely that even these figures are an underestimate, given their creased population, more effective fishing gear and greater access to fish resource since the fishing lot reforms.

Table 2: Fisheries production 2012-2016 by fishing class and sub-sector (tonnes)

Fishing Type	2012	2013	2014	2015	2016
Inland Caught Fish	509,000	528,000	505,005	487,905	509,350
Marine Caught Fish	99,000	110,000	120,250	120,500	120,600
Aquaculture	74,000	90,000	120,055	143,141	172,500
Total Fish Production	**682,000**	**728,000**	**745,310**	**751,546**	**802,450**

Source: Planning, Finance and International Cooperation Department, FiA (2016)

Fishing activity in Cambodia is divided into two broad categories: commercial or large-scale fisheries and small-scale or family fisheries.

The large-scale fishery takes place in lots that are periodically auctioned. The lots are allocated to the highest bidder for a period of two years. The lots exist around the Great Lake, along the Tonle Sap River, and down the Mekong/Bassac rivers to the Vietnamese border. There are currently 63 Dai fisheries lots.

Small-scale and rice-field fisheries tend to be open-access fisheries which do not require a license. They operated in floodplain areas during the closed season and in rice-fields during the wet season.

B. Marine Capture fisheries

Marine landings have increased from 99,000 tonnes in 2012 to 120,600 tonnes in 2016 (seeTable 3). However, much of the catch in Cambodian waters does not enter the landing statistics as it is harvested by foreign vessels and shipped directly to Thailand and Vietnam.

There are about 40 coastal fishing villages (Long Korn, 2003) with an unknown number officer, but the coastal provinces have a combined population of around 1 million people. The Gulf of Thailand adjacent to the coast of Cambodia is relatively shallow with a mud/sand bottom that allows for trawler operations. These are restricted by law to waters deeper than 20m, although this law is, (according to local fishermen), broken on a regular basis.

Cambodian marine fisheries consist mainly of small and medium-scale operators; the large-scale operators tend to be foreign. Local boats use a variety of fishing gear including trawl nets, drag nets, purse seines, anchovy purse seines, gill nets, hooks and lines, and traps. In recent years the majority of boats along the

coast have become motorized; non-motorized craft numbers fell from 3,312 in1996 to 227 craft in 1999 (DoF, 2001).

Generally speaking, coastal fishermen can fish all year round by changing their gear and targeting individual species, although it is often easier to fish during the dry season than the wet because of the greater frequency of storms and typhoons. The availability of different species also changes along the coast. *e.g.* the peak season for white shrimp in Kampot is from June until July, whereas in Koh Kong it is from July to August (Khy An, 2005).

Table 3: Marine production from 2012-20016 by provinces

Provinces	**2012**	**2013**	**2014**	**2015**	**2016**
Kep				2,237	1,370
Kampot	11,100	19,500	16,789	13,263	23,180
Preah Sihanuok	47,800	49,000	55,819	54,000	46,000
Koh Kong	40,100	41,500	47,642	51,000	50,050
Total	**99,000**	**110,000**	**120,250**	**120,500**	**120,600**

Source: Planning, Finance and International Cooperation Department, FiA (2016)

3.2 Catch species

a. Inland fisheries, many Mekong fish species make extensive longitudinal migrations between upland spawning grounds in Northern Cambodia/Lao and feeding grounds in the lowland floodplains. A large proportion of fish-over 500 species in the Cambodia's Mekong River and 296 fish species in Tonle Sap Lake, and other aquatic animals including crabs, snails, frogs, snakes, turtles, and shrimps have been found in inland water (MRC, 2004).

Table 4: Top ten species commonly caught at Dai Fishery (stationary bag-net)

No.	**Scientific name**
1	*Henicorhynchuscaudimaculatus*
2	*Paralaubucariveroi*
3	*Dangila sp.*
4	*Osteochilushasselti*
5	*Botiamodesta*
6	*Thynnichthysthynnoides*
7	*Belodontichthysdinema*
8	*Moruliuschrysophekadion*
9	*Puntioplitesproctozysron*
10	*Cyclocheilichthysenoplos*

(Source: IFReDI, FiA 2016)

b. Marine fishers can fish all year round and they may change fishing gears and target species to adapt weather condition in dry and wet season, and existing over 435 fish species.

Table 5: Marine species commonly catch in 3 coastal provinces

English name	2012	2013	2014	2015	2016
- Giant mud Crab	732	597	915	663	980
- Swimming Crab	4,090	4,325	6,700	3,622	5,120
- Squid	6,248	6,071	9,470	5,609	5,906
- Shrimp	7,705	11,140	8,806	9,170	12,139
- Shortfinscad (ត្រីកាម៉ុង)	3,336	3,504	5,225	2,663	2,574
- Waigieuseaperch (ត្រីឆ្ពង់)	245	240	265	315	334
- Grouper (ត្រីតុកកែ)	248	282	325	289	311
- Sharpjaw bonefish (ត្រីបេកា)	1,234	1,286	1,485	1,506	1,539
- Blood cockle (ក្រែងឈាម)	1,568	1,866	2,600	1,925	2,375
- Ki (ត្រីគី)	982	1,049	1,060	1,543	1,188
- Trash fish (ត្រីជី)	34,084	32,980	42,773	36,365	41,414

(Source: FiA Annual Report 2016)

3.3 Fishing Gear

3.3.1. Type of Inland fishing gear

Based on the Proclamation (Prakas)No. 458 of Ministry of Agriculture, Forestry and Fishery date 22 October 2012 on using fishing gear in Inland fishery.
In total, there are about 150 types of fishing gears found to be practiced in inland fisheries domain, of which only 40 fishing gears are commonly used and are classified into 16 major categories, based on their principle of capture. The 16 major groups of the common fishing gears are as follows:

Table 6: 16 major group of fishing gear

No.	English Name	Khmer Name
1	Capture by hand	NesatDoydai Torte
2	Scoop devices	ObpakorDorng/ Dos
3	Wounding gear	ObpakorTveroyRobous
4	Hook & Line	Santouch
5	Traps	Antakh
6	Gillnets/Entangle nets	Mong
7	Surrounding/Seine nets	Oun
8	Dragged gears	ObpakorKavOs
9	Pushed nets	ObpakorChukRunh
10	Lift nets/Dip nets	Obpakor Leak
11	Covering devices	ObpakorKrongKrub
12	Bagnets	ObpakorThnokThnang
13	Anaesthetic methods	VitisasTverOySanlop
14	Fishing by pumping	NesatDoyBom Bach
15	Attracting devices	ObpakorTverOy Trey Kom
16	Fish scaring methods	ObpakorTverOy Trey Phahal

(Source: Fishing Gear of the Cambodian Mekong, 2006)

Though, there are a wide variety of fishing gears only 52 are stimulated in the Law on Fisheries of Cambodia (Table 7). Based on fishing gear catalogue established in 2006 showed that, the common fishing gears found to be practiced by small scale fishing activities or so called family fishing gears are 25 gears. Those gear types are commonly legally fish by villagers in all type of water bodies such as main river, stream, canal, lake, reservoir, pond and low land rice field.

Table 7: The commercial fishing gear commonly used in Inland areas

No.	English Name	Khmer Name
1	Cast Net	Samnanh (សំណាញ់)
2	Drift Gillnet	Mong Bandet (មងបណ្តែត)
3	Wedge-shaped Scoop Basket	Chnangdai (ឈ្នាងដៃ)
4	Plunge Basket or Cover Pot	Ang Rot (អង្រុត)
5	Common Single Hook Line	San Touch PhleMoi (សន្ទូចផ្លែមួយ)
6	Common fishing Rod	San Touch Bor Bok (សន្ទូចបបក់)
7	Frog Gaff	Kongva Kangkeb (កង្វាកង្កែប)
8	one-pronged Barbless Spear	Snor (ស្នូ)
9	Hand Held Scissors Push Net	Thnorng Runh (ថ្នេងរុញ)
10	Hand Dragged Seine Net	Oun Os Dai (អួនអូសដៃ)
11	Horizontal Cylinder Trap for Rice Fields	Tru (ទ្រូ)
12	Brush Bundle Trap	Kan Som (កន្សំ)
13	Bamboo Tube Trap for Eel	Lan On Tung (លាន់អន្ទង់)
14	Paddy Gill Net	Mong trey Sre (មងត្រីស្រែ)
15	Three-pronged Barbed Spear	Chbok (ច្បូក)
16	Two Pronged Eel Fork	Chorng Krob (ចង្រ្កាប់)
17	Trident Fish Fork	Sorm (សម)
18	Multi-pronged Eel Rake	Kangva treychlonh (ចង្វាត្រីឆ្លូញ)
19	Brush Bundle Basket	Chneang Tram (ឈ្នាងត្រាំ)
20	Long Handle Circular Scoop Bag	Thnorng Chrong (ថ្នេងមូល)
21	Encircling Seine Net	Ounhom (អួនហ៊ុំ)
22	Surrounding/ Seine nets	Oun(អួន)
23	Santouch Bong Kai	Santouch Bong Kai (សន្ទូចបង្កៃ)
24	Hook Long Line	Santouch Ronang (សន្ទូចរនង)
25	Long Handle Triangle Scoop Bag	Thnong Chrong (ថ្នេងជ្រុង)

(Source: Fishing Gear of the Cambodian Mekong, 2006)

3.3.2. Number of Marine fishing gear

Based on the annual meeting report produced (2016) by Department of Planning, Finance and International Cooperation, Fisheries Administration showed that, the total marine fishing gear by type reported from 4 marine provinces are: The number of common fishing gears are:

Table 8: Fishing gear used in Marine areas

Nº	English Name	Number of Gear
1	Trawl (Uon Os)	2,212
2	Scomberomorus gill net (Mong Trey Beka)	409,000
3	Shrimp gill net or Trammel net (Mong Bang Kear)	278,000
4	Crab gill net (Mong Kdam)	582,000
5	Clupea gill net (Mong Trey Kbork)	56,500
6	Mackerel gill net (Mong Trey Kamong)	433,000
7	Beach seine (Uon Khov)	21
8	Encircling seine (Uon Huom)	17

(Source: FiA Annual Report 2016)

3.3.3. Fishing Vessel

A. Type of fishing vessel

The number of marine fishing vessel is shown in Table 9. Based on the report from Fisheries Affairs Department in 2016 showed that, the number of non power boat and in-board fishing boat have been decreased in number from 2012 up to present time. In contrast, the number of out-board reported to be increased in number.

Table 9: Type of fishing vessel

year	No. of non power	No. of out-board	No. of in-board
2012	1,312	6,204	538
2013	1,110	5,116	539
2014	956	6,082	514
2015	974	6,205	509
2016	945	6,494	509

Source: Fisheries Affairs Department, Fisheries Administration,2016

B. Engine Power

Based on the reported of Fisheries Administration 2016 indicated that, the number of fishing boat using engine power and >33HP has been decreased from year to year. It is noted that, for fishing boat with the engine power of <33HP, the permission or license issued at FiA cantonment level and for fishing boat with the engine power >33HP, the issuance of license has to be applied at Ministry of Transportation.

Table 10: Type of engine

year	<33HP	>33HP
2012	6,204	538
2013	5,116	539
2014	6,082	514
2015	6,205	509
2016	6,494	509

Source: Fisheries Affairs Department, Fisheries Administration, 2016

IV. Scientific Survey/Research

This system is mainly based on scientific research which is conducted by fisheries officers of the fisheries administration and collaboration with international organizations. Catch monitoring or CPUE survey has been carried out since Mekong River Commission came to support in fisheries sector in 1997. Different types of fishing activities have been observed in order to monitor the fluctuation of annual catch trend from year to year. The survey has been focused on catch monitoring from mobile fishing gears in main water bodies (Mekong and Tonle Sap River) and yearly observation from Dai Fishery (stationary bag-net) in the Tonle Sap River, supported by the Mekong River Commission.

Standardized form or log-book was prepared through expertized consultation at regional and internal level, particularly experts from MRC in order to improve the method quality of data collection. Monthly catch record is mainly focused on species composition, leng-frequency, weight, species abundance.

V. Livelihood from Fisheries

5.1. Fishermen education level

Based on socio-economic survey in 1998 showed that, literacy among the female household heads is lower than that of male household heads (Table 11). On the other hand, male-headed households have more members who can read or have completed a certain level of education.

Table 8: Level of education of male and female in Siem Reap province.

Level of education	Male	Female
No education	64	76
Can read only	220	76
Primary	47	6
Secondary	27	2

(Source: Socio-economic survey, 1998)

5.2. Religion

The predominant religion in Cambodia is Buddhism. The category of "others" Contains mainly the local religious system of the highland tribal groups and a few minority religious groups from other countries. The pattern of distribution of population by religion is more or less the same in 1998 and 2008.

Based on National Committee for Sub-national Democratic Committee (NCCD) district data-book report in 2009 found that, there are no indigenous people found in the province. With a total population of 947,371, Buddhism is the majority which is contributed 942,708 persons, about 99.50 percents and the second majority is belonged to Christianity, which is contributed 2,334 persons, follows by Islam 1,377 persons and the rest are other ethnic minority group.

Table 9: Population by Sex and By Religion

Religion	Sex		Total
	Male	Female	
Buddhism	450,731	491,977	942,708
Islam	691	686	1,377
Christianity	1,160	1,174	2,334
Other	500	453	953
Total	453,082	494,290	947,371

Source: NIS, 2008

5.3. Number of fishermen in eight selected provinces

Based on socio-economic survey in 1998 indicated that, about 5.65 million people (60% of total national population) live in these provinces; 4.19 million reside in 562 communes within 51 fishing districts. Households in about 328 (58%) communes in the fishing districts have a significant dependence on fishing and these are defined as fishing dependent communes, to be called fishing communes.

Table 10: Number of fishermen in eight selected provinces

No. of Province	Population	Population of Fishing
Phnom Penh	833,872	295,189
Kandal	905,840	762,151
Kampong Cham	1,464,000	1,118,749
Kampong Chhnang	244,434	244,434
Siem Reap	637,451	476,026
Pursat	322,852	276,816
Battambang	694,854	580,005
Kampong Thom	546,791	438,279

(Source: Socio-economic survey, 1998)

5.4. Age ration of fishermen

Nearly 87% of the household heads belong to the working age group 16-61 years, While 11% are below 31 years old. Table also shows that the population in fishing communes consists of a relatively large number of young children, nearly 58% are below 21 years old, and 32% are below 10 years old.

Table 11: Age ration of fishermen

Age Group	Male	Female
16-20 years	12	1
21-30 years	523	54
31-40 years	1,229	206
41-50 years	1,182	275
51-60 years	743	205
>61 years	457	230

(Source: Socio-economic survey, 1998)

5.5. Number of fishery household

Up to present time, the total households who are depend directly and indirectly on fishing activities have not been identified. Therefore, the need of social economic survey the current status and number of households depends on fishing activities and other related to fisheries resource is necessary needed.

5.6. Size of fishing household

Based on the socio-economic survey conducted in 1998 in seven provinces showed that, the average size of sample household from the 7 provinces is between 5 to 6 members. It is noted that, there is no much significant difference in household size of the representative geography of the country.

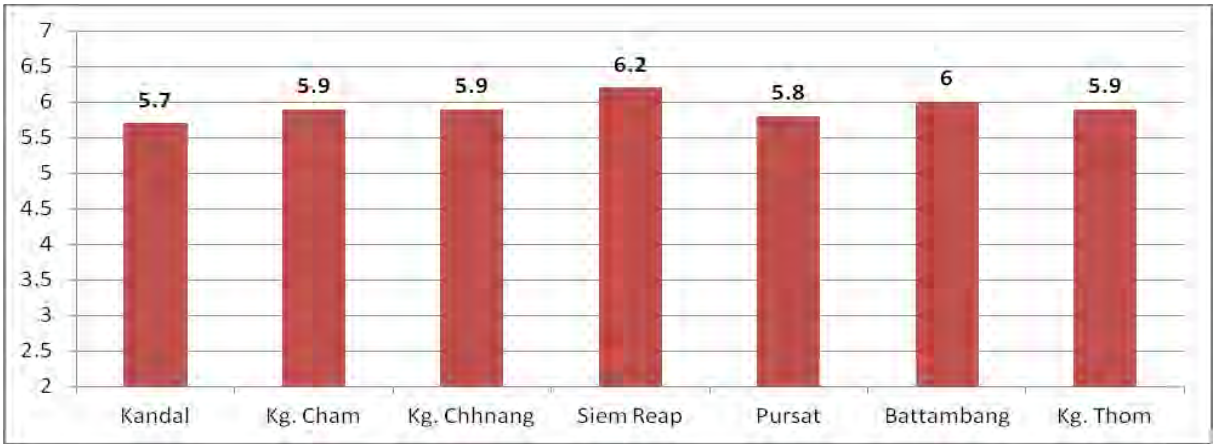

Figure 1: Size of fishing household in the seven target provinces (Source: Socio-economic survey, 1998)

5.7. Labors participating in fisheries

Based on socio-economic survey in 1998 in four provinces Kampong Chhnang, Kampong Cham, Kandal and Siem Reap showed that, an average size of family labor by sex by province. An average of family labor size is 3 in all sample provinces in total 695 of family labor by sex and provinces are not significantly in this survey sample size. Moreover, they have 191 (27.48%) labor of family in Kampong Chhnang province and 109 (15.68%) are male and 82 (11.82%) are female labor. Therefore, in Kampong Cham have 160 (23.02%), an average labor by male 87 (12.52%) and female 73 (10.50%).

Table 12: Average size of family labor by sex and province

Province	Male		Female		Total		Average size of hh.
	No.	(%)	No.	(%)	No.	(%)	
Kampong Chhnang	109	15.68	82	11.80	191	27.48	3
Kampong Cham	87	12.52	73	10.50	160	23.02	3
Kandal	97	13.96	76	10.94	173	24.89	3
Siem Reap	100	14.39	71	10.22	171	24.60	3
Total	**393**	**56.55**	**302**	**43.45**	**695**	**100.00**	**3**

(Source: Socio-economic survey, 1998)

An average size of family labor participated in fishing activities in four provinces Kampong Chhnang, Kampong Cham, Kandal and Siem Reap in Table 15 indicated the number of labor used in fishing activities. In generally, family labor was higher family size by province is 2.40. The number of people usually to fishing activities is ranged between 1- 11 persons in Siem Reap province. Contrarily, in average family size higher in Kampong Chhnang 2.63 and people use to fishing activities ranged only from 1-7 and other rest of provinces is no significantly by average of family labor participated in fishing activities.

VI. Conclusions

Currently, even though fisheries administration has involved many years in conducting scientific survey on fisheries statistic and information data collection with regional and international technical and financial support (Mekong River Commission (MRC), WorldFish Center, FAO and SEAFDEC), but some constraints have been arisen. The constraints which is usually occurred in the process of fisheries statistic and information data collection are related with small-scale fishing gears are highly diverse complexity of ecosystem, no proper landing places catch by small-scale fishing gears land everywhere which is caused in data collection, small-scale fishers are free to enter into fishing business difficult to control in terms number of fishers, fishing gear used, small-scale fishing gears are not requested for registration, according to the Law on Fisheries in Cambodia., cheap fishing gears, this makes it easy for people to cuter into fishing business especially in time of hardship. It is hard to define the number of common fishing gear due to the duration of using those gears is only for one year (*i.e.* floating net), knowledge of fisheries officers at Cantonment level is still limited, lack of fisheries officer and financial support in collecting fisheries statistic and information, most of local fishers are illiterate, which is the main constraint in the process of data recording, mobilization of fisher from one place to other places during peak season.

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Annex 6

REVIEW ON REPORTING OF STATISTICS BASED ON THE FRAMEWORK OF FISHERY STATISTICS OF SOUTHEAST ASIA: INDONESIA

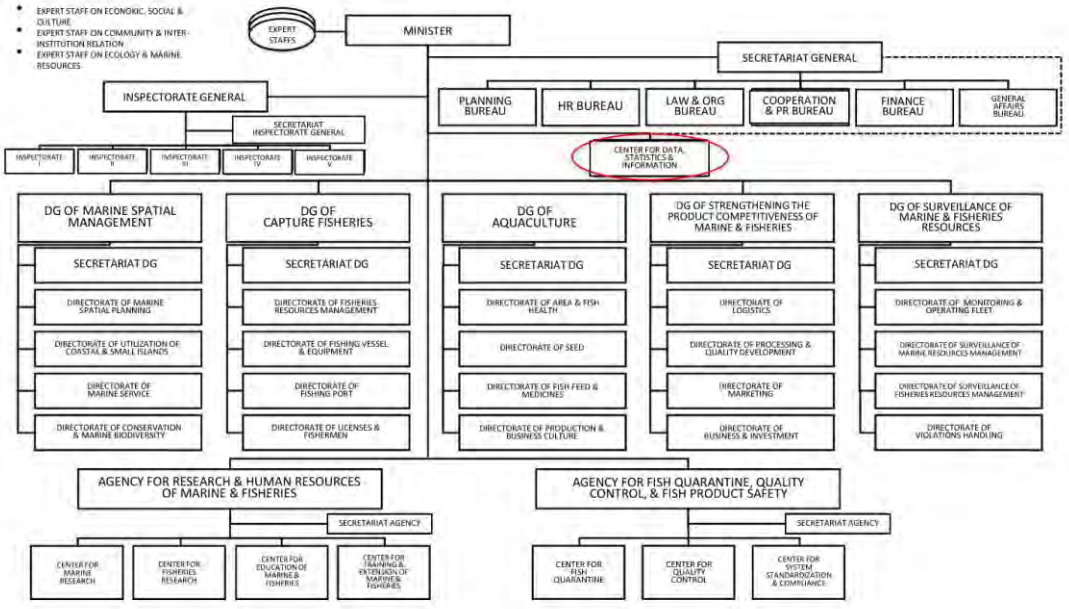
By Rennisca Ray Damanti

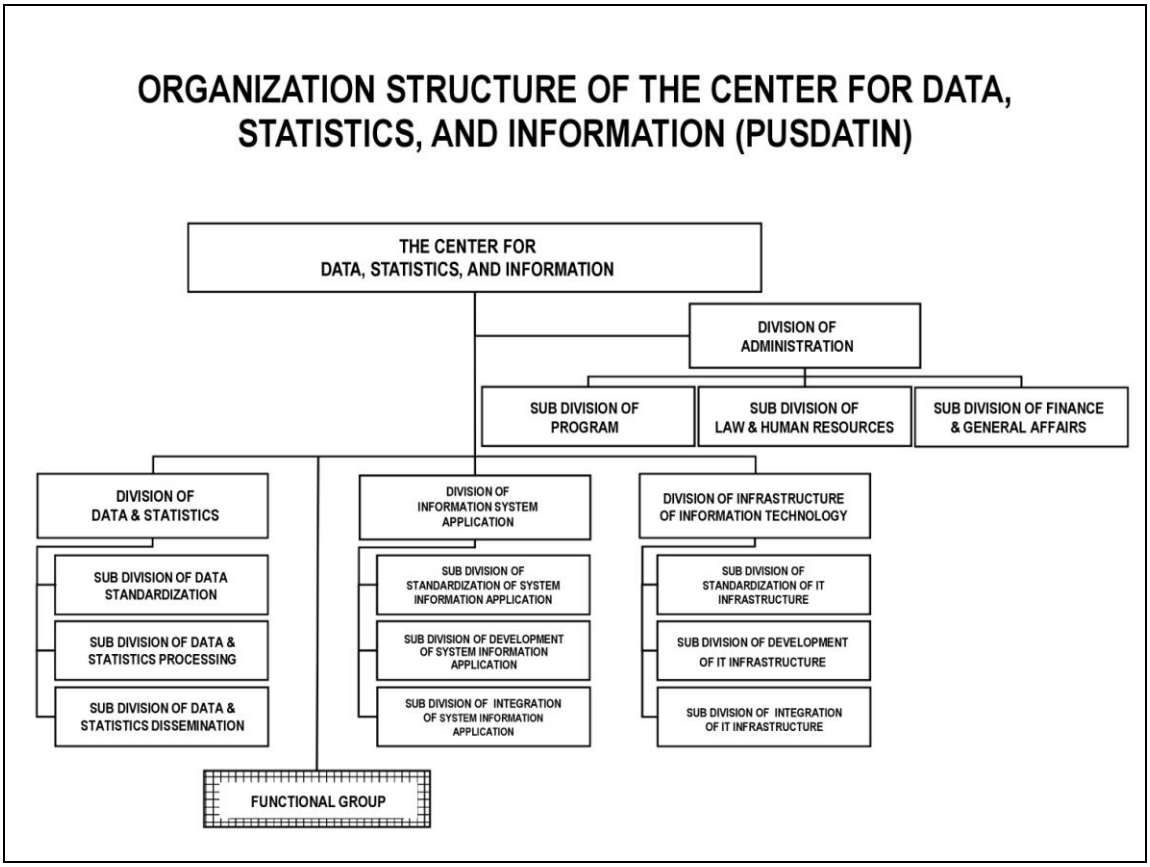
The Head of Fisheries Data and Statistics
Sub Division Center for Data, Statistics and Information, the Ministry of Marine Affairs and Fisheries

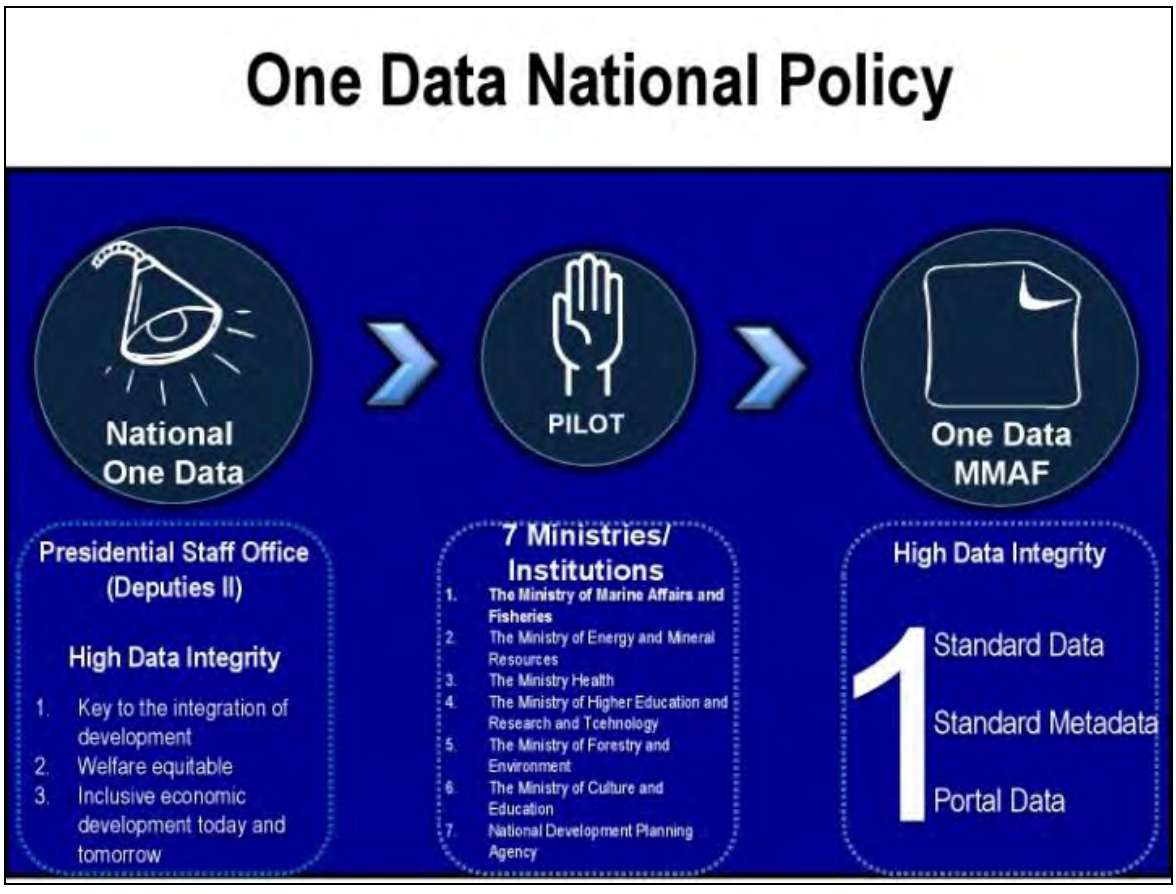
OUTLINE OF PRESENTATION

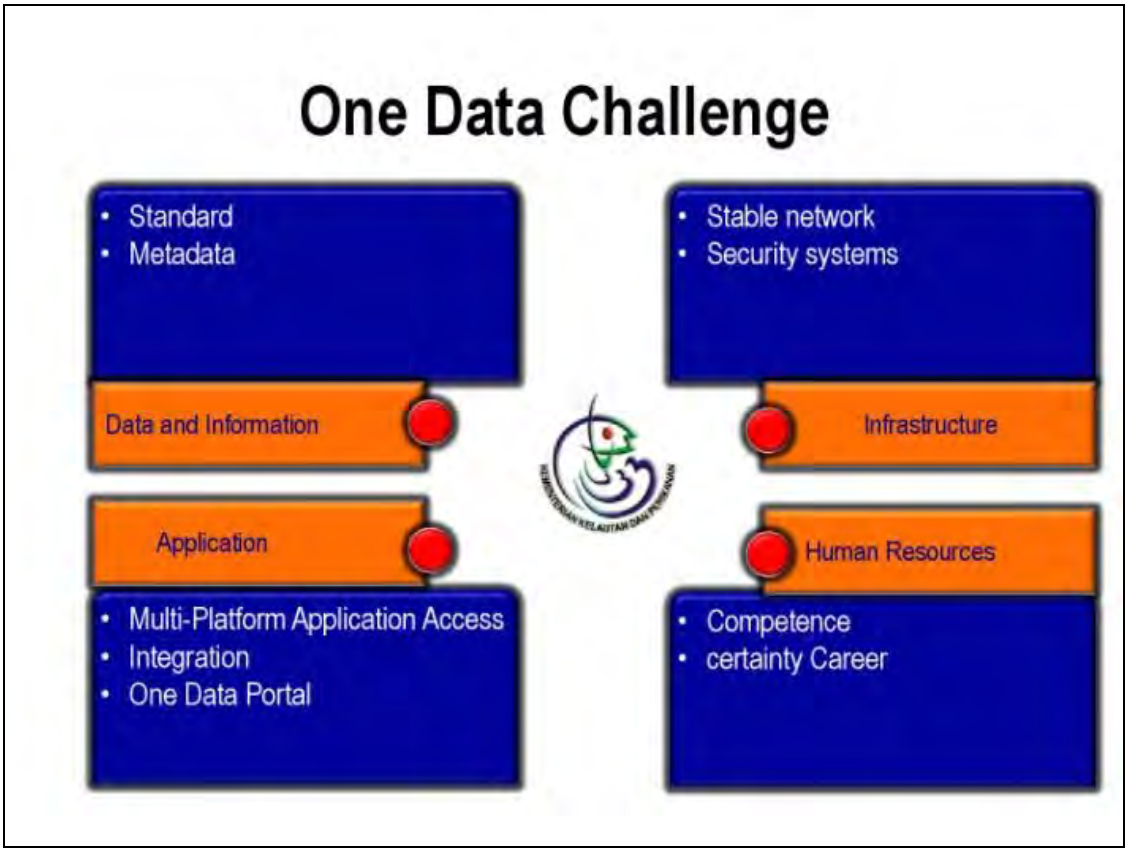
1. ORGANIZATION STRUCTURE OF THE MINISTRY OF MARINE AFFAIRS AND FISHERIES (MMAF) AND PUSDATIN
2. ONE DATA NATIONAL POLICY
3. FLOW OF FISHERIES DATA COLLECTION
4. TYPE OF QUESTIONNAIRES
5. FISHERIES STATISTICS
6. STATISTICIANS IN MMAF
7. VIDEO OF DATA COLLECTING BY THE ENUMERATORS
8. PROBLEMS IN REPORTING STATISTICS
9. SUGGESTIONS AND RECOMMENDATIONS

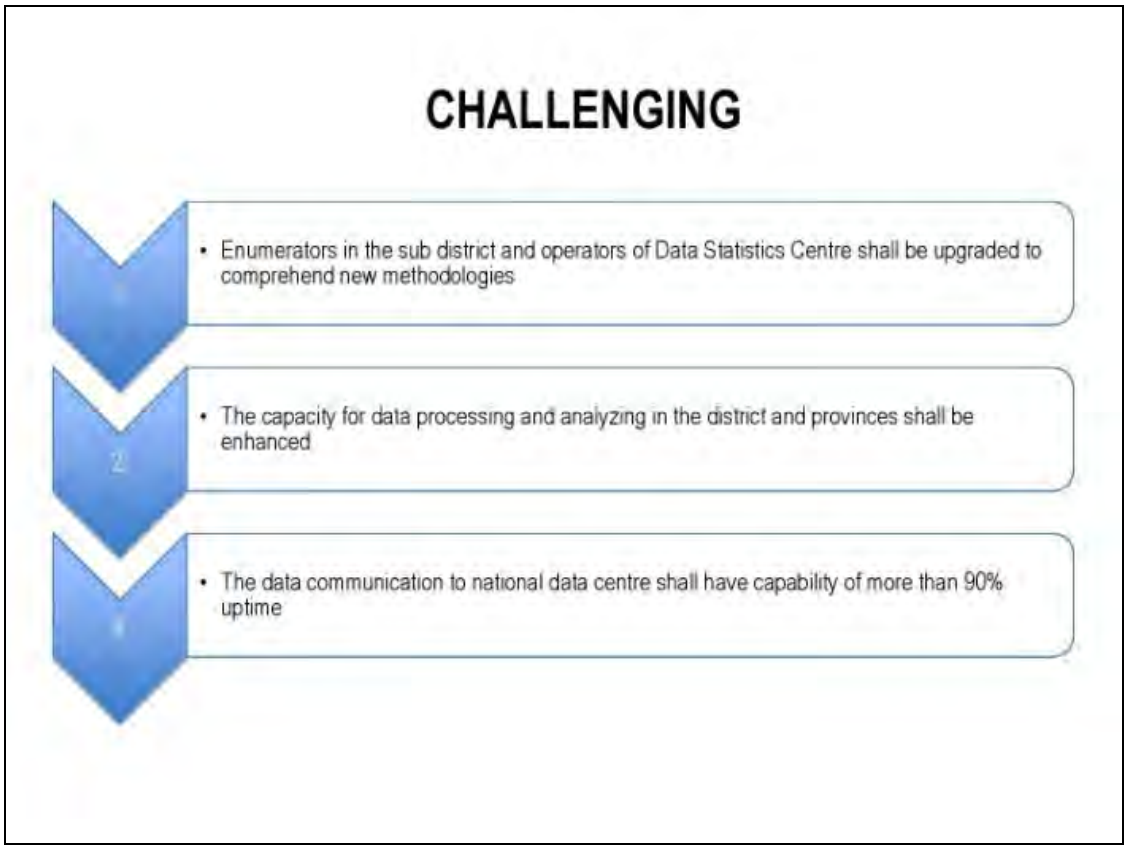
ORGANIZATION STRUCTURE OF THE MINISTRY OF MARINE AFFAIRS AND FISHERIES (MMAF)

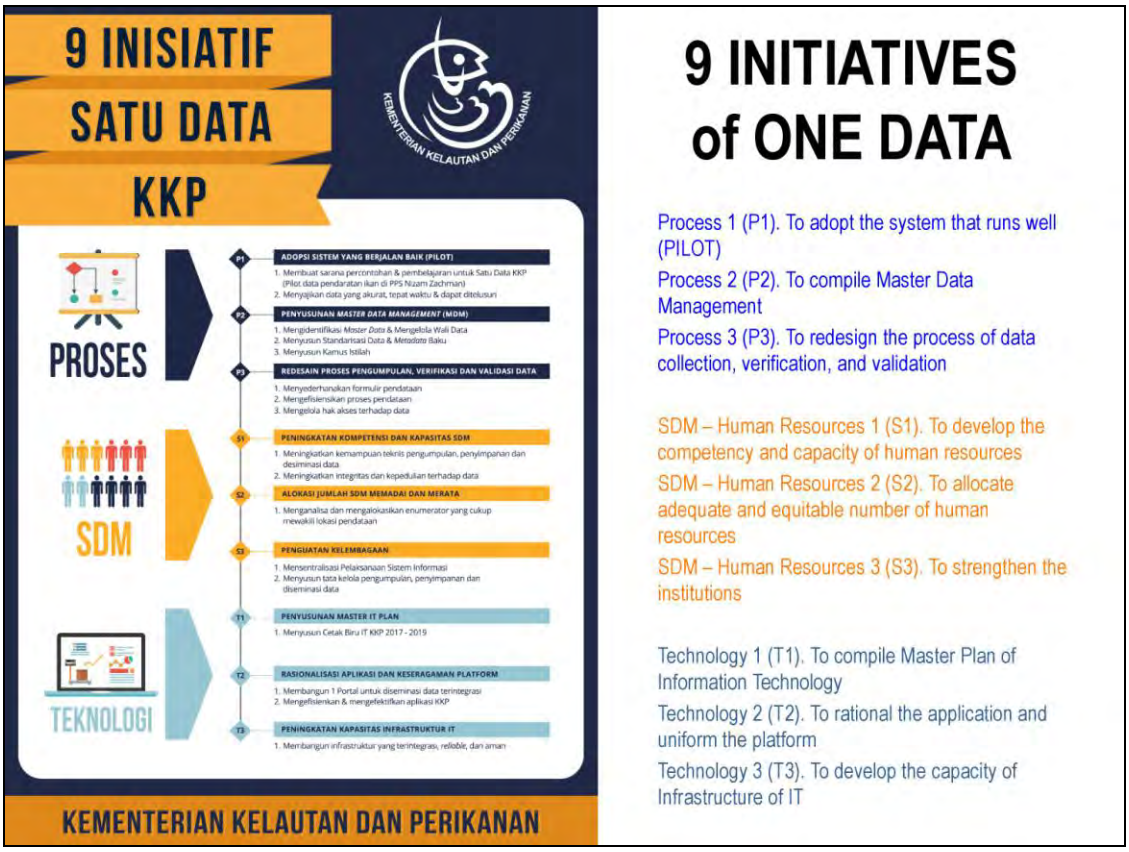


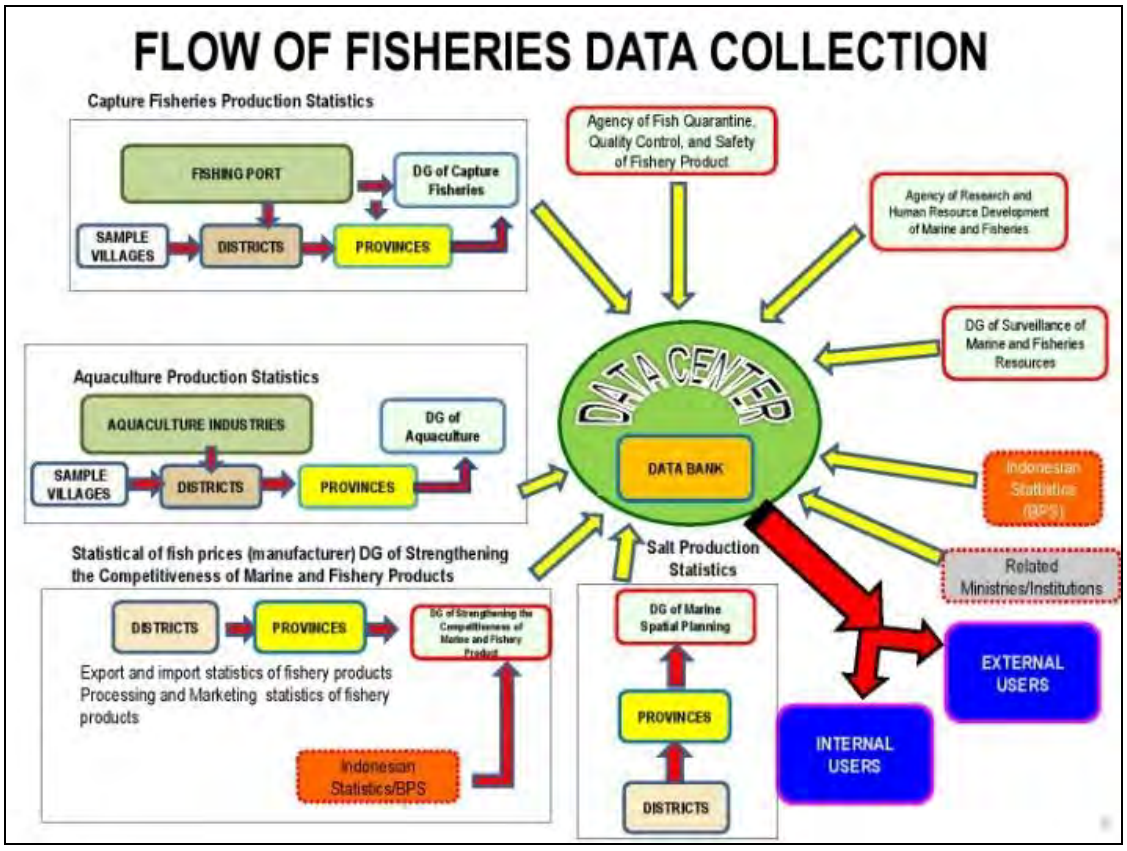

ORGANIZATION STRUCTURE OF THE CENTER FOR DATA, STATISTICS, AND INFORMATION (PUSDATIN)
THE CENTER FOR DATA, STATISTICS, AND INFORMATION
DIVISION OF ADMINISTRATION
SUB DIVISION OF PROGRAM
SUB DIVISION OF LAW & HUMAN RESOURCES
SUB DIVISION OF FINANCE & GENERAL AFFAIRS
DIVISION OF DATA & STATISTICS
SUB DIVISION OF DATA STANDARDIZATION
SUB DIVISION OF DATA & STATISTICS PROCESSING
SUB DIVISION OF DATA & STATISTICS DISSEMINATION
DIVISION OF INFORMATION SYSTEM APPLICATION
SUB DIVISION OF STANDARDIZATION OF SYSTEM INFORMATION APPLICATION
SUB DIVISION OF DEVELOPMENT OF SYSTEM INFORMATION APPLICATION
SUB DIVISION OF INTEGRATION OF SYSTEM INFORMATION APPLICATION
DIVISION OF INFRASTRUCTURE OF INFORMATION TECHNOLOGY
SUB DIVISION OF STANDARDIZATION OF IT INFRASTRUCTURE
SUB DIVISION OF DEVELOPMENT OF IT INFRASTRUCTURE
SUB DIVISION OF INTEGRATION OF IT INFRASTRUCTURE
FUNCTIONAL GROUP


One Data National Policy
National One Data
PILOT
One Data MMAF
Presidential Staff Office (Deputies II)
High Data Integrity
1. Key to the integration of development
2. Welfare equitable
3. Inclusive economic development today and tomorrow
7 Ministries/ Institutions
1. The Ministry of Marine Affairs and Fisheries
2. The Ministry of Energy and Mineral Resources
3. The Ministry Health
4. The Ministry of Higher Education and Research and Tcehnology
5. The Ministry of Forestry and Environment
6. The Ministry of Culture and Education
7. National Development Planning Agency
High Data Integrity
1 Standard Data
Standard Metadata
Portal Data


One Data Challenge
Standard
Metadata
Data and Information
Stable network
Security systems
Infrastructure
Application
Multi-Platform Application Access
Integration
One Data Portal
Human Resources
Competence
certainty Career


CHALLENGING
Enumerators in the sub district and operators of Data Statistics Centre shall be upgraded to comprehend new methodologies
2
The capacity for data processing and analyzing in the district and provinces shall be enhanced
The data communication to national data centre shall have capability of more than 90% uptime


9 INISIATIF
SATU DATA
KKP
KEMENTERIAN KELAUTAN DAN PERIKANAN
PROSES
P1 ADOPSI SISTEM YANG BERJALAN BAIK (PILOT)
1. Membuat sarana percontohan & pembelajaran untuk Satu Data KKP (Pilot data pendaratan ikan di PPS Nizam Zachman)
2. Menyajikan data yang akurat, tepat waktu & dapat ditelusuri
P2 PENYUSUNAN MASTER DATA MANAGEMENT (MDM)
1. Mengidentifikasi Master Data & Mengelola Wali Data
2. Menyusun Standartisasi Data & Metadata Baku
3. Menyusun Kamus Istilah
P3 REDESAIN PROSES PENGUMPULAN, VERIFIKASI DAN VALIDASI DATA
1. Menyederhanakan formulir pendataan
2. Mengefisiensikan proses pendataan
3. Mengelola hak akses terhadap data
SDM
S1 PENINGKATAN KOMPETENSI DAN KAPASITAS SDM
1. Meningkatkan kemampuan teknis pengumpulan, penyimpanan dan diseminasi data
2. Meningkatkan integritas dan kepedulian terhadap data
S2 ALOKASI JUMLAH SDM MEMADAI DAN MERATA
1. Menganalisa dan mengalokasikan enumerator yang cukup mewakili lokasi pendataan
S3 PENGUATAN KELEMBAGAAN
1. Mensentralisasi Pelaksanaan Sistem Informasi
2. Menyusun tata kelola pengumpulan, penyimpanan dan diseminasi data
TEKNOLOGI
T1 PENYUSUNAN MASTER IT PLAN
1. Menyusun Cetak Biru IT KKP 2017 - 2019
T2 RASIONALISASI APLIKASI DAN KESERAGAMAN PLATFORM
1. Membangun 1 Portal untuk diseminasi data terintegrasi
2. Mengefisienkan & mengefektifkan aplikasi KKP
T3 PENINGKATAN KAPASITAS INFRASTRUKTUR IT
1. Membangun infrastruktur yang terintegrasi, reliable, dan aman
KEMENTERIAN KELAUTAN DAN PERIKANAN
9 INITIATIVES
of ONE DATA
Process 1 (P1). To adopt the system that runs well (PILOT)
Process 2 (P2). To compile Master Data Management
Process 3 (P3). To redesign the process of data collection, verification, and validation
SDM – Human Resources 1 (S1). To develop the competency and capacity of human resources
SDM – Human Resources 2 (S2). To allocate adequate and equitable number of human resources
SDM – Human Resources 3 (S3). To strengthen the institutions
Technology 1 (T1). To compile Master Plan of Information Technology
Technology 2 (T2). To rational the application and uniform the platform
Technology 3 (T3). To develop the capacity of Infrastructure of IT


FLOW OF FISHERIES DATA COLLECTION
Capture Fisheries Production Statistics
FISHING PORT
DG of Capture Fisheries
SAMPLE VILLAGES
DISTRICTS
PROVINCES
Aquaculture Production Statistics
AQUACULTURE INDUSTRIES
DG of Aquaculture
SAMPLE VILLAGES
DISTRICTS
PROVINCES
Statistical of fish prices (manufacturer) DG of Strengthening the Competitiveness of Marine and Fishery Products
DISTRICTS
PROVINCES
DG of Strengthening the Competitiveness of Marine and Fishery Product
Export and import statistics of fishery products
Processing and Marketing statistics of fishery products
Indonesian Statistics/BPS
Salt Production Statistics
DG of Marine Spatial Planning
PROVINCES
DISTRICTS
Agency of Fish Quarantine, Quality Control, and Safety of Fishery Product
Agency of Research and Human Resource Development of Marine and Fisheries
DG of Surveillance of Marine and Fisheries Resources
DATA CENTER
DATA BANK
Indonesian Statistics (BPS)
Related Ministries/Institutions
EXTERNAL USERS
INTERNAL USERS

TYPE OF QUESTIONNAIRES

There are **16** type of questionnaires consist of:

- **7** Listing Questionnaires
- **9** Transaction Questionnaires (Production)

Processing & Marketing: 4 Listing, 5 Transaction

No	Listing	No	Transaction
1.	Market (Data KP - PDS – P –T)	5.	Wholesale Fish Price (Data KP - PDS – HG –H)
2.	Fish Processing Unit (UPI) (Data KP - PDS – UPI –T)	6.	Retail Fish Price (Data KP - PDS – HE –H)
3.	Cold Storage (Data KP - PDS – CS –T)	7.	Fish Processing Unit Production (Data KP - PDS – UPI –B)
4.	Unit Non-Consumer Product Handling (UPPN) (Data KP - PDS – UPPN – T)	8.	Fish Stock in Cold Storage (Data KP - PDS – CS –B)
		9.	UPPN Production (Data KP - PDS – UPPN – B)

Capture Fisheries: 1 Listing, 2 Transaction

No.	Listing	No.	Transaction
1.	Capture Fisheries Household (Data KP – PT – T)	2.	Fishing Port Production (Data KP – PT – H)
		3.	Capture Fisheries Production (Data KP – PT – B)

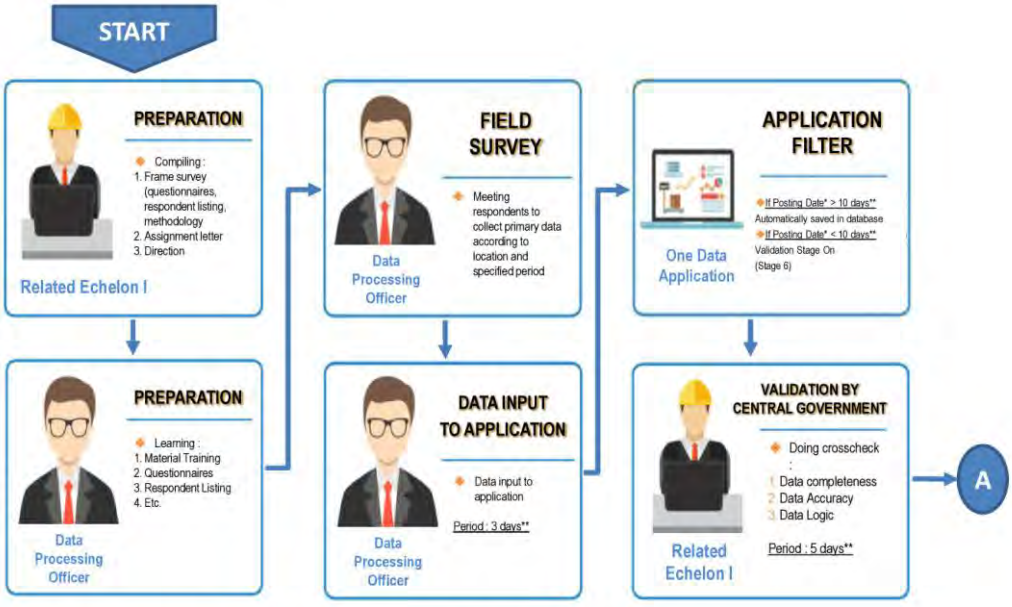
Aquaculture: 1 Listing, 1 Transaction

No.	Listing	No.	Transaction
1.	Aquaculture Household (Data KP - PB - T)	2.	Aquaculture Production (Data KP - PB - B)

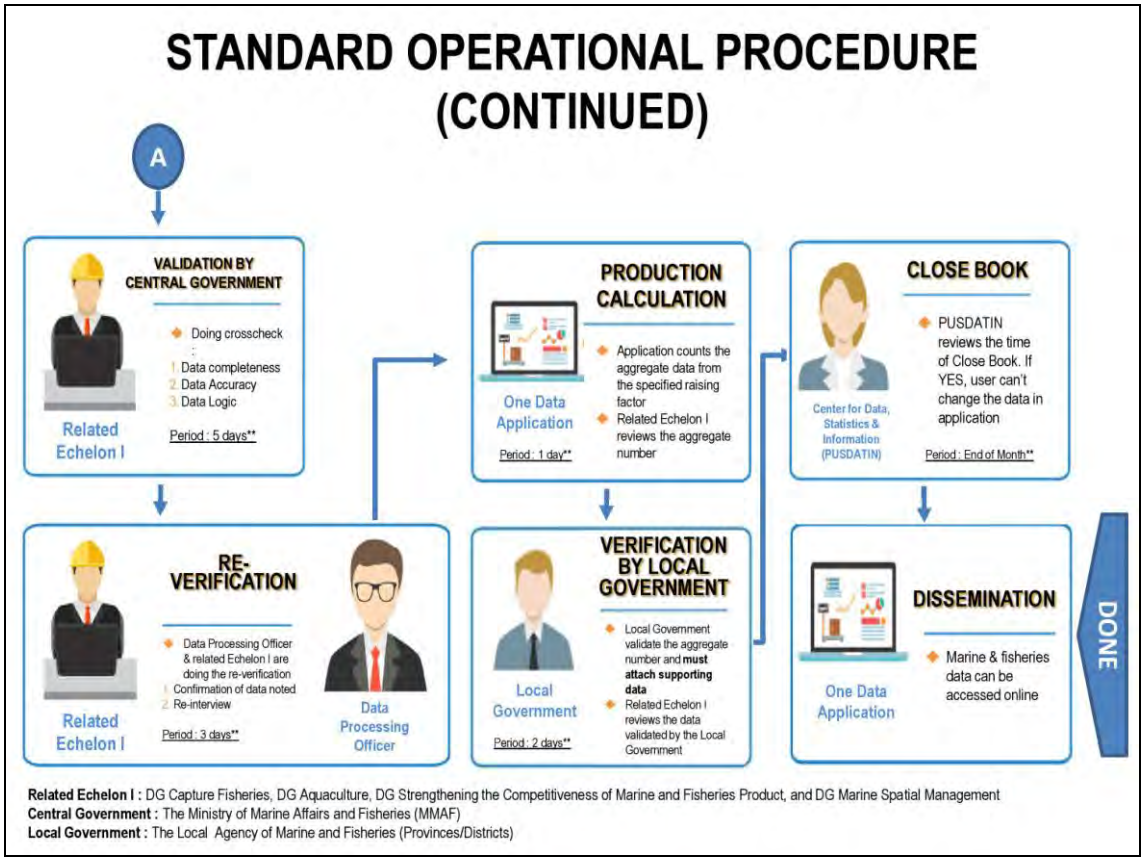
Salt: 1 Listing, 1 Transaksi

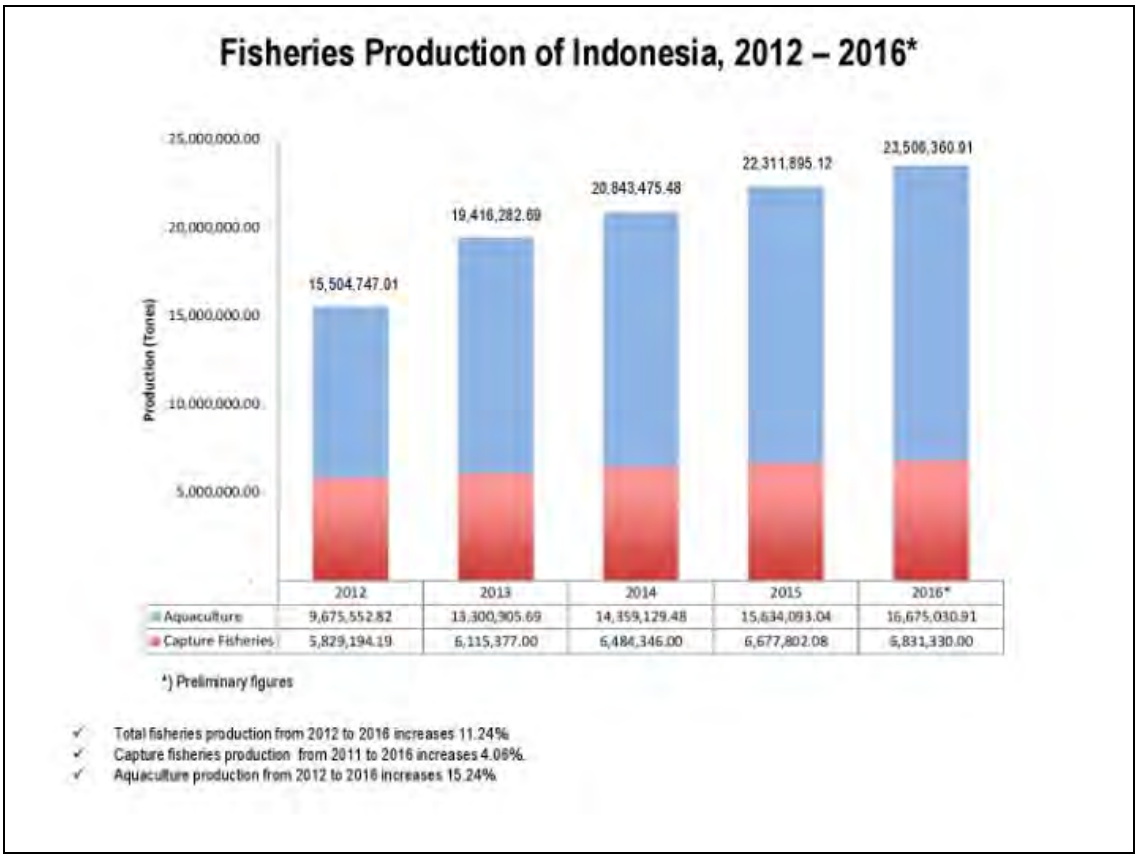
No.	Listing	No	Transaction
1.	Salt Farmer (Data KP - PRL - T)	2.	Salt Production (Data KP - PRL - B)

STANDARD OPERATIONAL PROCEDURE

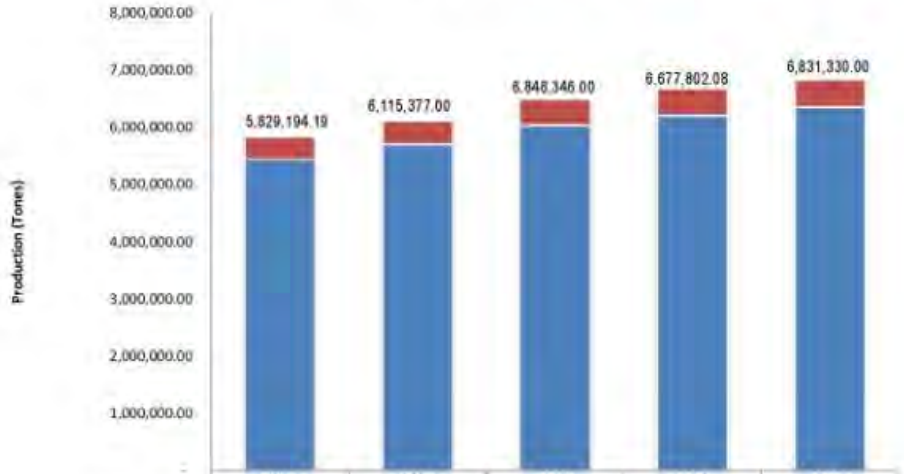


* Posting Date: The Date of Data Processing Officer input the data into the application One Data
** Variable that can be changed in the One Data Application


STANDARD OPERATIONAL PROCEDURE (CONTINUED)
A
VALIDATION BY CENTRAL GOVERNMENT
Doing crosscheck :
1. Data completeness
2. Data Accuracy
3. Data Logic
Related Echelon I
Period : 5 days**
PRODUCTION CALCULATION
Application counts the aggregate data from the specified raising factor
Related Echelon I reviews the aggregate number
One Data Application
Period : 1 day**
CLOSE BOOK
PUSDATIN reviews the time of Close Book. If YES, user can't change the data in application
Center for Data, Statistics & Information (PUSDATIN)
Period : End of Month**
RE-VERIFICATION
Data Processing Officer & related Echelon I are doing the re-verification
1. Confirmation of data noted
2. Re-interview
Related Echelon I
Period : 3 days**
Data Processing Officer
VERIFICATION BY LOCAL GOVERNMENT
Local Government validate the aggregate number and must attach supporting data
Related Echelon I reviews the data validated by the Local Government
Local Government
Period : 2 days**
DISSEMINATION
Marine & fisheries data can be accessed online
One Data Application
DONE
Related Echelon I : DG Capture Fisheries, DG Aquaculture, DG Strengthening the Competitiveness of Marine and Fisheries Product, and DG Marine Spatial Management
Central Government : The Ministry of Marine Affairs and Fisheries (MMAF)
Local Government : The Local Agency of Marine and Fisheries (Provinces/Districts)


Fisheries Production of Indonesia, 2012 – 2016*
Production (Tones)
25,000,000.00
20,000,000.00
15,000,000.00
10,000,000.00
5,000,000.00
15,504,747.01
19,416,282.69
20,843,475.48
22,311,895.12
23,506,360.91
2012
2013
2014
2015
2016*
Aquaculture 9,675,552.82 13,300,905.69 14,359,129.48 15,634,093.04 16,675,030.91
Capture Fisheries 5,829,194.19 6,115,377.00 6,484,346.00 6,677,802.08 6,831,330.00
*) Preliminary figures
Total fisheries production from 2012 to 2016 increases 11.24%
Capture fisheries production from 2011 to 2016 increases 4.08%.
Aquaculture production from 2012 to 2016 increases 15.24%

Capture Fisheries Production, 2012 – 2016*

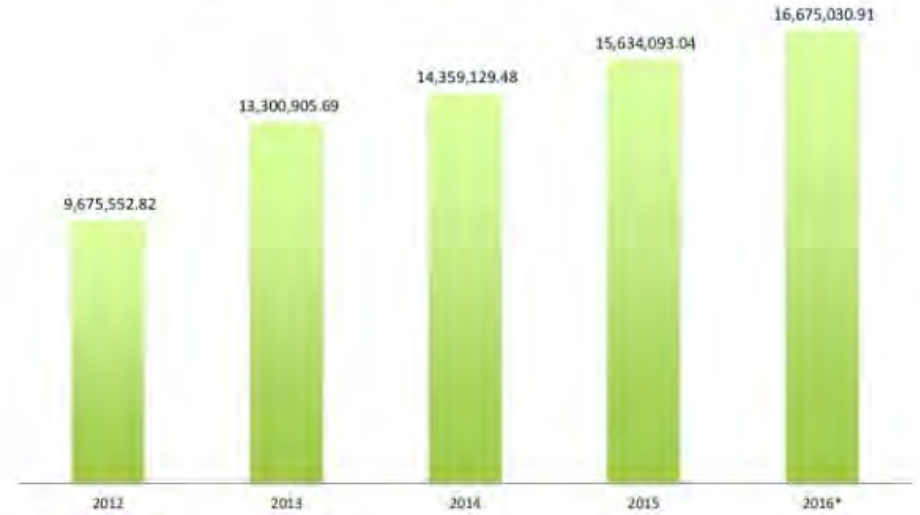


	2012	2013	2014	2015	2016*
Inland Openwater Fisheries	393,561.00	408,364.00	446,692.00	473,134.00	479,850.00
Marine Fisheries	5,435,633.19	5,707,013.00	6,037,654.00	6,204,668.08	6,351,480.00

*) Preliminary figures

- ✓ Total capture fisheries production from 2012 to 2016 increases 4.06%.
- ✓ Marine fisheries production from 2012 to 2016 increases 3.96%.
- ✓ Inland open water fisheries production from 2012 to 2016 increases 5.92%.

Aquaculture Production, 2012 – 2016*



*) Preliminary figures
In Tones

- ✓ Total aquaculture production from 2012 to 2016 increases 15.24%.
- ✓ Aquaculture type in Indonesia consist of manculture, seaweeds culture, floating net, brackishwater pond, freshwater pond, cage, floating cage net, pen culture, and rice fish culture.

Aquaculture Production by Species, 2012 - 2016

Unit: Tones

Fish	Year					Trend (%)
	2012	2013	2014	2015	2016*)	
Total	**9,675,553**	**13,300,906**	**14,359,129**	**15,634,093**	**16,675,033**	**15.24**
Shrimps	415,517	645,955	639,369	590,466	674,555	15.26
Groupers	11,950	18,864	13,346	14,140	15,645	11.30
Nile tilapia	695,063	914,778	999,695	1,084,281	1,187,812	14.73
Common carp	374,366	412,703	434,653	461,107	498,297	7.43
Milk fish	515,527	627,333	631,125	625,341	740,720	9.96
Asian seabass /Giant seaperch / Barramundi	6,198	6,735	5,447	6,558	5,544	-1.38
Pangas cat fishes	347,000	410,883	418,002	339,069	437,112	7.54
Cat fishes	441,217	543,774	679,379	719,619	873,716	18.88
Giant gouramy	84,681	94,605	118,776	113,407	149,553	16.16
Mud crab	14,163	11,898	13,606		-	
Shells	17,251	29,091	44,394	163,074	73,252	83.37
Seaweeds	6,514,854	9,298,474	10,076,992	11,269,342	11,631,586	16.54
Other	237,764	285,812	284,348	247,690	387,241	15.79

Notes :

*. Preliminary Figures

Capture Fisheries Production in Fishing Port, 2012 – 2016

No.	Fishing Port (under DG Capture Fisheries)	Year					Trend (%)
		2012	2013	2014	2015	2016	
1	PPS BELAWAN	63,304.9	56,502.4	49,788.3	47,674.2	27,659.2	-17.21
2	PPS BITUNG	28,175.7	73,026.1	111,316.6	45,208.5	47,618.9	39.39
3	PPS BUNGUS	1,873.7	2,321.9	2,090.9	991.1	320.6	-26.57
4	PPS CILACAP	16,698.4	22,508.1	6,880.8	12,433.3	8,073.4	2.75
5	PPS KENDARI	19,611.0	22,790.9	21,329.0	13,418.7	21,690.8	8.59
6	PPS NIZAM ZACHMAN	93,517.8	113,369.5	119,662.2	81,421.2	74,065.0	-3.55
	TOTAL PPS	**223,181.4**	**290,518.9**	**311,067.8**	**201,147.1**	**179,427.9**	**-2.22**
7	PPN AMBON	68,460.8	82,554.1	68,395.8	8,671.0	1,148.9	-42.66
8	PPN BRONDONG	57,371.9	58,145.2	69,576.4	63,449.0	59,663.7	1.56
9	PPN KEJAWANAN	4,179.5	4,352.3	4,028.0	4,080.2	3,885.0	-1.70
10	PPN PALABUHAN RATU	8,846.5	7,936.0	10,357.0	9,121.9	3,839.1	-12.41
11	PPN PEKALONGAN	19,672.2	15,282.0	15,622.7	17,536.4	19,636.1	1.03
12	PPN PEMANGKAT	8,757.5	8,570.9	10,241.5	8,574.4	9,560.6	3.15
13	PPN PANGAMBENGAN	7,867.7	10,215.5	18,245.0	17,264.0	8,458.2	13.01
14	PPN PRIGI	31,992.7	27,130.7	16,129.3	24,015.0	4,069.3	-22.48
15	PPN SIBOLGA	6,658.6	15,770.2	1,684.7	17,253.0	19,247.3	245.80
16	PPP SUNGAILIAT	5,813.7	7,089.3	6,293.0	3,933.0	6,111.5	7.15
17	PPN TERNATE	6,836.9	6,853.6	6,950.4	7,161.6	5,042.5	-6.22
18	PPN TANJUNGPANDAN	1,298.6	3,029.0	2,621.1	1,874.6	1,874.6	22.82
19	PPN TUAL	20,979.4	28,986.1	21,236.6	157.7	157.7	-21.96
	TOTAL PPN	**248,736.2**	**275,914.8**	**251,381.6**	**183,091.7**	**142,694.4**	**-11.80**
20	PPP TELUK BATANG	1,581.0	2,117.0	2,105.9	1,167.1	1,167.1	-2.80
21	PPP KARANGANTU	2,711.9	2,820.4	2,875.1	1,907.7	2,205.8	-3.02
22	PPP KWANDANG	4,646.9	4,662.1	4,152.8	5,408.7	5,248.4	4.17
	TOTAL PPP	**8,939.8**	**9,599.6**	**9,133.8**	**8,483.5**	**8,621.3**	**-0.74**
	TOTAL 22 Fishing Port	**480,857.3**	**576,033.3**	**571,583.2**	**392,722.3**	**330,743.6**	**-7.01**

PPS = Pelabuhan Perikanan Samudera | Oceanic Fishing Port
PPN = Pelabuhan Perikanan Nusantara | Archipelagic Fishing Port
PPP = Pelabuhan Perikanan Pantai | Coastal Fishing Port

Tuna, Skipjack, Eastern Little Tuna Production in Fishing Port, 2012 – 2016

No.	Fishing Port (under DG Capture Fisheries)	Year					Trend (%)
		2012	2013	2014	2015	2016	
1	PPS BELAWAN	1,168.9	1,168.9	1,213.9	621.0	669.7	-9.29
2	PPS BITUNG	24,048.2	60,058.1	95,121.0	36,726.1	38,212.7	37.69
3	PPS BUNGUS	1,765.9	2,265.9	1,806.4	836.0	279.5	-28.06
4	PPS CILACAP	4,130.7	1,984.8	1,461.4	3,443.4	3,019.7	11.25
5	PPS KENDARI	14,202.8	15,810.7	13,763.0	15,919.7	18,227.5	7.13
6	PPS NIZAM ZACHMAN	58,053.3	73,616.5	21,119.3	49,957.8	45,204.3	20.63
	TOTAL PPS	**103,369.7**	**154,904.8**	**134,485.0**	**107,504.0**	**105,613.4**	**3.71**
7	PPN AMBON	2,524.2	4,245.2	3,668.1	450.0	1,048.4	24.96
8	PPN BRONDONG	772.3	1,183.4	713.9	436.9	271.2	-15.79
9	PPN KEJAWANAN	7.5	21.1	11.9	46.7	75.0	123.21
10	PPN PALABUHAN RATU	6,731.4	5,992.8	7,612.3	5,687.1	2,325.6	-17.09
11	PPN PEKALONGAN	3,336.9	2,532.3	2,057.5	2,019.9	2,467.6	-5.63
12	PPN PEMANGKAT	2,504.7	3,219.6	4,264.2	3,020.8	3,978.3	15.88
13	PPN PANGAMBENGAN	3,913.5	1,715.1	2,412.0	480.8	159.6	-40.60
14	PPN PRIGI	18,154.3	15,875.9	9,954.8	10,498.0	2,381.4	-30.43
15	PPN SIBOLGA	4,914.1	12,821.8	1,026.8	11,722.6	13,139.4	280.66
16	PPP SUNGAILIAT	383.2	208.8	357.0	39.7	66.3	0.93
17	PPN TERNATE	810.6	815.4	837.3	678.4	2,792.2	73.97
18	PPN TANJUNGPANDAN	39.4	36.8	27.2	27.2	86.3	46.19
19	PPN TUAL	1.5	-	1.0	0.0	2.4	
	TOTAL PPN	**44,093.6**	**48,668.2**	**32,944.1**	**35,108.1**	**28,793.7**	**-8.34**
20	PPP TELUK BATANG	14.0	42.3	1.9	-	3.9	
21	PPP KARANGANTU	23.4	46.6	25.4	10.8	30.7	45.05
22	PPP KWANDANG	1,684.6	1,903.9	1,622.4	1,064.2	1,017.2	-10.15
	TOTAL PPP	**1,721.9**	**1,992.8**	**1,649.7**	**1,075.0**	**1,051.8**	**-9.62**
	TOTAL 22 Fishing Port	149,185.2	205,565.8	169,078.8	143,687.0	135,458.9	**-0.18**

PPS = Pelabuhan Perikanan Samudera | Oceanic Fishing Port
PPN = Pelabuhan Perikanan Nusantara | Archipelagic Fishing Port
PPP = Pelabuhan Perikanan Pantai | Coastal Fishing Portwkwwkwkwkw

Squid Production in Fishing Port, 2012 – 2016

No.	Fishing Port (under DG Capture Fisheries)	Year					Trend (%)
		2012	2013	2014	2015	2016	
1	PPS BELAWAN	6,953.9	5,809.9	2,277.8	6,973.7	3,873.8	21.12
2	PPS BITUNG	39.9	56.6	68.9	5.4	27.2	94.36
3	PPS BUNGUS	2.5	0.1	0.2	0.7	0.0	57.62
4	PPS CILACAP	247.8	437.9	459.2	1,379.6	116.7	47.63
5	PPS KENDARI	-	0.4	1.0	2.5	7.1	
6	PPS NIZAM ZACHMAN	11,130.0	11,238.3	5,923.2	12,114.5	10,497.1	11.21
	TOTAL PPS	**18,374.1**	**17,543.2**	**8,730.2**	**20,476.4**	**14,521.9**	**12.68**
7	PPN AMBON	4,180.4	7,883.4	3,307.6	243.6	-	-40.52
8	PPN BRONDONG	753.4	1,207.2	1,489.3	1,744.1	2,833.4	40.79
9	PPN KEJAWANAN	2,210.9	2,273.2	2,252.1	2,967.0	1,843.8	-1.06
10	PPN PALABUHAN RATU	3.0	2.0	9.1	3.9	3.9	64.80
11	PPN PEKALONGAN	134.6	139.3	238.1	179.0	124.2	4.75
12	PPN PEMANGKAT	75.6	128.3	101.0	92.7	161.4	28.60
13	PPN PANGAMBENGAN	0.6	0.1	1.9	-	-	
14	PPN PRIGI	0.2	2.1	2.5	21.3	6.6	388.60
15	PPN SIBOLGA	16.2	17.8	5.4	43.1	75.9	179.96
16	PPP SUNGAILIAT	190.2	146.5	126.4	84.2	397.2	75.45
17	PPN TERNATE	3.5	5.4	5.3	2.9	-	-23.49
18	PPN TANJUNGPANDAN	47.1	72.8	47.8	89.2	54.0	16.80
19	PPN TUAL	49.2	32.9	98.7	0.0	0.0	14.35
	TOTAL PPN	**7,664.8**	**11,911.2**	**7,685.0**	**5,471.0**	**5,500.2**	**-2.09**
20	PPP TELUK BATANG	11.0	6.9	-	-	1.5	
21	PPP KARANGANTU	391.0	310.4	276.7	210.8	228.0	-11.78
22	PPP KWANDANG	8.2	10.7	9.2	10.1	7.6	0.40
	TOTAL PPP	**410.2**	**328.0**	**285.9**	**220.9**	**237.1**	**-12.07**
	TOTAL 22 Fishing Port	**26,449.1**	**29,782.4**	**16,701.1**	**26,168.3**	**20,259.2**	**0.70**

PPS = Pelabuhan Perikanan Samudera | Oceanic Fishing Port
PPN = Pelabuhan Perikanan Nusantara | Archipelagic Fishing Port
PPP = Pelabuhan Perikanan Pantai | Coastal Fishing Port

Bali Sardinella Production in Fishing Port, 2012 – 2016

No.	Fishing Port (under DG Capture Fisheries)	Year					Trend (%)
		2012	2013	2014	2015	2016	
1	PPS BELAWAN	-	-	-	-	-	
2	PPS BITUNG	-	-	-	-	-	
3	PPS BUNGUS	-	-	-	-	-	
4	PPS CILACAP	-	-	-	-	-	
5	PPS KENDARI	-	-	-	-	-	
6	PPS NIZAM ZACHMAN	231.2	236.8	169.1	250.7	80.2	-11.48
	TOTAL PPS	**231.2**	**236.8**	**169.1**	**250.7**	**80.2**	**-11.48**
7	PPN AMBON	-	-	-	-	-	
8	PPN BRONDONG	152.2	104.0	14.0	10.4	19.5	-14.10
9	PPN KEJAWANAN	-	-	-	-	-	
10	PPN PALABUHAN RATU	-	-	-	-	-	
11	PPN PEKALONGAN	3,200.0	1,236.6	2,416.4	2,608.1	3,195.6	16.13
12	PPN PEMANGKAT	-	-	-	-	-	
13	PPN PANGAMBENGAN	2,436.5	6,331.3	14,306.8	16,047.2	7,149.7	60.63
14	PPN PRIGI	2,077.8	1,188.3	1,463.3	2,277.5	29.7	-15.68
15	PPN SIBOLGA	-	-	-	-	-	
16	PPP SUNGAILIAT	-	-	-	-	-	
17	PPN TERNATE	-	-	-	-	-	
18	PPN TANJUNGPANDAN	-	-	-	-	-	
19	PPN TUAL	-	-	-	-	-	
	TOTAL PPN	**7,866.5**	**8,860.1**	**18,200.5**	**20,943.2**	**10,394.5**	**20.69**
20	PPP TELUK BATANG	-	-	-	-	-	
21	PPP KARANGANTU	-	-	-	-	-	
22	PPP KWANDANG	-	-	-	-	-	
	TOTAL PPP	-	-	-	-	-	
	TOTAL 22 Fishing Port	**8,097.7**	**9,096.9**	**18,369.6**	**21,193.9**	**10,474.7**	**19.77**

PPS = Pelabuhan Perikanan Samudera | Oceanic Fishing Port
PPN = Pelabuhan Perikanan Nusantara | Archipelagic Fishing Port
PPP = Pelabuhan Perikanan Pantai | Coastal Fishing Port

Statisticians in MMAF

MMAF has 25 statisticians that spread in Indonesia consist of :

1. Senior Statisticians 14 People (Ambon, Bali, West Kalimantan, Bangka-Belitung, Central Java, East Java, North Sumatera)
2. Junior Statisticians 11 People (MMAF-Jakarta, Central Java, Ambon, East Java, West Java)

This picture shows the Scientific Forum of MMAF Statisticians 2016

PROBLEMS IN REPORTING STATISTICS

- The number of enumerators in the districts are not sufficient to covers all the areas of Indonesia.
- One data application is still on development stage of making data reporting (It soon to be finished on the end of August 2017).
- Need to improve the methodology of data collection in inland open waters.
- Budget for statistics is very low.
- Data collection is not include for ornamental fish and seed.
- Indonesia fisheries resources characterized by multi species of fish affected to the method of collecting data for some fish unpopular species becoming into classified grouping data as other species.

SUGGESTIONS AND RECOMMENDATIONS

- Improvements methodology based of budget (how to get samples with the low budget, low human resources);
- The methodology of data collection in inland open waters which will be held this year with the Pilot Project on Musi River Palembang.
- Methodology survey data estimates of seed and ornamental fish;
- On the job training for staff of MMAF as well as staff in the province and district for data collecting data, data processing, and improvement of methodology.

Annex 7

REVIEW ON REPORTING OF STATISTICS BASED ON THE FRAMEWORK OF FISHERY STATISTICS OF SOUTHEAST ASIA: LAO PDR

By Mr. Bounthanom Chamsinhg

Fisheries Division, Department of Livestock and Fisheries (DLF),
Ministry of Agriculture and Forestry (MAF)

I. Country profile

The Lao Peoples' Democratic Republic (Lao PDR) is a land-locked country with total area of 236,800 square kilometers, about 70% of total land is mountainous: agriculture land is 4.5 hectare and 88.7% (207,674km^2) drains into the Mekong River, making up 26.1% of Mekong Basin, and contributing about 35%of the Mekong River's discharge. Another 12.3% in the north-eastern area drains to the north of Vietnam into rivers that flow to the China Sea. All most all Lao territory is of enormous importance, both for fishery resources and for its rich aquatic biodiversity.

The country has border with 5 countries: North is China and Myanmar, South is Cambodia, East is Vietnam and the West is Thailand. The Capital of Lao is Vientiane Municipality; the country is divided into 18 provinces these in turn are subdivided into 148 districts and 8,507 villages. Total population is 6,492,400 peoples and consists of 49 different ethnic groups (LECS5).

II. Overview on status and trend of fisheries and aquaculture in Lao PDR.

Capture fisheries and aquaculture in Lao PDR are based on water resource ecosystems which consist mainly of rivers and streams, hydropower and irrigation reservoirs, diversion weirs, small water bodies, flood plains and wet-season rice-fields. The total area of water resources for capture fisheries is believed to be more than 1.2 million ha. The estimated consumption of inland fish in Lao PDR is approximately 167,922 tons per year while consumption of other aquatic animals is estimated at 40,581 tons per year. Most of the consumption is from internal production (*i.e.* imports are of minor importance), so these figures represent approximate catches or yield from fisheries. These estimated yields are conservatively valued at almost US$150 million per year.

The people of Lao PDR, especially in the rural communities more than 75% of the total population, still depend upon the country's fish and other aquatic animals as their most reliable sources of animal protein. More than 481fish species have been identified in Lao PDR including 22 fish species identified as exotic species. About 37 amphibians, 7 species of crabs and 10 species of shrimps have only been recorded for Lao PDR, but these records would cover only about 15% of total. Due to the diversity of aquatic ecosystem, the structure of inland fisheries as well as their production can be characterized by various types of capture and culture. Capture fisheries in Lao can be categorized by the use of various water bodies such as the Mekong River and its tributaries, large hydropower reservoirs, natural ponds, lakes and small wetland, irrigation reservoirs, weirs, and the large areas of wet season rice fields and seasonal Mekong flood plains. The majority of the catches of the fish and other aquatic animals in the various water bodies are still using for house hold "subsistence and semi-subsistence fishing or artisanal fisheries" except in large reservoirs where the catches have been organized and normalized. As noted by Coates *et al.(2003)*, the general accessibility of aquatic resources to most local communities, and the high participation in exploitation and utilization of these resources are linked intimately. This type of catch is an integral part of the livelihood of entire communities, and most fishing effort is part time and seasonal in nature.

The estimate of fish consumption per capita (kg/capita/ year) of inland fish is 24.5 kg, while other aquatic animals account for about 4.1 kg and marine products around 0.4 kg, to make a total of 29 kg of fish and aquatic products consumed per capita per year Hortle (2007).

As aquaculture in Lao PDR expands, many forms of production systems are being developed, for example pond culture, communal ponds, rice-cum-fish culture and cage culture. Most fish culture systems in Lao PDR are small-scale. Such forms of production systems are divided into sub-categories depending on the nature and main activity of the producers. The main fishes species that farmers preferred for culturing such: silver carp (*Hypophthalmichtys molitrix*), big head carp (*Aristichthys nobilis*), grass carp (*Ctenopharyngodon idella*), catla (*Catla catla*), rohu (*Labeo rohita*), mrigal (*Cirrhinus mrigala*), common carp (*Cyprinus carpio*), silverbarb (*Barbodes gonionotus*), Pa phone (*Cirrhinus microlepis*), *Clarias macrocephalus, Pangasianodon hypophthalmus, Hemibagrus wyckioides, Hummibgrus spp., Pangasius krempfi, Pangasius larnaudi, Henicorhynchus siamensis, Cirrhinus microlepis, Barbonymus gonionotus, Anabus testudineus* and tilapia *(Oreochromis niliticus).* According to the Department of Livestock and Fisheries reported to MAF, aquaculture production in 2014 accounted for 90,374 tons in an area of more than 58,536ha, including cage cultures.

There has been a significant increase in intensive tilapia production in recent years in Lao PDR, almost tilapia cage cultures in the Mekong River, its tributaries and in some irrigation reservoirs. In the last five years from 2010 to 2014 number of tilapia cages culture increased more than 2,400 cages (DLF 2014).

Table 1: Production of capture fisheries and aquaculture (ton) from 2010- 2014

Year	2010	2011	2012	2013	2014
Capture production	30.900	34.000	34.105	38.946	60.232
Culture production	82.100	95.600	101.894	103.896	90.347
Total	113.000	129.600	135.999	142.842	150.579

(DLF, 2014)

Figure 1: Trends of Capture and Aquaculture production 2010-2014

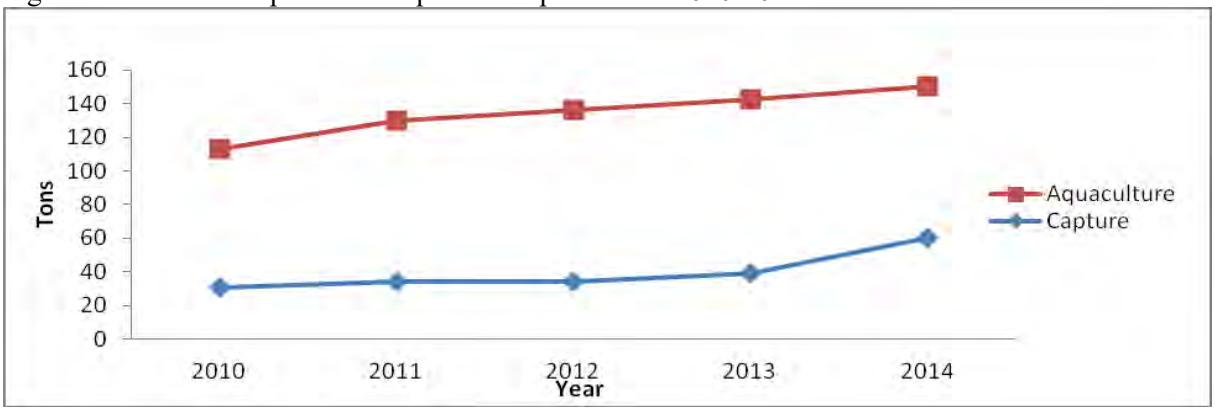
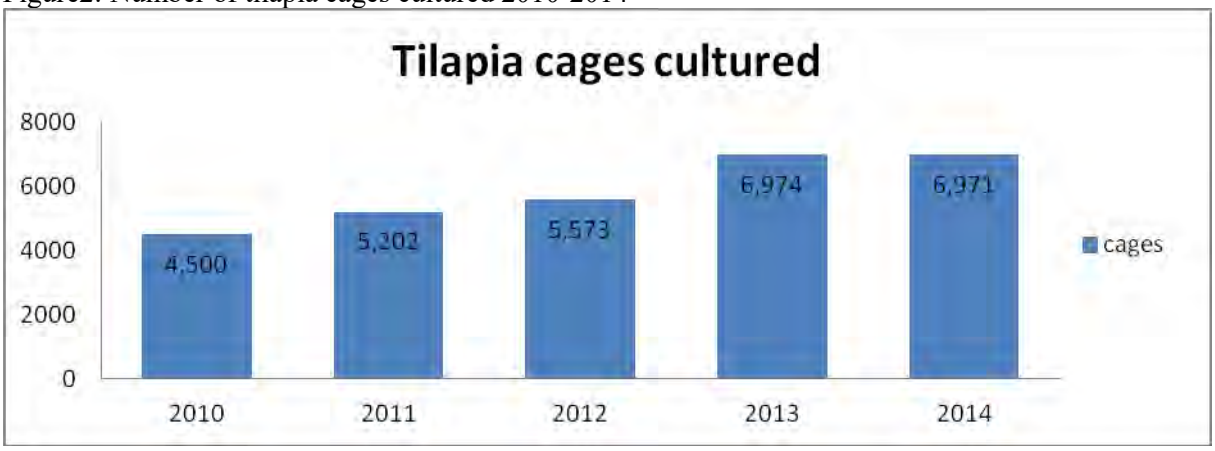


Figure2: Number of tilapia cages cultured 2010-2014



(DLF 2014)

III. National fisheries statistical systems

3.1 National level (Ministry of Planning and Investment)

The statistics system of Lao PDR is decentralized involving several institutions, each with specific assignment. Until 2010, the Department of Statistics (DOS) under Ministry of Planning and Investment (MPI) was responsible for **Population Censuses and Household Survey** in the non-agriculture sector, notably the Lao Expenditure and Consumption Survey (LECS), which undertaken every 5 years. The Statistics Law was enacted in June 2010, which upgraded DOS into the Lao Statistics Bureau (LSB), with status equivalent to a sub-ministry of a line ministry. The Statistics law provides LSB the authority to conduct censuses and survey, compile national accounts statistics and provide overall coordination of the system. It also specifies that the line ministries and province, municipality, district and sub-district offices can conduct sample surveys after receiving technical approval of LSB.

3.2 Ministry Agriculture and Forestry level

Under Lao statistics Law (2010):

- The Ministry of Agriculture and Forestry (MAF) is responsible for parts of the Economic statistics and Socio statistics under guidance from the Lao Statistics Bureau (LSB);
- The Department of Planning and Cooperation (DOPC) is responsible for statistical work of MAF. It is secretary body is the Center for Agricultural Statistics (CAS) by the Minister's decision 2013.
- CAS plays a role of coordinator with line departments and institution as well as local authorities covering all sub-sectors. In accordance with the Action for Improving Agricultural and Rural Statistics Lao PDR.

The census of Agriculture undertaken every 10 years, the first organized in 1998/99 and the second in 2010/2011 covered the whole country, including all 143 districts. The census consist three components:

1. **Village component:** a survey of all villages in the country to collect data from village chief on rural infrastructure and services.
2. **Household component:** a survey of all households in the country to collect basic data on livestock and fisheries.
3. **Sample farm household component:** a sampling survey of 41, 660 farm households to collect detailed data on agricultural activities including fisheries.

To adopt decentralization system for agricultural statistics, the Department of Livestock and Fisheries in collaboration with Living Aquatic Resources Research Center (LARReC), Provincial Livestock and Fisheries and District Livestock and Fisheries Units collects and compiles data on Livestock and Fisheries (capture fisheries and Aquaculture) regularly by provincials, districts and village then report by weekly, monthly, quarterly, biannual and annual report.

IV. The issues and constraints on fishery statistics in Lao PDR as details bellow:

4.1 Issues:

- Very few detailed study at local level (cluster and village)
- Availability of fishery statistics: Mostly production related
- Accuracy, reliability and timeliness: Need to be improve
- Data analysis and dissemination insufficient

- Lack of staff with competent knowledge and skills in fishery statistics, in conjunction with an inadequacy of tools, equipment for measuring, calculating, recording and analyzing the data, especially at the grassroots level
- Lack of regular update

4.2 Constraints:

- Organization and responsibility
- Data collection methods
- Manpower and human capacity
- Budget
- Infrastructure

V. The national plans to improve data collection system

The issues that government considers for improving data collection system as below:

- Improve the administrative report system
- Improve dissemination of agriculture statistics
- Develop system for collection farm-gate price statistics
- Improves cost of production statistics
- Improve food balance sheet
- Developing integrated system of agricultural statistics
- Building capacity in agricultural statistic
- Improving Livestock and Fisheries, and Forestry statistics
- Developing Agro-environmental statistics

VI. The difficulties faced in reporting of statistics to SEAFDEC (and also FAO)

- Lack of staff with competent knowledge and skills in fishery statistics.
- Data or statistics exist in fisheries not meet requirement and
- Data and information fishery sector has, but not official yet.

VII. Suggestions and Recommendations

- Lao PDR requests to SEAFDEC and FAO for capacity building on fisheries statistics to fisheries staffs (Special on statistics need of SEAFDEC and FAO)
- Harmonizes data collect forms of SEAFDEC and FAO if possible.
- SEAFDEC/FAO Collaborates DLF to re- nominates focal point for reporting fisheries statistics.

VIII. Acknowledgement

The Department of Livestock and Fisheries, Ministry of Agriculture and Forestry, Lao PDR and myself personally would like to take this opportunity to express sincere thanks to SEAFDEC, and other international organizations and donors for their kind support and assistance extended to the strengthening capacity for the fisheries and aquaculture in Lao PDR.

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Annex 8

REVIEW ON REPORTING OF STATISTICS BASED ON THE FRAMEWORK OF FISHERY STATISTICS OF SOUTHEAST ASIA: MALAYSIA

By Mr.Syed Yusuf Wan Drahman

Department of Fisheries Malaysia

Overview of Fisheries in Malaysia.

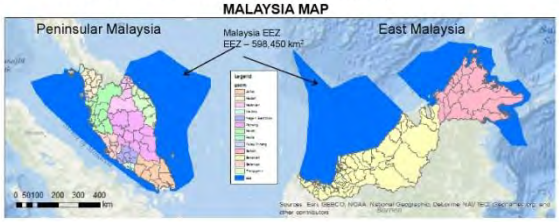
Regional Technical Consultation On Fishery Statistics and Information in Southeast Asia
15 – 18 August 2017
Bangkok, Thailand

Mr. Zaki Mokri (*DOF Malaysia*)
Mr. Syed Yusuf Wan Drahman (*DOF Malaysia*)

MALAYSIA

- 14 states
- Population 32 Million
- Total fish production around 2 million tm
- Fish consumption 52kg (per person per year)

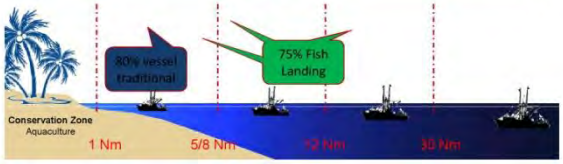
MALAYSIA MAP



FISHERIES INDUSTRY IN MALAYSIA

1. Capture fisheries
   - Fishing ground : EEZ – 598,450 km²
   - 53,000 vessel
   - 132,000 Fishermen
   - Average 1.5 million tonnes fish landing

Zoning system



Continue..

1. Capture fisheries

YEAR	NO. VESSEL	NO. FISHERMEN	LANDING (TONNES)	VALUE (USD' Million)
2012	54,235	136,514	1,472,240	1,856.20
2013	57,095	114,019	1,482,900	1,938.60
2014	57,927	143,421	1,458,128	2,043.10
2015	56,211	140,949	1,486,050	2,167.90
2016	53,190	132,305	1,574,447	2,366.60

1 USD = MYR 4.3

2. Aquaculture
   - ✓ *407,000 tonnes production*
   - ✓ *22,000 Culturists*
   - ✓ *brackishwater and freshwater*
   - ✓ *pond, cage, tank, pen culture, etc*

3. Inland fishery
   - ✓ *6,000 tonnes landing*
   - ✓ *5,000 Fishermen*
   - ✓ *river, lake, dam etc*

2. **AQUACULTURE**

YEAR	NO. Culturists	PRODUCTION (Tonnes)			VALUE (USD Million)
		Freshwater	Brackishwater	TOTAL	
2012	29,494	163,757	470,620	634,376	641.42
2013	26,802	132,892	397,313	530,205	625.28
2014	26,516	106,731	413,783	520,515	808.19
2015	25,060	112,145	394,320	506,465	766.62
2016	21,790	103,348	304,039	407,387	647.38

1 USD = MYR 4.3

3. Inland fisheries

WHAT KIND OF DATA COLLECTED ?

Wide range of data were collected and emphasis on the:

Capture Fisheries

Catch

Landing, by :
- species
- gear-type
- month
- states, etc..

Fishing Effort

by gear type
- No. of trip
- No. of haul
- hour per haul, etc.

Cont...

Others data.

Aquaculture

Production by:
- state
- Culture system
- species etc

economy

Quantity and Value
- price
- value
- import
- export
- self sufficient level (SSL)
- etc.

METHODOLOGY OF DATA COLLECTION

1. Stratified Random Sampling

- Divide the population into sub-populations (groups / strata) before sampling.
- taking samples from each stratum or sub-group of a population.

TRAWL NET
- below 10 GRT
- 10 – 25 GRT
- 25 – 40 GRT
- 40 – 70 GRT
- above 70 GRT

FISH PURSE SEINES
- below 10 GRT
- 10 – 25 GRT
- 25 – 40 GRT
- 40 – 70 GRT
- above 70 GRT

ANCHOVY PURSE SEINES
- below 10 GRT
- 10 – 25 GRT
- 25 – 40 GRT
- 40 – 70 GRT
- above 70 GRT

GILL / DRIFT NET
- below 10 GRT
- 10 – 25 GRT
- 25 – 40 GRT
- 40 – 70 GRT
- above 70 GRT

Sub-Group by GEAR Type

METHODOLOGY OF DATA COLLECTION

2. Listing base on Data Strata

- Done before data collection:
- Aim: to get total no. of vessels in operation
- Exercises were conducted by Fisheries District to estimate total number of vessels in operation according to each stratum
- Validate the number of vessel in operation with the number of license issued.

Licensed and operating vessels | Licensed vessels but not operating | Illegal vessels (without licenses but operating)

(Example) **TRAWLER**

Vessel Tonnage (GRT)	No. of Vessel in Operation
Below 10	
10 – 25	
25 – 40	250
40 – 70	
Above 70	

These figures will be the multiplying factors to estimate the total landings.

Repeat For Other Gear type

METHODOLOGY OF DATA COLLECTION

3. Sampling plan

Unit in Operation	No. of Samples to Collect
< 35	100%
35 - 100	35
101 - 499	35 for first 100 unit + 10% for additional unit
500 >	75

(Example) For State A, 250 unit trawlers (*25 – 40 GRT*) in Operation. The no. of sample to be collected ?:

First 100 unit + 10 % for additional unit (150X10%) = TOTAL samples to be collected

35 + 15 = 50

* Total sample for each districts in State – A ?

EXAMPLE

STATE : Perak

GEAR TYPE : Trawl Net

DISTRICTS	KERIAN		LARUT MATANG		MANJUNG UTARA		MANJUNG SELATAN		HILIR PERAK		TOTAL	
SUB GROUP	Unit in operation	Sampel	Unit in operation	Sampel	Unit in operation	Sampel	Unit in operation	Sampel	Unit in operation	Sampel	Unit in operation	Sampel
below 10 GRT	-	-	-	-	-	-	-	-	70	35	70	35
10 – 25 GRT	6	1	487	42	232	22	7	1	131	11	863	75
25 – 40 GRT	-	-	20	7	5	2	28	10	46	16	99	35
40 – 70 GRT	-	-	128	18	15	4	17	4	244	40	404	66
above 70 GRT	-	-	7	3	-	-	-	-	81	32	88	35

METHODOLOGY OF DATA COLLECTION

4. Collecting Data

FA (*Fisheries Assistant*) collect data at the fish landing.

Type of data to be collected ?:

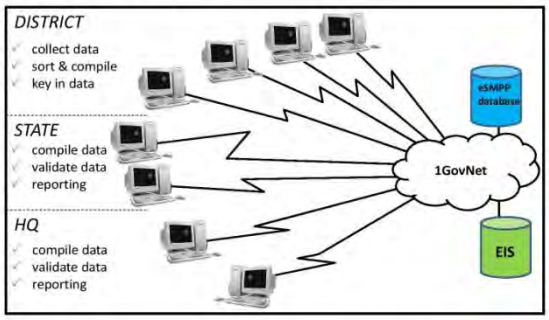
- *Date*
- *No. of Vessel*
- *Trip*
- *No. of haul*
- *Average (hour) per haul*
- *No. of day*
- *Landing of fish (kg) by species*

How to collected ?

- *observation*
- *receipt*
- *logbook*
- *interview, ect..*

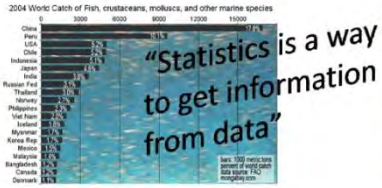
METHODOLOGY OF DATA COLLECTION

5. PROCESS & COMPILE DATA



CONSTRAINTS

- Wide area of coverage
  - ✓ *High no. of landing port to cover*
- Insufficient enumerators
- Lack of supervisions
- Lack of training
- Insufficient fund



IMPROVEMENT ON FISHERY STATISTIC

Reporting statistics on aquaculture

Improve aquaculture data collection methodology

- ✓ System-based
- ✓ Census and sampling
- ✓ Started 2017

Reporting of fish prices

Going to develop a mobile app for the user to monitor the price of fishes in the market

Thank you

Annex 9

REVIEW ON REPORTING OF STATISTICS BASED ON THE FRAMEWORK OF FISHERY STATISTICS OF SOUTHEAST ASIA: MYANMAR

By May Thanda Wint

Deputy Director, Ministry of Livestock, Fisheries and Rural Development

Regional Technical Consultation on Fishery Statistics and Information in Southeast Asia

Department of Fisheries
Ministry of Livestock ,Fisheries and Rural Development
Nay Pyi Taw

By
May Thanda Wint
Deputy Director

BKK, Thailand **15-18 August**

Status and Trend of Fisheries and Aquaculture

Production

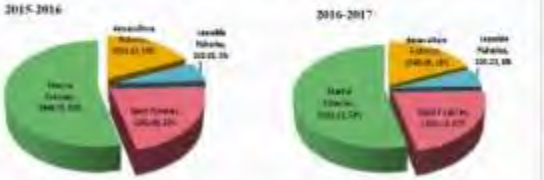
- The total production of fish was 5.67 million metric tons
- Freshwater fish was 2.64 million metric tons (47% of the total fish production)
- Marine fish was 3.03 million metric tons (53% of the total fish production)

Export

- Amount of fish and fishery products was 0.439 million metric tons and the value of which was 605.820 million US$

FISHERY PRODUCTION

No.	Year	Total	Aquaculture	Leasable Fisheries	Open Fisheries	Marine Fisheries
1.	2012-2013	4716.22	929.38	290.00	1012.97	2483.87
2.	2013-2014	5047.40	964.12	304.44	1076.59	2702.25
3.	2014-2015	5316.95	999.63	315.36	1147.76	2854.20
4.	2015-2016	5591.83	1014.42	338.69	1241.98	2996.74
5.	2016-2017	5675.47	1048.69	339.23	1251.13	3036.42



THE PRODUCTION OF LEASABLE FISHERIES AND OPEN FISHERIES

No.	Year	Total amount of Leasable Fisheries (Number)	Production of Leasable Fisheries (MT-000)	Production of Open Fisheries (MT-000)	Total Production of Inland Fisheries (MT-000)
1.	2012-2013	3409	290.00	1012.97	1302.97
2.	2013-2014	3290	304.44	1076.59	1381.03
3.	2014-2015	3304	315.36	1147.76	1463.12
4.	2015-2016	3312	338.69	1241.98	1580.67
5.	2016-2017	3299	339.23	1251.13	1590.36

FISHING VESSELS

No.	Year	Small Fishing Boat		Off-shore Vessels		Total
		Powered Boat	Non-Powered Boat	National	Foreign	
1.	2012-2013	12157	12757	2724	150	27788
2.	2013-2014	12490	13732	2736	153	29111
3.	2014-2015	12240	13391	2840	52	28523
4.	2015-2016	13831	12583	3030	11	29455
5.	2016-2017	16012	10704	3105	48	29869

TOTAL AQUACULTURE PONDS AND PRODUCTION

No.	Year	Area of Aquaculture Ponds (Acre)	Production of Aquaculture Ponds (Thousand Metric Ton)
1.	2012-2013	449692	929.38
2.	2013-2014	450324	964.12
3.	2014-2015	469153	999.63
4.	2015-2016	478002	1014.42
5.	2016-2017	487525	1048.69

Quantity - Metric Ton
Value - US $ in Million

No.	Year	Fish		Prawns		Others		Total	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1.	2012-2013	266464.97	378.05	17267.93	89.29	93112.79	185.50	376845.69	652.84
2.	2013-2014	237142.31	286.93	16508.97	61.98	91616.08	187.36	345267.36	536.27
3.	2014-2015	225974.93	258.61	17527.33	56.89	94788.33	166.75	338290.59	482.25
4.	2015-2016	246970.93	274.25	13673.49	49.64	108326.47	178.74	368970.89	502.63
5.	2016-2017	290580.04	319.04	13082.46	58.21	135044.01	228.57	438706.51	605.82

Unit - Thousand Metric Ton

No.	Year	Production		
		Fresh Water	Marine	Total
1.	2012-2013	94.68	167.01	261.69
2.	2013-2014	135.04	166.42	301.46
3.	2014-2015	142.45	152.95	295.40
4.	2015-2016	127.56	159.46	287.02
5.	2016-2017	124.65	170.58	295.23

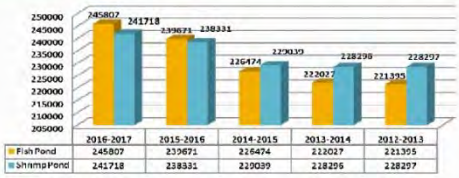
Aquaculture

- **26** hatcheries owned by the Department of Fisheries had managed to produce a total of **644.092** million freshwater fish fry and fingerling
- **39** private hatcheries around Myanmar had produced an impressive amount of **1875** million fry and fingerling
- **56798** number of permanent men labors working in 2016-2017

TOTAL AREA OF AQUACULTURE PONDS

Unit-Acre

No.	Year	Area		
		Fish Pond	Shrimp Pond	Total
1.	2012-2013	221395	228297	449692
2.	2013-2014	222028	228296	450324
3.	2014-2015	232515	236638	469153
4.	2015-2016	239671	238331	478002
5.	2016-2017	245807	241718	487525



- Also initiated the paddy cum fish farming in appropriate regions through demonstration 14678 acres of paddy field in States and Divisions
- Total area of 7517.25 hectares of prawn and fish polyculture farms in the whole country
- Three types of shrimp farming;
- Semi-intensive shrimp ponds – 2181.72 hectares
- Extensive plus shrimp ponds- 37157.36 hectares
- Extensive or traditional shrimp ponds – 57151.36 hectares
- **Production**
- Total production of freshwater prawn and marine shrimp were 67723.87 MT

PRESENT DATA COLLECTION SYSTEMS

Before 94/95

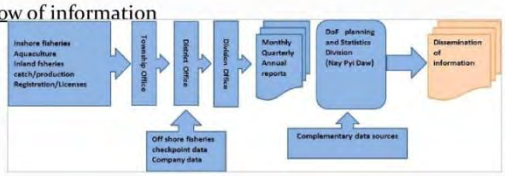
Myanmar Fisheries Enterprise responsible for marine fisheries data collection of their vessels
DoF responsible for inland Lease fisheries data collection and registration/licenses and non MFE vessels

After 94/95

Planning Division of DoF responsible for all fisheries and aquaculture data collection

PRESENT DATA COLLECTION SYSTEMS

Flow of information



MARINE FISHERIES DATA COLLECTION

Structural data, numbers, characteristics, etc

- Register and licensing system

Total catch and effort

- Check point data for marine offshore
- Target data of planning division for marine inshore

Species composition marine offshore

- Fish, prawn and trash fish from check point
- Sampling species composition 29 species for 10 vessels monthly in Taninthayi

Species composition marine inshore

- Not set in the target levels and not collected or reported

INLAND FISHERIES DATA COLLECTION

Structural data, numbers, characteristics, etc

- Register and licensing system

Total catch Lease

- Some reporting but mainly based on target data

Total catch Open water

- Mainly based on target level

Species composition

- Almost absent

AUACULTURE DATA COLLECTION

Structural data, numbers, characteristics, etc

- Register and licensing system

Production data

- conform the target levels set for Prawn, Fish and Crab asset by the planning division

Target levels in "viss/acre" total production calculated with "registered acres" and not with "active acre" gives over estimation.

National fisheries statistical system

- *the fishery statistics systems/mechanism that include reporting fishery statistics data from landing sites to national statistics center.*
- *fisheries statistics systems that reporting statistics data from Department of fisheries Statistics Division office.*
- *fisheries data from Township fisheries office via state and division fisheries offices were not directly from landing sites.*
- *Normally Township fisheries officers did not going to their landing sites regularly due to unsupported the traveling cost and data collection fee for staffs.*

Issue and constraints on fishery statistical systems

- *Country presents the issues and constraints which still pose problems in the national system on data collection and also constraints on the fishery statistics mechanism.*
- *The collection and analysis of data on fisheries and aquaculture are activities that require a lot of time, human (staff/ enumerators) and financial resources.*
- *Unavailability of adequate financial and human resources for data collection, is often the cause of poor quality of statistical data used for management and development of fisheries polices.*

On-going and planned initiatives for improvement of fishery statistics

- suggested to develop a Technical Cooperation Programme (TCP) in one Region/State in which there is a significant presence of all inland capture, marine capture and aquaculture production for testing and gaining experience on the structure and constraints of a new data collection system.
- the most suitable Region/State decided to implement the pilot project would be the Yangon Region.
- After the pilot phase developed in a single Region, the system could be extended to the national level.

Currently, FAO implementing with DoF, "Improvement of data collection on fisheries and aquaculture production: pilot system for Yangon Region, TCP/MYA/3601. Starting from southern district of Yangon region.

To improve the data collection on fisheries and aquaculture production, the implement following aims will be implemented

Sample based data collection for marine small scale sector;

Full census for marine industrial sector;

Sample based for the inland fisheries open water and lease fisheries;

Sample based for aquaculture sector;

The paper based system for data collection should be replaced by digitalized system.

For the long run, the database should be web based.

Country presents the national plans of improvement of fishery statistics and data collection system e.g. for

Reporting statistics by species.

In National level statistics, no species breakdown was mention, only three highly aggregated species is shown such fish, shrimp and others.

Reporting inland fisheries.

The production of inland fisheries is also mostly estimated by Township fisheries offices.

Reporting statistics on aquaculture of ornamental, seed production, etc.

DoF collected pond area of fish and shrimps culture but ornamental fish culture data. Also DoF collected fish production of the hatcheries of private and department of fisheries owns.

Reporting on fishing vessels, fishing gears

Taxation and admin division collection the inventory of fishing vessels by GRT, and size of vessel. Also the DoF registered the type of the fishing gears by boat, but not the number of the fishing gears.

Reporting of number of fishers

Township fishery officer collected the number of fishers including their fishing license issuing registered book. But some necessary information are still missing.

Reporting of fish prices

Normally, DoF did not collected the fish prices for fisheries statistics. But they input total amount of export USD and other currencies but not prices (rate).

Problems in reporting of statistics for regional compilation

- Species breakdown of capture fishery statistics is very poor, with marine catches reported only by 3 highly aggregated specie items and no breakdown at all for inland water catches.

Suggestion and recommendations

To assess the current fisheries data collection system and provide recommendation for improvements, FAO and Bay of Bengal Large Marine Ecosystem project (BOBLME) organized a mission in Myanmar from 19 October 2014. The mission reported the following findings:

• The present official system does not provide appropriate and available data to support fisheries management and policy development;

•Part of the information (e.g. structural data on numbers and characteristics of the fleets, and aquaculture operations) that should be generated by frame survey is already available as it was collected through District fisheries Offices and through the Myanmar Census of Agriculture (MCA) 2010;

In order to improve the current situation, the following actions were recommended:

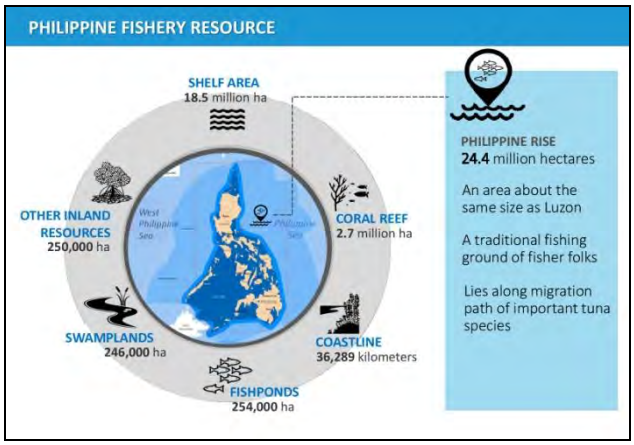
- A standard data collection system for fisheries and aquaculture with overall guideline, appropriate data collection forms, and correct and transparent raising and estimation procedures should be developed.
- The paper based data collection system should progressively replace by digitalized by system.
- To change the mindset of the fishery officers to set priority for improvement of fishery data statistics system not only fulfillment of fishery tax and licenses collection.

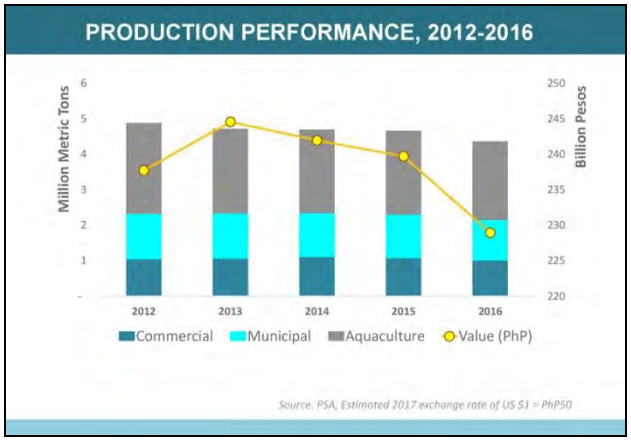
Annex 10

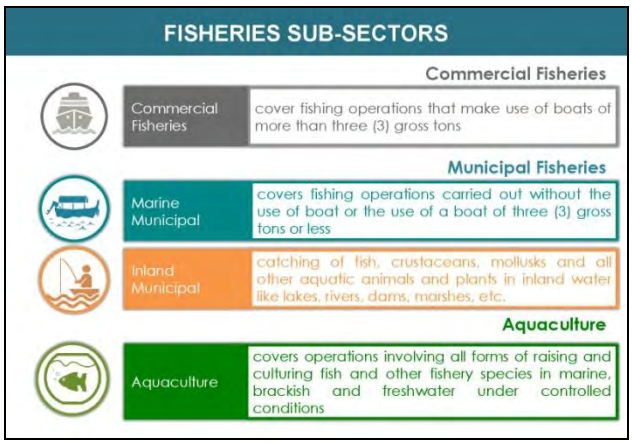
REVIEW ON REPORTING OF STATISTICS BASED ON THE FRAMEWORK OF FISHERY STATISTICS OF SOUTHEAST ASIA: PHILIPPINES

By Elymiarj S. Tuñacao

Project Evaluation Officer, Fisheries Policy and Economics Division
Bureau of Fisheries and Aquatic Resources of Philippines







QUARTERLY COMMERCIAL FISHERIES SURVEY (QCFS)

Sampling Frame — List of traditional commercial fish landing centers

Sampling Design — Stratified random sampling of traditional commercial fish landing centers

Listing Activity — Listing of Commercial Fish Landing Centers (LCFLC)

Variable — Average daily unloading

QUARTERLY COMMERCIAL FISHERIES SURVEY (QCFS)

Data Collection (traditional commercial fish landing centers)

Respondent — 5 key informants per landing center. **Key informant** - boat operator, technician, fisherman and/or trader

Interviewer — Statistical researchers (SRs)

Coverage — 59 provinces, 31 species and others

Frequency — Quarterly, Every third week of the last month of the quarter

QUARTERLY COMMERCIAL FISHERIES SURVEY (QCFS)

QCFS Form 1

I. Geographic and Sample Identification

II. Unloading and Price Information

III. Reasons for Change and Remarks

QUARTERLY COMMERCIAL FISHERIES SURVEY (QCFS)

Data Items

Production — Volume of unloading in the entire landing center during the quarter. Enter in whole number and kilogram unit.

Price per kilogram — Amount received from the first point of sale. Enter in 2 decimal places and peso unit

Disaggregation: by species and by month

QUARTERLY COMMERCIAL FISHERIES SURVEY (QCFS)

Sampling Frame — List of non-traditional commercial fish landing centers

Sampling Design — All non-traditional commercial LCs are covered

QUARTERLY COMMERCIAL FISHERIES SURVEY (QCFS)

Data Collection (Privately-managed Landing Centers)

Respondent — gather data from administrative records of PFDA, LGU and Privately managed LCs

Interviewer — Field staff

Coverage — 7 PFDA, 33 LGU & 41 Private LCs, 31 species and others

Frequency — Monthly, On or before the 15th of the succeeding month

QUARTERLY COMMERCIAL FISHERIES SURVEY (QCFS)

QCFS Form 2

I. Geographic and Sample Identification

II. Unloading and Price Information

QUARTERLY COMMERCIAL FISHERIES SURVEY (QCFS)

Data Items

Production
Volume of unloading in the entire landing center during the quarter.
Enter in whole number and kilogram unit.

Price per kilogram
Amount received from the first point of sale
Enter in 2 decimal places and peso unit

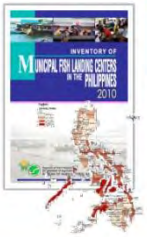
Disaggregation: by species and by month

MUNICIPAL FISHERIES
Data System

The survey aims to generate volume and value of marine municipal fisheries production by species and by quarter at the national, regional and provincial level

QUARTERLY MUNICIPAL FISHERIES SURVEY (QMFS)

Sampling Frame	List of traditional municipal fish landing centers
Sampling Design	Stratified random sampling of traditional municipal fish landing centers
Listing Activity	Listing of Municipal Fish Landing Centers (LMFLC)
Variable	Average daily unloading



QUARTERLY MUNICIPAL FISHERIES SURVEY (QMFS)

Data Collection (Traditional Municipal Fish Landing Centers)

Respondent	5 key informants per landing center. Key informant - boat operator, technician, fisherman and/or trader
Interviewer	Statistical researchers (SRs)
Coverage	67 provinces 31 species and others
Frequency	Quarterly, Every third week of the last month of the quarter

QUARTERLY MUNICIPAL FISHERIES SURVEY (QMFS)

QMFS Form 1

I. Geographic and Sample Identification

II. Unloading and Price Information

III. Reasons for Change and Remarks

QUARTERLY MUNICIPAL FISHERIES SURVEY (QMFS)

Data Items

Production
Volume of unloading
in the entire landing center during the quarter.
Enter in whole number and kilogram unit.

Price per kilogram
Amount received from the first point of sale
Enter in 2 decimal places and peso unit

Disaggregation: by species and by month

A landing center can be commercial and municipal at the same time. If that is the case, consider only volume unloaded by municipal fishing boats, i.e., 3 gross tons or less, as production for municipal and vice versa.

QUARTERLY MUNICIPAL FISHERIES SURVEY (QMFS)

Data Collection (non-traditional municipal fish landing centers)

Respondent: gather data from administrative records of PFDA and LGU LCs

Interviewer: Field staff

Coverage: 3 PFDA and 14 LGU
31 species and others

Frequency: Monthly,
On or before the 15th of the succeeding month

QUARTERLY MUNICIPAL FISHERIES SURVEY (QMFS)

QMFS Form 2

I. Geographic and Sample Identification

II. Unloading and Price Information

QUARTERLY MUNICIPAL FISHERIES SURVEY (QMFS)

Data Items

Production
Volume of unloading
as per record of the landing center
Enter in whole number and kilogram unit.

Price per kilogram
Amount received from the first point of sale
Enter in 2 decimal places and peso unit

Disaggregation: by gear, by species and by month

QUARTERLY MUNICIPAL FISHERIES SURVEY (QMFS)

Sampling Frame: List of inland fishing households

Listing Activity: Listing of Inland Municipal Fishing Households (LIMFS)

Variables
- Number of HH members
- Average daily catch
- Number of fishing days in a month
- Fishing gear used
- Fishing ground

QUARTERLY MUNICIPAL FISHERIES SURVEY (QMFS)

Data Collection

Respondent: Fisherman or knowledgeable member of the sample household

Interviewer: Statistical researchers (SRs)

Coverage: 76 provinces
31 species, other fishes, other crustaceans and other mollusks

Frequency: Quarterly,
Every third week of the last month of the quarter

QUARTERLY MUNICIPAL FISHERIES SURVEY (QMFS)

Data Items

Production
Volume of catch of the of all fishermen in the sample household
Enter in whole number and kilogram unit.

Price per kilogram
Amount received from the first point of sale
Enter in 2 decimal places and peso unit

Disaggregation: by species and by month

AQUACULTURE FISHERIES
Data System

The survey aims to generate volume and value of aquaculture production by aquafarm type, by species and by quarter at the national, regional and provincial level

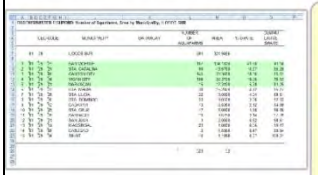
QUARTERLY AQUACULTURE SURVEY (QAqS)

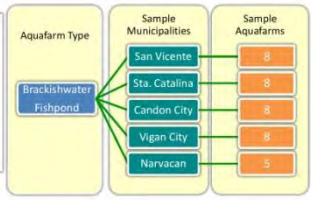
Sampling Frame
List of aquafarms by type based on Aquaculture Farms Inventory (AqFI)

- Area
- Ownership Status
- Culture System
- Management System
- Species Cultured
- Location of Aquafarm

QUARTERLY AQUACULTURE SURVEY (QAqS)

Sampling Design
By aquafarm type,
- Municipalities with cumulative share of 80% to total area
- For each municipality,
  - 8 sample aquafarms, if total aquafarms >= 25
  - 5 sample aquafarms, if TA < 25





QUARTERLY AQUACULTURE SURVEY (QAqS)

Data Collection

Respondent: Owner, operator and/or caretaker of sample aquafarm

Interviewer: Statistical researchers (SRs)

Coverage: 81 provinces; 13 aquafarm types; 17 species & others

Frequency: Quarterly, Every third week of the last month of the quarter

QUARTERLY AQUACULTURE SURVEY (QAqS)

Data Items

Production
Volume of species harvested/to be harvested during the quarter in fresh form and marketable size.
Enter in whole number and kilogram unit.

Area Harvested
Area of the aquafarm harvested.
No area for natural entry species.
If polyculture, allocate area
Enter in 4 decimal places, hectare unit.

Price per kilogram
Amount received from the first point of sale
Enter in 2 decimal places

During the quarter (TQ) and the same quarter last year (SQLY)

QUARTERLY AQUACULTURE SURVEY (QAqS)

Survey Forms

QAqS Form 1	Quarterly Aquaculture Survey - FISHPOND
QAqS Form 2	Quarterly Aquaculture Survey – PEN AND CAGE
QAqS Form 3	Quarterly Aquaculture Survey – OYSTER, MUSSEL & SEAWEED
QAqS Form 5	Quarterly Aquaculture Survey – OTHER FRESHWATER FARMS
QAqS Form 6	Quarterly Aquaculture Survey – LIST OF SAMPLES

QUARTERLY AQUACULTURE SURVEY (QAqS)

Data Review

- ✓ Completeness check
- ✓ Accuracy
- ✓ Consistency
- ✓ Auxiliary Data
- ✓ Validation of Damage Report
- ✓ Validation with BFAR/LGU Programs

NATIONAL STOCK ASSESSMENT PROGRAM – *Bureau of Fisheries and Aquatic Resources (BFAR) & National Fisheries Research and Development Institute (NFRDI)*

NATIONAL STOCK ASSESSMENT PROGRAM

Survey methods used by NSAP

1) Survey at landing centers

- ✓ For municipal and commercial fisheries
- ✓ Direct interview with the fisherman/fishing operator
- ✓ Actual catch sampling

2) Survey by logbooks

- ✓ For boats that stay at sea for long period i.e. purse seine
- ✓ Data of commercial fishing boats are recorded in logbooks

NATIONAL STOCK ASSESSMENT PROGRAM

Data Collection

CATCH Data include:

- ✓ Weight of catch (*kg*)
- ✓ Kinds of fishes or invertebrates caught
- ✓ Size-frequency (*cm*) of the commercially important species and other species of interest

NATIONAL STOCK ASSESSMENT PROGRAM

Data Collection

EFFORT Data include:

- ✓ Number of fishers
- ✓ Number of hours or days fishing
- ✓ Type of fishing gear and technical specifications
  - #hooks, size of hook;
  - #gillnet panels, net length, mesh size
  - #hauls, soaking time
- ✓ Vessel type, size/dimensions, Horsepower (for motorized vessels)
- ✓ Indicative area of fishing ground (using standard grid map)

NATIONAL STOCK ASSESSMENT PROGRAM

Frequency of Sampling

- every after 2 days regardless of Saturdays Sundays & Holidays
- with 10-11 days surveys each month per landing site

STANDARD MONTHLY SAMPLING SCHEDULE

DAYS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

Sampling Days – Landing Center 1

Sampling Days – Landing Center 2

R – Rest/Off Day

NATIONAL STOCK ASSESSMENT PROGRAM

Data Recording (Using NSAP Data Forms)

- *data collected should be recorded in forms.*
- *forms should contain all important information needed*
- *NSAP forms:*
  - ✓ *1 Monthly Report (Summary)*
  - ✓ *2 Catch & Effort (including weight measurement)*
  - ✓ *3 Length Tally Form*
  - ✓ *4 Boat Particulars*
  - ✓ *5 Gear Particulars*

ISSUES AND CONSTRAINTS, ON-GOING & PLANNED INITIATIVES; AND SUGGESTIONS & RECOMMENDATIONS

ISSUES & CONSTRAINTS ON FISHERY STATISTICS SYSTEMS

- *Outdated sampling frames*
- *Need for refresher training course on species identification for PSA enumerators/statistical researchers*
- *Fisheries Agency is different from the Statistics Agency – need to harmonize data; joint upgrading of sampling frames; among others*
- *Need to use or translate statistical data into policies for fisheries management*

ON-GOING & PLANNED INITIATIVES FOR FISHERY STATISTICS

- ✓ *Updating of Lists of Aquaculture Farms (ULAF) under the activity Improvement of AgStat Surveys. For fisheries, it will cover all subsector namely commercial, municipal and aquaculture. The activity also includes review of the sampling design and methodology. (PSA)*
- ✓ *Conduct Workshop on New approaches to NSAP Data Analysis for Inputs to Policy Formulation Sept 3-7, 2017 (BFAR).*

Ongoing Fisherfolk (FishR) and Boat (BoatR) Registrations (BFAR, LGUs)

FishR

Municipal Fisherfolk Registration Program

http://www.mfrs.bfar.da.gov.ph

BoatR

Municipal Fishing Vessels and Gears Registration Program

http://www.boatrs.bfar.da.gov.ph

ON-GOING & PLANNED INITIATIVES FOR FISHERY STATISTICS

- ✓ *On-going policy formulation (e.g. Reference points, Harvest Control Rules, Fisheries Management Areas, etc.) using the NSAP data.*
- ✓ *For 2018, Boat and Gear Inventory will be conducted under the NSAP (BFAR, NFRDI).*
- ✓ *Consultations with Partner Agencies on the Improvement of Fisheries Data Gathering, Processing and Analysis – 4th Quarter 2017 onwards (BFAR, PSA, etc)*

SUGGESTIONS AND RECOMMENDATIONS

- *Continuous capacity building activities for enumerators, statistical researchers, data analysts, fisheries managers, and policy makers.*
- *Data and information sharing within and among countries on new technologies and techniques related to data collection, analysis and policy formulation.*

THANK YOU!

Annex 11

REVIEW ON REPORTING OF STATISTICS BASED ON THE FRAMEWORK OF FISHERY STATISTICS OF SOUTHEAST ASIA: THAILAND

By Praewpan Kongprakhon

Statistician, Department of Fisheries Thailand

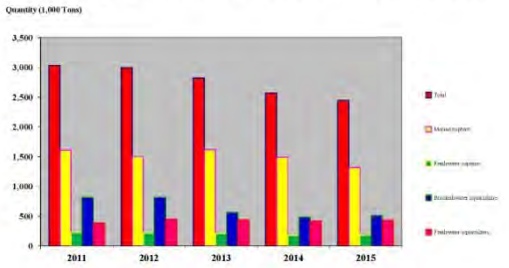
Reviews on Reporting of Statistics Based on the Framework of Fishery Statistic of Southeast Asia : Thailand

"Regional Technical Consultation on Fisheries Statistics and Information in Southeast Asia" (15-18 August 2017, Bangkok, Thailand)

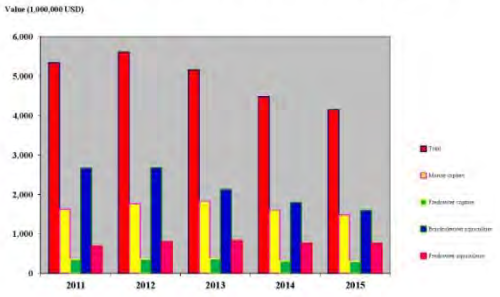
MS. Praewpan Kongprakhon
Statistician, Department of Fisheries, Thailand

Overview on status and trend of fisheries and aquaculture

Average production 2.77 million tons/year



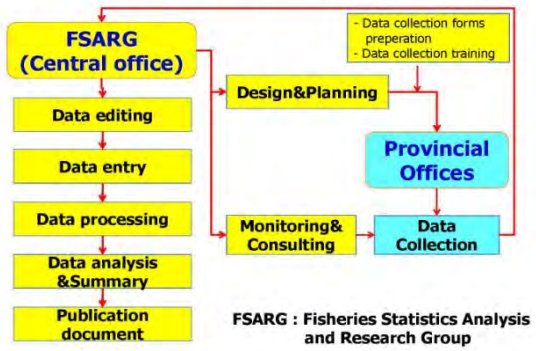
Average value 4.94 billion USD/year



Distribution by sub-sector (Average 2011-2015)

Fisheries Sector	Quantity (1,000 Tons)	%	Value (million USD)	%
Grand Total	2,769.6	100	4,940.4	100
Capture	1,710.2	61.75	2,003.0	40.54
Marine	1,506.1	88.07	1,663.4	83.05
Freshwater	204.1	11.93	339.6	16.95
Aquaculture	1,059.4	38.25	2,937.4	59.46
Brackishwater (Including mariculture)	637.5	60.18	2,172.0	73.94
Freshwater	421.9	39.82	765.4	26.06

National fisheries statistical system



Issues and constraints on fishery statistics system

1. Insufficient budget and staff
2. No statistical officer at provincial level
3. Inefficient data processing program

On-going and planned initiatives for improvement of fishery statistics

1. Improve marine capture surveys appropriate for the new fisheries emergency decree 2015;
   - community fishery : vessel < 10 GT
   - commercial fishery : vessel ≥ 10 GT

7

2. Data reported through fishing logbook under the Combatting IUU Fishing database system has been used instead of survey method.

3. Improve community fishery survey to be monthly data collection.

4. Data entry online system initiative for freshwater capture fishery survey.

5. Integrate fishery sampling frame with aquaculture registration system & developing for aquaculture statistical mechanism.

9

Problems in reporting of statistics for regional compilation

1. Unable to report data in the indicated timeline.
2. Spend more time to prepare data in requirement forms.
3. Data not available for;
   - Preliminary data in Q4 form
   - Ornamental production and seed production
   - No data updated for number of fishers

10

Suggestions and Recommendations

1. Is it possible to set up different time frame for data submission for each country?

2. Should mark on preliminary data, both of database and publication document.

11

Annex 12

REVIEW ON REPORTING OF STATISTICS BASED ON THE FRAMEWORK OF FISHERY STATISTICS OF SOUTHEAST ASIA: VIET NAM

By Duong Long Try

Director of Fisheries Information Centre (FICen), Directorate of Fisheries of Viet Nam (D-Fish)

Regional Technical Concultation on Fishery Statistics and Information in Southeast Asia
Bangkok – 15 - 18 August 2017

Overview of Fisheries Statistics in Viet Nam

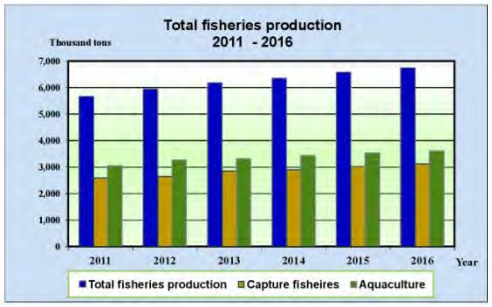
Duong Long Tri - Director
Fisheries Information Centre (FICen)
Directorate of Fisheries of Viet Nam (D-Fish)

1. Overview on status and trend of fisheries and Aquaculture

- Viet Nam has a long coastline of over 3,200km with EEZ of over 1 million km²
- Fisheries sector has showed a rapid development and become an important economic sector of the country.
- In 2011 – 2016, a growth rate was 3.56% in average
  - *3.76 % for capture fisheries*
  - *3.38 % for aquaculure.*
- In 2016
  - Total fisheries production was 6.73 MT
    - *Marine catch was 2.93 MT*
    - *Inland catch was 0.19 MT*
    - *Aquaculture production was 3.61 MT*
  - Total fisheries export value was US$ 7.16 billion
  - Total No of fishing boats was 110,950
  - Total aquaculture area 1.3 million ha

2

1. Overview on status and trend of fisheries and Aquaculture



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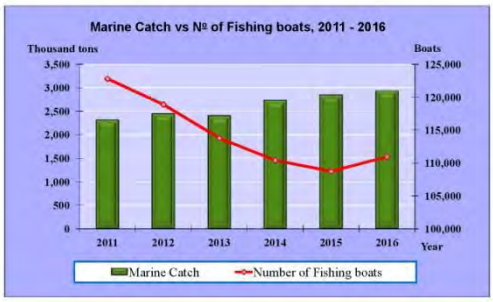
1. Overview on status and trend of fisheries and Aquaculture

- Capture Fisheries



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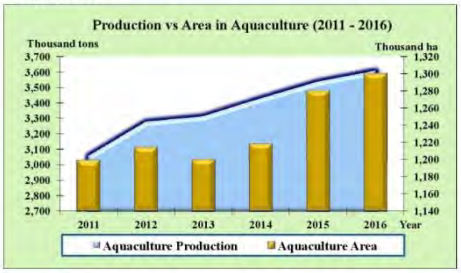
1. Overview on status and trend of fisheries and Aquaculture

- Aquaculture

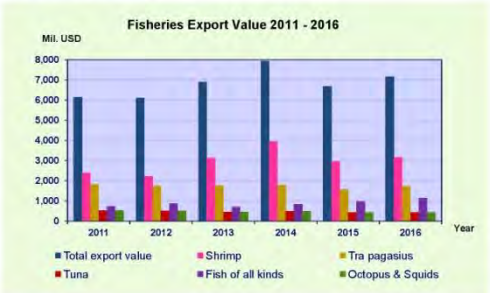


In 2016, aquaculture production was 3.6 million tons.
Of which : Shrimp production culture was 657,282 tons
Tra pagasius production was 1.15 million tons

5

1. Overview on status and trend of fisheries and Aquaculture

- Fisheries Export



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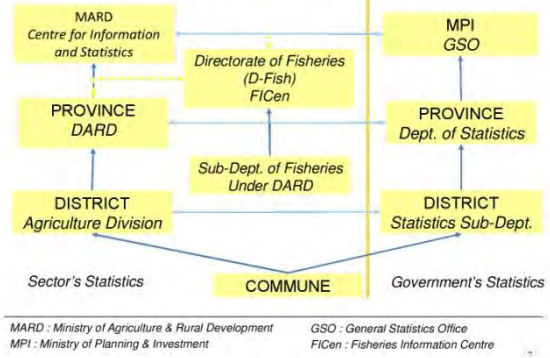
2. National Statistical System of Fisheries & Aquaculture



3. Current status of data collection

- *Method of data collection*
  - *Monthy administration report (from local to D-Fish)*
  - *Sample survey for collecting data from landing sites*
  - *Survey of Aquaculture and Fisheries (every 2 years)*
  - *Data collected from other specific research project*
- *Method of analyzing data*
  - *Process data collected from administration reports*
  - *Analize data collected from sampling surveys for estimating total production by species captured*
  - *Use application softwares for updating data on fisheries and aquaculture*
  - *Develop databases for statisticians to input and update data on main target species*

8

4. Additional data needs for policy making

- Fisheries production
  - Total production and its value, broken down by
    - Major target-species
    - Fishing grounds (coastal, off-shore)
    - Culture environment (freshwater, brackishwater and marine water)
- Fisheries and aquaculture capacity
  - Fishing boats by gear types, by target-species, etc
  - Culture areas, number of culture units by species and production scale
- Data on labourers classified needs to be surveyed and updated

9

5. Issues and constraints (1)

- The Fisheries System of Statistics is not unified from the centre to the locals :
  - At ministry level
  - At province level
  - At district level
- Human resources for the Fisheries statistical system are insufficient in both quantity and quality
  - Due to limited human resources, the statistical system has not chance to supplement more staff according to its requirement
  - Insufficent enumerators while there is a wide range of coverage of data collected

10

5. Issues and constraints (2)

- Lack of proper methodology of collecting fisheries statistical data
  - Definitions, terminology used in statistics of fisheries and aquaculture need to standardized.
  - Research into proper method of gathering statistical data on fisheries and aquaculture.
- Application of ICT into fisheries statistics is limited.
- Annual budget spent on fisheries statistics in general and data collection in particularly is not given priority.
  - A role of aquaculture statistics has not been paid sufficient attention by the manager at all the levels
  - Governmet's budget for statistical activities has been still linited

11

6. On-going and planned initiatives for improvement of fishery statistics

- Draft of Project of establishement of fisheries Information system in Viet Nam has submitted for approving by PM
- National fisheries databases (namely VNFishbase) have been developed including fishing boat registered, data on capture fisheries and aquaculture, etc.
- Plan of training statistician and enumerators
- Improvement of catch documentation and traceability for combat IUU fishing
- Development of online software of Tra pangasius
- Sampling survey of commercial fisheries has conducted in landing sites

12

7. Problems in reporting of statistics for regional compilation

- Statistical data requried is so detail (name of species, type of water bodies, ornamental production, labors in fisheries, etc) while the system of fisheries statistics of the country has not been sufficent to collect such data.
- Some form of data required need more time and resources becasue many data not available such as :
  - Data in form Q3 (Producer prices)
  - Data in form Q4 (Quantity gear)
  - Data in form Q5 (Water bodies) : Production and value for inland fisheries is not collected by water bodies.
  - Data in form Q9 (Ornamental production) : There is no data collected

13

7. Suggestions and Recommendation

- Sthengthening of the role of the statistical data and information on fisheries as an very important tool for management and making development programs of the fisheries.
- Improvement and sthengthening of capacity of the fisheries statistical system need to be given high priority
- Establishment of routine data collection system compatible with regional and international systems of fisheries statistics need to be highly prioritized to achieve given targets
- Development of a plan of training for staff working in fisheries statistical system incl. statisticians and enumerators at all level.
- Improvement of cooperation in the region in fisheries statistics to share experiences, method of collecting data, to get technical assistance from international organizations

14

Thank you
for your attention !

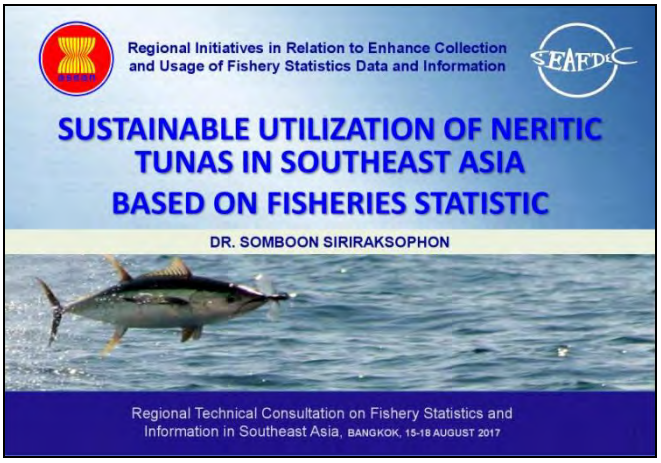
15

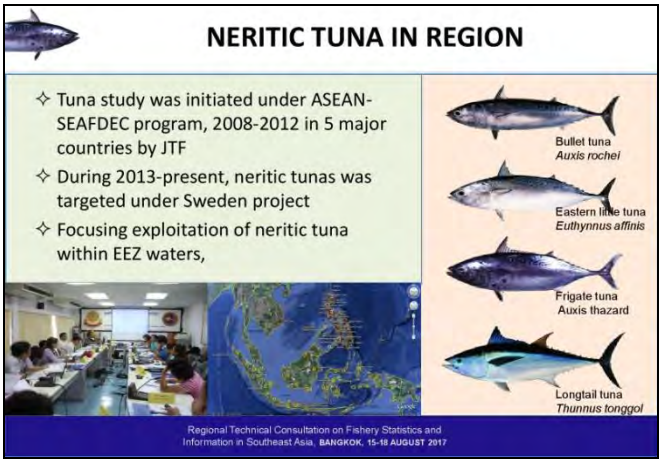
Annex 13

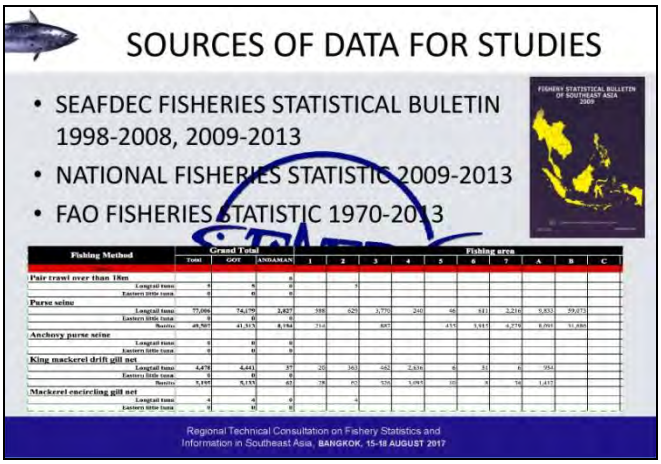
REGIONAL INITIATIVES IN RELATION TO ENHANCE COLLECTION AND USAGE OF FISHERIES STATISTICS DATA AND INFORMATION: TUNA SPECIES

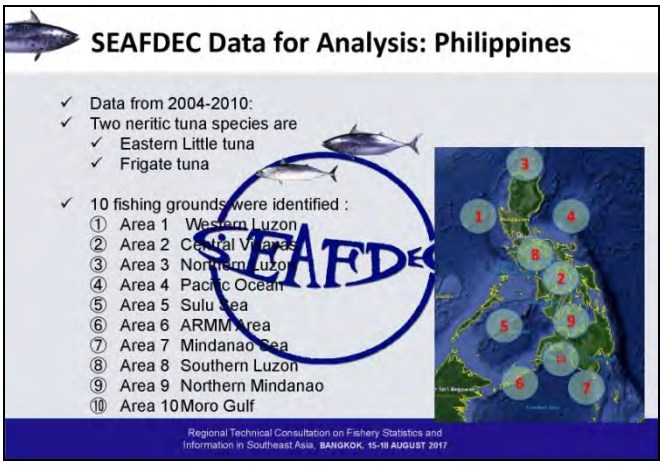
By Dr. Somboon Siriraksophon

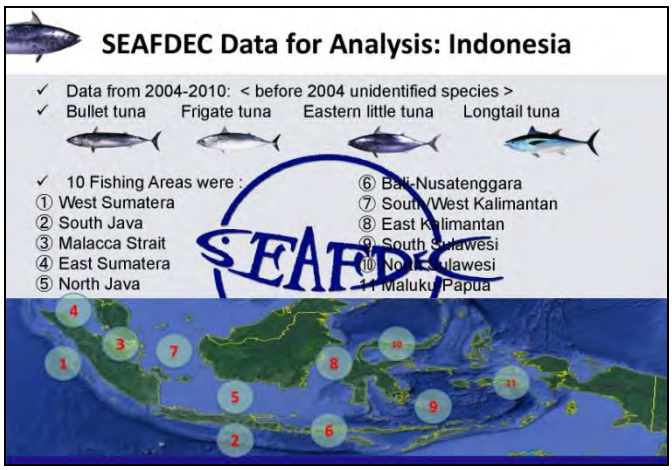
SEAFDEC Secretariat

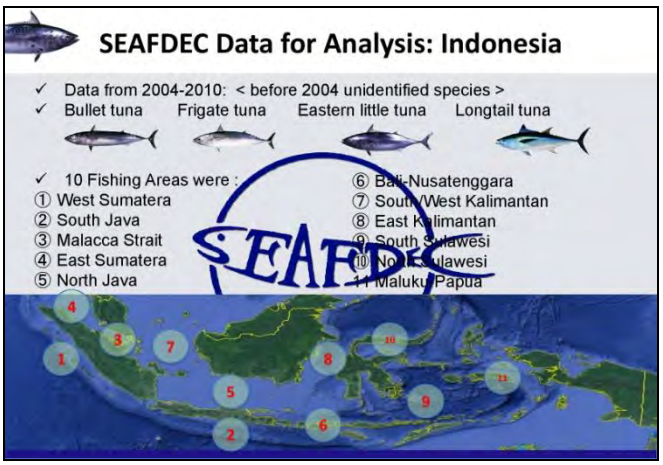






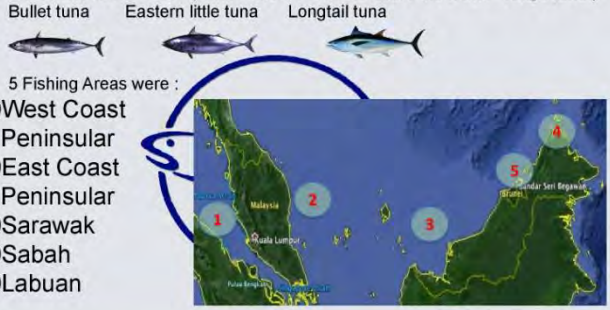






SEAFDECData for Analysis: Malaysia

- ✓ Data from 2004-2010: (before 2003, recorded under the name "Tongo tuna")
- ✓ Bullet tuna Eastern little tuna Longtail tuna



- ✓ 5 Fishing Areas were :

①West Coast Peninsular
②East Coast Peninsular
③Sarawak
④Sabah
⑤Labuan

SEAFDEC Data for Analysis: Thailand

- ✓ Data from 2004-2010: (since 2009, recorded 4 species)
- ✓ Bullet tuna Frigate tuna Eastern little tuna Longtail tuna

- ✓ 4 Fishing Areas were :

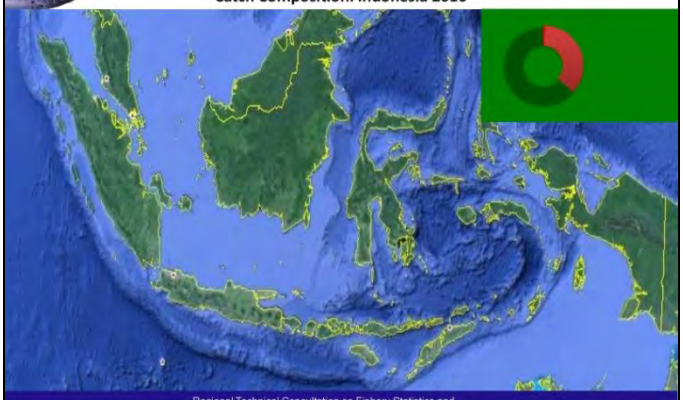
① GOT
② Andaman Sea
③ E+S GOT
④ N + S Andaman sea

RESULTS FROM SEAFDEC FISHERIES STATISTIC:

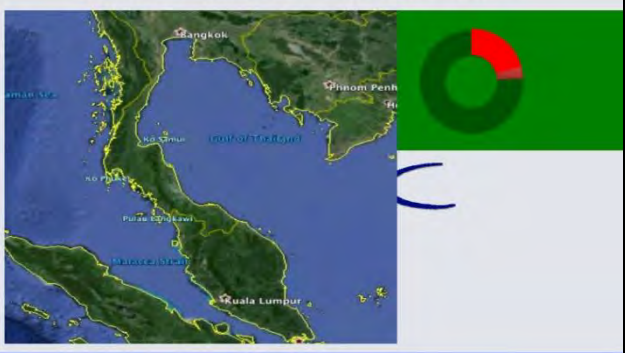
Catch Composition: Philippines 2010

RESULTS FROM SEAFDEC FISHERIES STATISTIC:

Catch Composition: Indonesia 2010

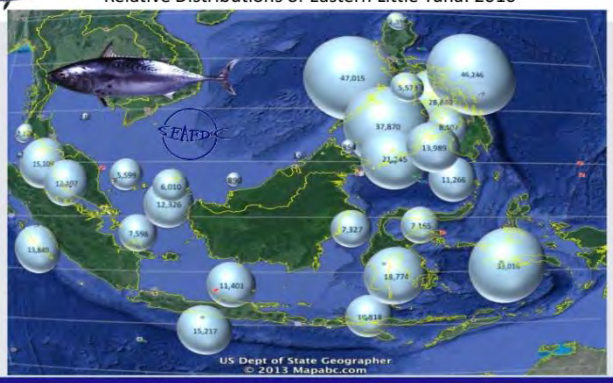


Catch composition: Thailand 2010



Relative Distributions of Longtail Tuna: 2010

RESULTS FROM SEAFDEC FISHERIES STATISTIC
Relative Distributions of Eastern Little Tuna: 2010



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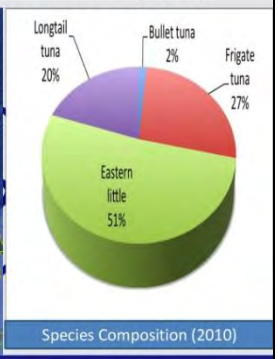
RESULTS FROM SEAFDEC FISHERIES STATISTIC
PRODUCTION OF NERITIC TUNAS (2010)



Species Composition (2010)

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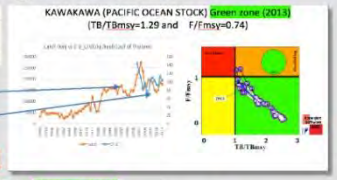
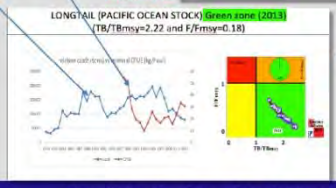
Catch Data & Effort > Stock + Risk Assessment
Management measures

Catch data

CPUEs



FAO-71



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Results of Regional Analysis on
Fisheries Statistic Data

- ✧Known the Status and Trend of Fisheries resources; distribution, abundance, composition, etc
- ✧Regional Plan of Action (RPOA) for sustainable utilization of neritic tunas resources;
- ✧Used in the Stock & Risk Assessment for development of the fisheries management measures;
- ✧Support management of fishing capacity

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Characteristic of
SEAFDEC Fisheries Statistics

BEFORE 2008

- ❖ Data set by species, countries and areas or Provinces which are very useful for Regional studies based on Sea areas:
- ❖ However, No inputs from some countries>Incomplete regional analysis;
- ❖ Some countries inputs only some parts of data requirements,

AFTER 2008 - PRESENT

- ❖ NO DATA by Area or Province, which make difficulty for regional study by areas/ fishing grounds
- ❖ No inputs from some countries;
- ❖ Some countries inputs only some parts of data requirements;
- ❖ Lack of data in many parts

Regional Technical Consultation on Fishery Statistics and Information in Southeast Asia, BANGKOK, 15-18 AUGUST 2017

Challenges and Recommendations

- ❖ Policy on Improvement of National Fisheries Statistics should be strengthened at national level;
- ❖ Delay for publishing due to delay of submissions and others; It is better to develop the online submission; otherwise strengthening on electronic template through the reviewing on Country electronic system for those countries are in place. Support to those countries that do not have system in place;
- ❖ Better to cover fisheries statistic data not only by country, but deep to areas, and/or provinces. These would be useful for regional study and support the stock assessment by Sub-regional areas; (like data before 2008);
- ❖ Lack of catch data for sharks and rays and other endangered species.

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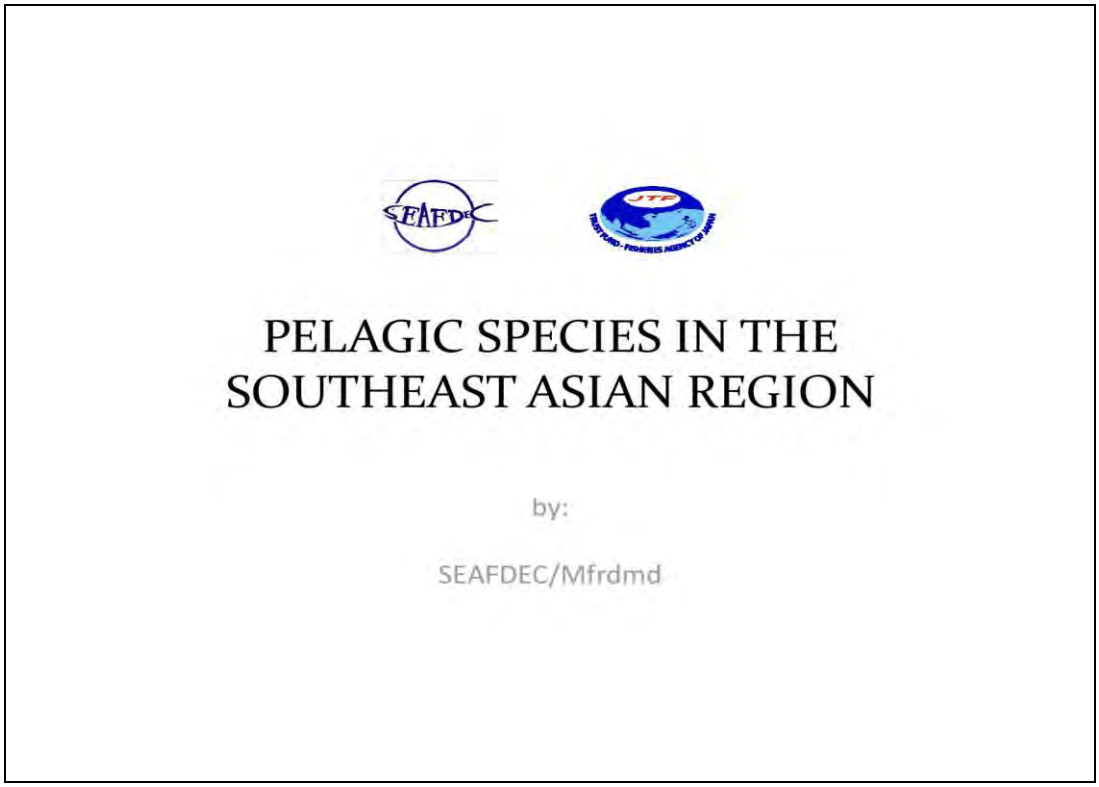
Annex 14

REGIONAL INITIATIVES IN RELATION TO ENHANCE COLLECTION AND USAGE OF FISHERIES STATISTICS DATA AND INFORMATION: PELAGIC SPECIES

By Mohammad Faisal Md. Saleh

SEAFDEC/MFRDMD



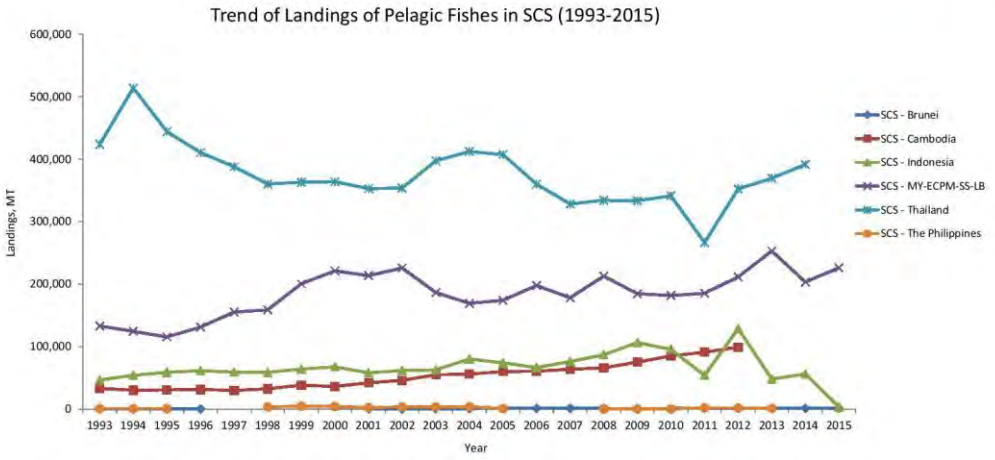
CONTENTS

BACKGROUND AND OVERVIEW

- In the Southeast Asian region, pelagic fishes such as Indian mackerels, scads and sardinellas are not only considered as a very important food resources, but also for employment and livelihood of fishers.
- Purse seine is one of the major fishing gears to catch those small pelagic fishes.
- Each country uses different size category of purse seine.
  - Brunei – Gross tonnage (GT) and horsepower
  - Indonesia, Philippines & Thailand - gross tonnage (GT)
  - Malaysia – gross registered tonnage (GRT).
  - Myanmar – length (feet) and horsepower (Hp)
  - Cambodia & Vietnam – horsepower (Hp)
- Total landings of pelagic fishes in the SEA region: latest year, MT production
- The current status and trend of pelagic species in the SEA region will be presented according to the two sub-regions, namely the Andaman Sea and the South China Sea (based on the statistic data collected so far).

Trend of Landings (South China Sea)

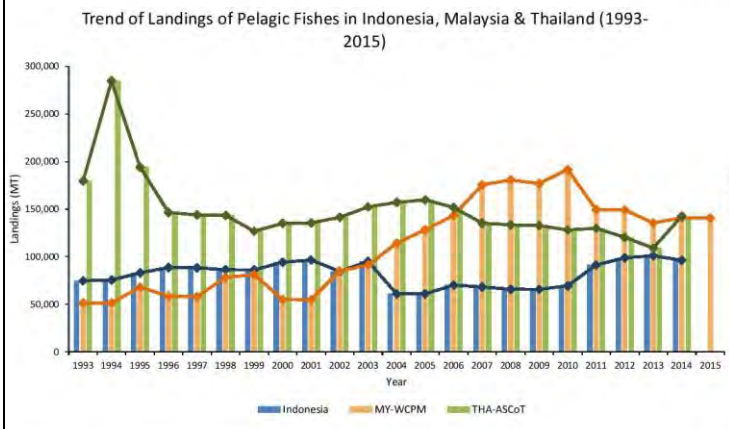
BACKGROUND AND OVERVIEW

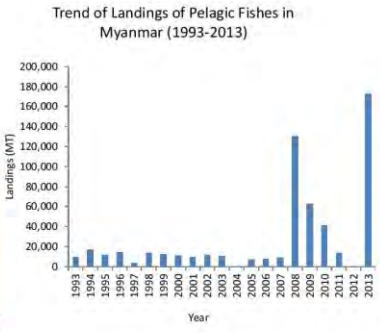


Sources : a. BRU : Statistic provided by country 1993-1996, 2001-2015 for JTF6 project
b. CB : Statistic provided by country 1993-2012 for JTF6 project
c. INDO : Statistic provided by country 1993-2015 for JTF6 project
d. MAL : Annual Fisheries Statistics 1993-2015.
e. TH : Statistic provided by the country 1993-2014 for JTF6 project
f. PHIL : Current Status of Purse Seine Fisheries in the South East Asia 2015

Trend of Landings (Andaman Sea)

BACKGROUND AND OVERVIEW





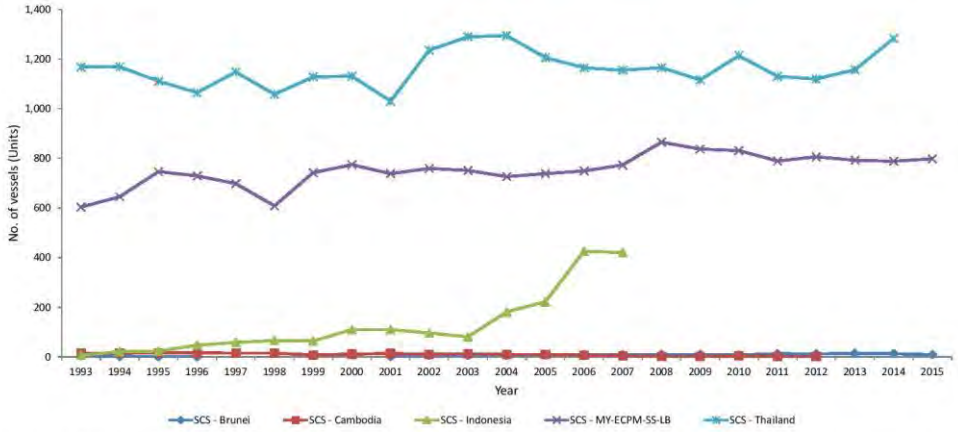
Sources: a. MAL: Annual Fisheries Statistics 1993-2015
b. TH: Statistic provided by the country 1993-2014 for JTF6 project
c. INDO: Statistic provided by the country 1993-2014 for JTF6 project

Source : Fishery Statistical Bulletin of Southeast Asia (1993-2013)

Trend of Fishing Effort (South China Sea)

BACKGROUND AND OVERVIEW

Trend of No. of Vessels of Brunei DS, Cambodia, Indonesia, Malaysia and Thailand (1993 – 2015)

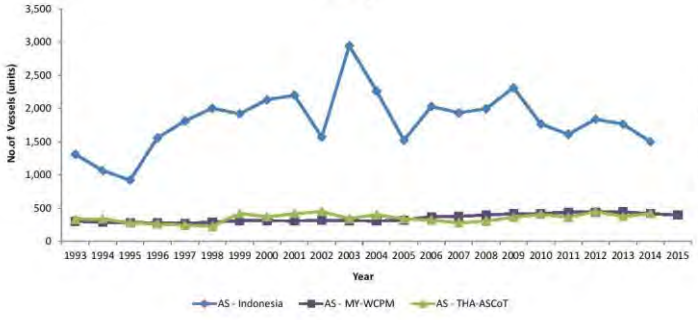


Sources :
a. BRU : Statistic provided by country 1993-1996, 2001-2015 for JTF6 project
b. CB : Statistic provided by country 1993-2012 for JTF6 project
c. INDO : Statistic provided by country 1993-2007 for JTF6 project
d. MAL : Annual Fisheries Statistics 1993-2015.
e. TH: Statistic provided by the country 1993-2014 for JTF6 project

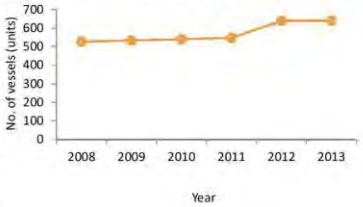
Trend of Fishing Effort (Andaman Sea)

BACKGROUND AND OVERVIEW

Trend of No. of Vessels in Indonesia, Malaysia & Thailand (1993-2015)



Trend of No. of Vessel in Myanmar (2008-2013)



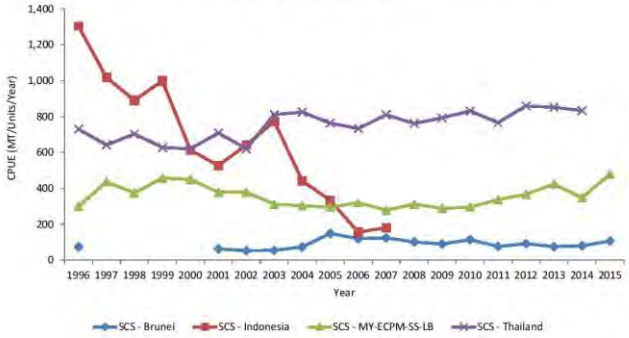
Sources:
a. MAL: Annual Fisheries Statistics 1993-2015
b. TH: Statistic provided by the country 1993-2014 for JTF6 project
c. INDO: Statistic provided by the country 1993-2014 for JTF6 project

Source : Fishery Statistical Bulletin of Southeast Asia (2008-2013)

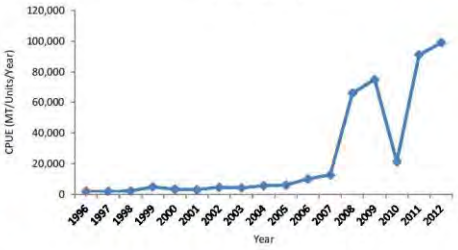
Trend of CPUE (South China Sea)

BACKGROUND AND OVERVIEW

Trend of CPUE (Landings/Vessels) in Brunei DS, Indonesia, Malaysia and Thailand (1996-2015)



Trend of CPUE (Landings /Vessels) in Cambodia (1996-2012)



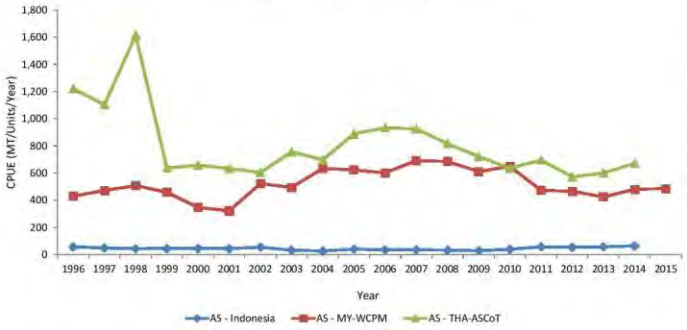
Sources : a. BRU : Statistic provided by country 1996, 2001-2015 for JTF6 project
b. INDO : Statistic provided by country 1999-2007 for JTF6 project
c. MAL : Annual Fisheries Statistics 1993-2015.
d. TH : Statistic provided by the country 1993-2014 for JTF6 project

Source: Statistic provided by country 1996-2012 for JTF6 project

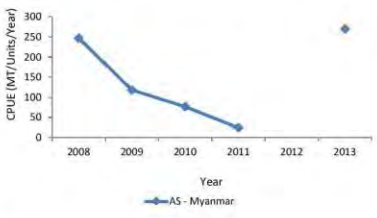
Trend of CPUE (Andaman Sea)

BACKGROUND AND OVERVIEW

Trend of CPUE (Landings/Vessels) in Indonesia, Malaysia and Thailand (1996-2015)



Trend of CPUE (Landings/Vessels) in Myanmar (2008-2013)



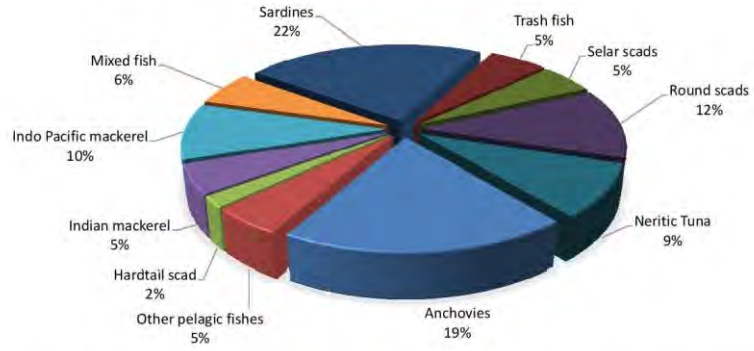
Sources: a. MAL: Annual Fisheries Statistics 1996-2015
b. TH: Statistic provided by the country 1996-2014 for JTF6 project
c. INDO: Statistic provided by the country 1996-2014 for JTF6 project

Source : Fishery Statistical Bulletin of Southeast Asia (2008-2013)

Composition of pelagic fishes (South China Sea)

BACKGROUND AND OVERVIEW

Composition of Pelagic Fishes in Malaysia & Thailand (1993-2014)



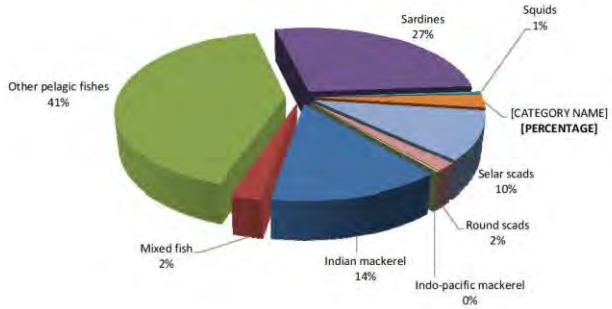
Note:
1. Malaysia : Bigeye scad, Yellowtail scad, Spanish mackerel are grouped into other pelagic fishes as the species are not available in the GoT.
2. Malaysia & GoT: Crustaceans and squids are grouped into other pelagic fishes due to catch data less than <1% from total.

Sources: a. MAL : Annual Fisheries Statistics 1993-2014.
b. TH : Statistic provided by the country 1993-2014 for JTF6 project

Composition of pelagic fishes (South China Sea)

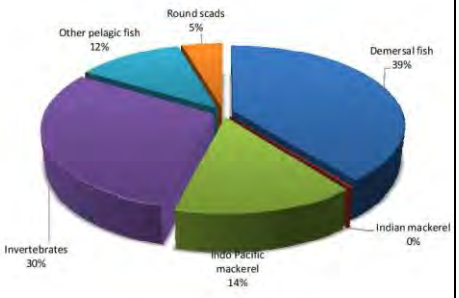
BACKGROUND AND OVERVIEW

Composition of Pelagic Fishes in Brunei DS (2001-2016)



Source : Statistic provided by country for JTF6 project, 2001-2016

Composition of Pelagic Fishes in Indonesia: Natuna Sea (2005-2014)

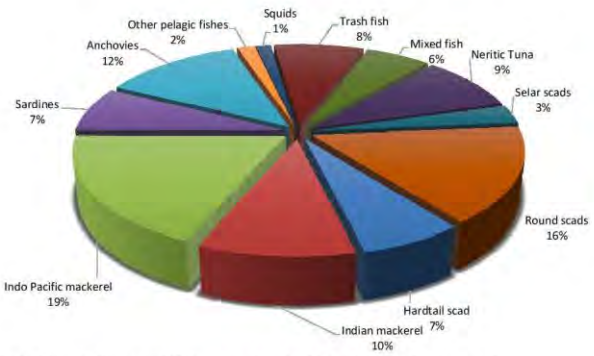


Source : Statistic provided by the country for JTF6 project, 2005-2014.

Composition of pelagic fishes (Andaman Sea)

BACKGROUND AND OVERVIEW

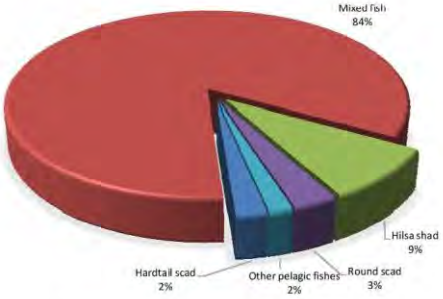
Composition of Pelagic Fishes in Malaysia & Thailand (2000-2014)



Note: For Malaysia, Bigeye scad, Yellow-stripped scad and Spanish mackerel were grouped into other pelagic fishes since Thailand have a small catch of these 3 species.

Sources: a. MAL : Annual Fisheries Statistics 2000-2014.
b. TH : Statistic provided by the country 2000-2014 for JTF6 project

Composition of Pelagic Fishes in Myanmar (2008-2013)



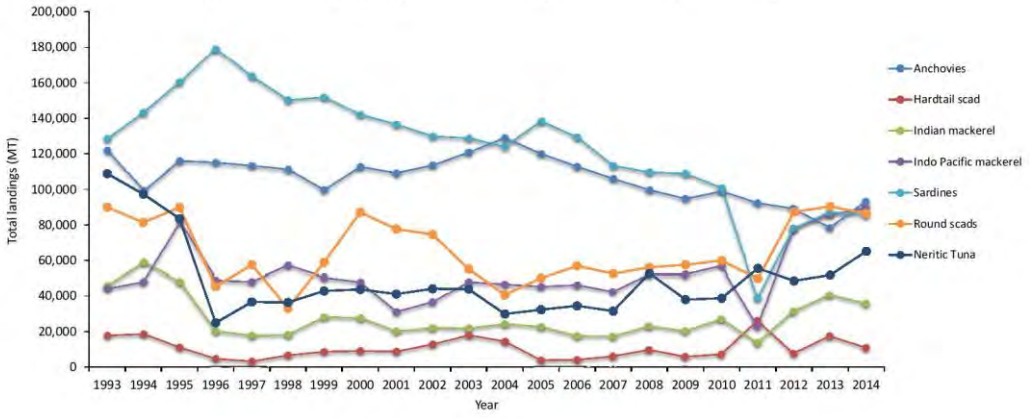
Note: 3 species (Indian mackerel, Indo Pacific king mackerel and Squids) are included in Other pelagic fishes group due to data less than 1% from total catch.

Source : Fishery Statistical Bulletin of Southeast Asia (2008-2011, 2013)

Trend of species (South China Sea)

BACKGROUND AND OVERVIEW

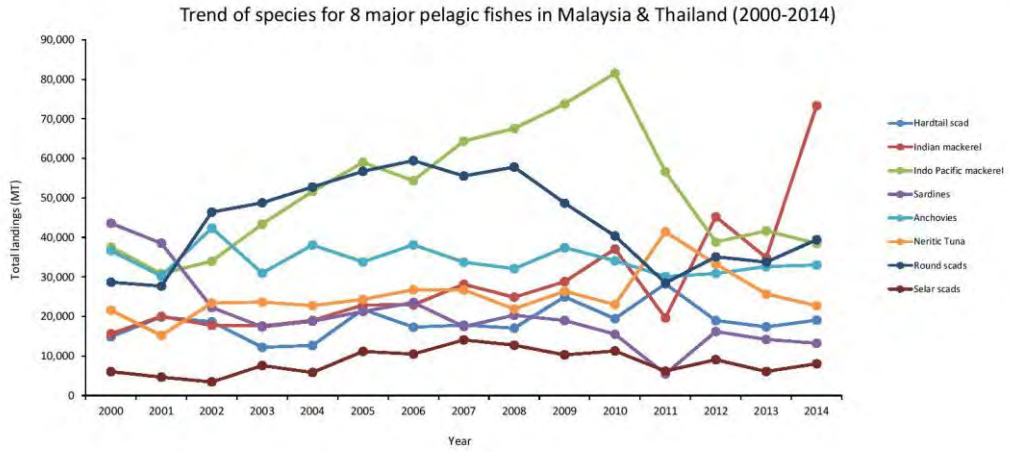
Trend of species for 7 major pelagic fishes in Malaysia & Thailand (1993-2014)



Sources: a. MAL : Annual Fisheries Statistics 1993-2014
b. TH: Statistic provided by the country 1993-2014 for JTF6 project.

BACKGROUND AND OVERVIEW

Trend of species (Andaman Sea)



Sources: a. MAL : Annual Fisheries Statistics 2000-2014.
b. TH : Statistic provided by the country 2000-2014 for JTF6 project

BACKGROUND AND OVERVIEW

Rationale (Why statistics data are necessary to support sustainable development and management of pelagic species)

- Pelagic fish resources is declining most probably:
  - Overfishing
  - Poor data collection of fishery statistic lead to unknown status of pelagic fish stocks.
- Fishery statistics is considered as an important tool to provide a basis to the formulation of national fisheries policies, as well as an indicator of the status of fisheries resources in the region.
- Different classification during collecting data (species and gear) among MCs could be a constraint in providing a good fishery statistic.
- Thus, it is crucial for every MCs to have reliable data collection in order to enhance their fishery statistic capability.

REVIEW ON RELEVANT REGIONAL ACTIVITIES

PAST

- **JTF2:** *Tagging program for economically important small pelagic species in the SCS and AS (2007-2012)*

ONGOING

- **JTF6**: *Comparative Studies for Management of Purse Seine Fisheries in the Southeast Asian Region (2013-2019)*

REVIEW ON RELEVANT REGIONAL ACTIVITIES

PAST PROJECT- JTF2

- Project Duration: **6 years** (2007-2012)
- The project involves on-site training for tagging in each participating SEAFDEC member country and tagging was implemented in the South China Sea and Andaman Sea.
- Tagging poster printed in national language was distributed throughout the countries involved to promote awareness on the project and to inform public on the reward given upon returning of recaptured tagged fish to the authority.
- Information and data includes date, time and tagging site, releasing position, tag number, fork length and species of the tagged fish were recorded in the 'Tagging Data Sheet' and uploaded to the Small Pelagic Tagging Database which was developed by SEAFDEC/TD.
- Countries involved: *8 MCs (Brunei DS, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, Viet Nam)*

REVIEW ON RELEVANT REGIONAL ACTIVITIES

JTF2 – Main Objective

1. To examine the movement and migration routes of the targeted pelagic fishes (TPF) in the SCS and AS.
2. To examine existence or absence of sub-populations of the selected species in both SCS and AS.
3. To suggest a management plan of purse seine fisheries in the SCS with reference to the obtained information and outcomes of the 1st phase of JTF2 project.

REVIEW ON RELEVANT REGIONAL ACTIVITIES

JTF2 - Tagging sites

- South China Sea - **13**
- Andaman Sea - **6**

REVIEW ON RELEVANT REGIONAL ACTIVITIES

JTF2 – Outcomes

Rastrelliger brachysoma (Indo Pacific mackerel)

	SCS	AS
No. of tagged fish	5220	5975
No. of recaptured	12	33
Recovery rate (%)	0.23 %	0.55 %

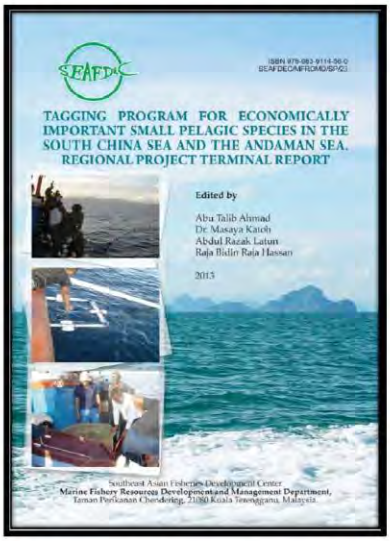
Rastrelliger kanagurta (Indian mackerel)

	SCS	AS
No. of tagged fish	7642	6636
No. of recaptured	16	8
Recovery rate (%)	0.21 %	0.15 %

REVIEW ON RELEVANT REGIONAL ACTIVITIES

JTF2 – Achievement

- Most tagged fishes were recaptured **within the vicinity** of released location.
  - Within the EEZs
- Tagged fishes does not migrate too far from released site
- **List of publications**:
  - Tagging Program for Economically Important Small Pelagic Species in the South China Sea and Andman Sea. Regional Project Terminal Report (2013).



REVIEW ON RELEVANT REGIONAL ACTIVITIES

ONGOING PROJECT - JTF6

- The project involves **compilation and comparison of annual and/or monthly CPUE** to examine the trend of resource level for the last three decades in the region.
- MFRDMD will compare purse seine fisheries management systems including **TAC systems and other management measures** in the world and **conduct the genetic study** of a commercially important pelagic species.
- At the end of the project, MFRDMD will review available information including stock levels, and MFRDMD and member countries will examine applicable management strategies for sustainable purse seine fisheries in the Southeast Asian region
- Countries involved, 8 MCs: *Brunei Darussalam, Cambodia, Indonesia, Malaysia, Myanmar, the Philippines, Thailand and Viet Nam.*

REVIEW ON RELEVANT REGIONAL ACTIVITIES

JTF6- Objectives

1. To compile and compare annual and/or monthly catch per unit effort (CPUE) data for the last three decades in Malaysia and Thailand where historical catch-effort statistics had been collected by SEAFDEC and to interpret the trend of resources in the region.
2. To assess which unit of effort is most appropriate for Malaysia, Thailand and other member countries and to examine other indicators for stock assessment.
3. To compare existing management systems/measures of purse seine fishery including total allowable catch (TAC) systems in the world to examine which management system/measure is applicable for management of purse seine fishery in the region.
4. To compare genetic structures of commercially important small pelagic species in the region by studying one species of the commercially important sardines
5. To propose management strategies for sustainable purse seine fisheries in the Southeast Asian region based on available data

REVIEW ON RELEVANT REGIONAL ACTIVITIES

JTF6- Expected Final Goals of the Project

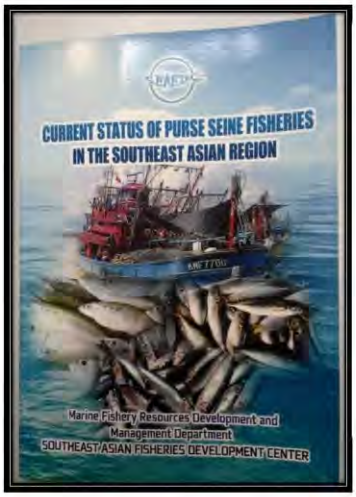
- MFRDMD will review available information including stock levels, and MFRDMD and member countries will established / examine management strategies / measures for sustainable purse seine fisheries in the region.

REVIEW ON RELEVANT REGIONAL ACTIVITIES

JTF6- Progress

- ✓ MFRDMD collected updated information on PS fisheries from few MCs and continuously examined the data for regional synthesis of PS fisheries in the region to suggest possible suitable stock indicator and management systems in the MCs.
- ✓ **List of Completed Publications:**

1. Meeting report for "Core Expert Meeting on Comparative Studies for Management of Purse Seine Fisheries in the Southeast Asian Region. (CEM 2014).
2. "Current Status of Purse Seine Fisheries in the Southeast Asian Region" was published in 2015.
3. Current status of Pelagic Fisheries in the Southeast Asian Region (Fish for the people, 2015).
4. Meeting report for "Core Expert Meeting on Comparative Studies for Management of Purse Seine Fisheries in the Southeast Asian Region. (CEM 2016). In press.



REVIEW ON RELEVANT REGIONAL ACTIVITIES

JTF6- Progress

- ✓ Genetic samples from spotted sardinella (*Amblygaster sirm*) collected by participating member countries were analyzed and the preliminary result based on four sampling locations (Muara, Kuantan, Kudat, Songkla) was presented during the 2nd Core Expert Meeting in 2016.
- ✓ The preliminary results found that *Amblygaster sirm* in South China Sea is a single evolutionary unit and therefore can be regarded as a single conservation unit for the management of sustainable fisheries.

Amblygaster sirm

AVAILABLE STATISTIC DATA OF PELAGIC SPECIES

JTF6 - Initiatives taken to improve data collection

- ➢ Following the agreement reached during the workshop on "Comparative Studies for Management of Purse Seine Fisheries in the Southeast Asian Region" held in Kuala Lumpur from 7th to 8th March 2017;
  - ✓ MFRDMD has already sent formal request to all MCs with template provided to gather statistical data of PS fisheries.
  - ✓ MFRDMD has been sent a soft reminder as follow up to the previous request however only a few of MCs responded.

AVAILABLE STATISTIC DATA OF PELAGIC SPECIES

JTF6 – Current statistic data collected

PARAMETERS	REGION		SCS	SCS	SCS	AS	SCS	AS	SCS	SCS	AS	AS	SCS
	COUNTRY		BRU	CAM	IND0-711	IND0-571	TH-GOT	TH-AS	PHI	MY-SCS	MAS-AS	MYM	VN
Landing of Purse Seine Fisheries	Trend of Landing		√	√	√	√	√	√	√	√	√	√	√
	Sp. Composition		√		√	√	√	√		√	√		
	Biological information	Lm	√		√	√				√	√		
		Spawning Season			√	√				√	√		
Fishing effort for Purse Seine Fisheries	No of PS vessels (FPS, APS)		√	√	√	√	√	√		√	√	√	
	No of PS vessels (GRT)		√		√	√	√			√	√		
	No. of days/trip		√				√	√		√	√		
	No. of trips/month		√		√	√	√	√		√	√		
	No. of hauls/days		√				√	√		√	√		
	Trend of CPUE	by vessel	√		√	√	√	√		√	√		
		by trip	√		√		√	√		√	√		
		by days	√				√	√		√	√		
Status of Pelagic Fish Stock	Biomass			√						√	√		
	MSY		√	√	√	√				√	√		
Existing management strategies	Close Season			√						√	√		
	Close Area						√	√	√	√	√	√	
	Survey-exploration				√	√				√	√	√	
	Joint venture program			√						√	√		√

*Note: - data not available yet

ISSUES AND RECOMMENDATION

Issues and Challenges

1) Commitment from member countries to send related data to MFRDMD.
2) Statistical data
   - ➢ Uniformity of data
     - each country has its own statistical data collection system, thus can not compare directly.
     - Data have been sent did not follow the standard requirements or format in the provided template.
   - ➢ Insufficient statistical data – shortage of human resources (manpower) to develop a systematic data collection
   - ➢ Data reliability and validity
3) Different management strategies
   - ➢ Data are not categorised by species
   - ➢ Fishing zonation
   - ➢ Different classification of fishing gear
4) Genetic study of *Amblygaster sirm*
   - ➢ Difficulties in bureaucratic procedures and legislations to bring samples from countries to MFRDMD, which makes regional genetic studies interrupted.
   - ➢ Misidentification of some samples sent from MCs, showing some MCs has still have difficulties in species identification of small pelagic species.

ISSUES AND RECOMMENDATION

Recommendation

1) Member Countries are requested to submit the updated data within the agreed time frame based on the project involved and provide clarification if their data is lacking and insufficient.
2) Capacity building to MCs in identification of species, methodology of data collection, standardization of data classification etc.

Annex 15

REGIONAL INITIATIVES IN RELATION TO ENHANCE COLLECTION AND USAGE OF FISHERIES STATISTICS DATA AND INFORMATION: SHARKS AND RAYS

By Dr. Worawit Wanchana

SEAFDEC Secretariat

AGENDA 4.2
REGIONAL INITIATIVES IN RELATION TO ENHANCE COLLECTION AND USAGE OF FISHERY STATISTICS DATA AND INFORMATION: SHARKS AND RAYS

Worawit Wanchana

The Secretariat

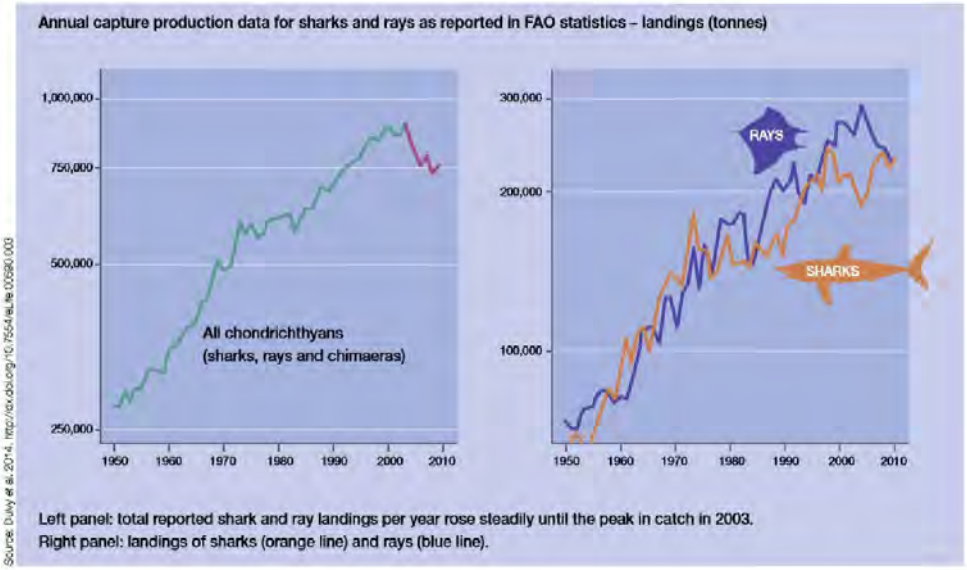
Regional Technical Consultation on Fishery Statistics and Information in Southeast Asia

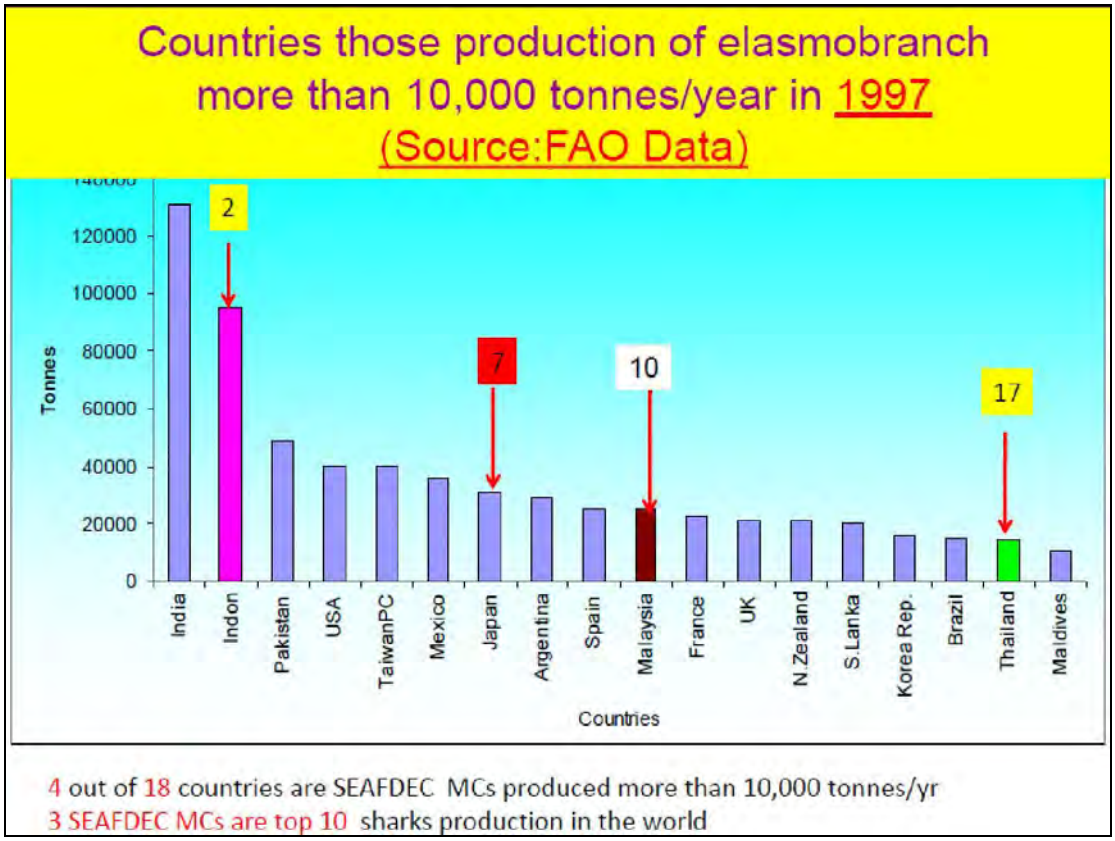
August 2017

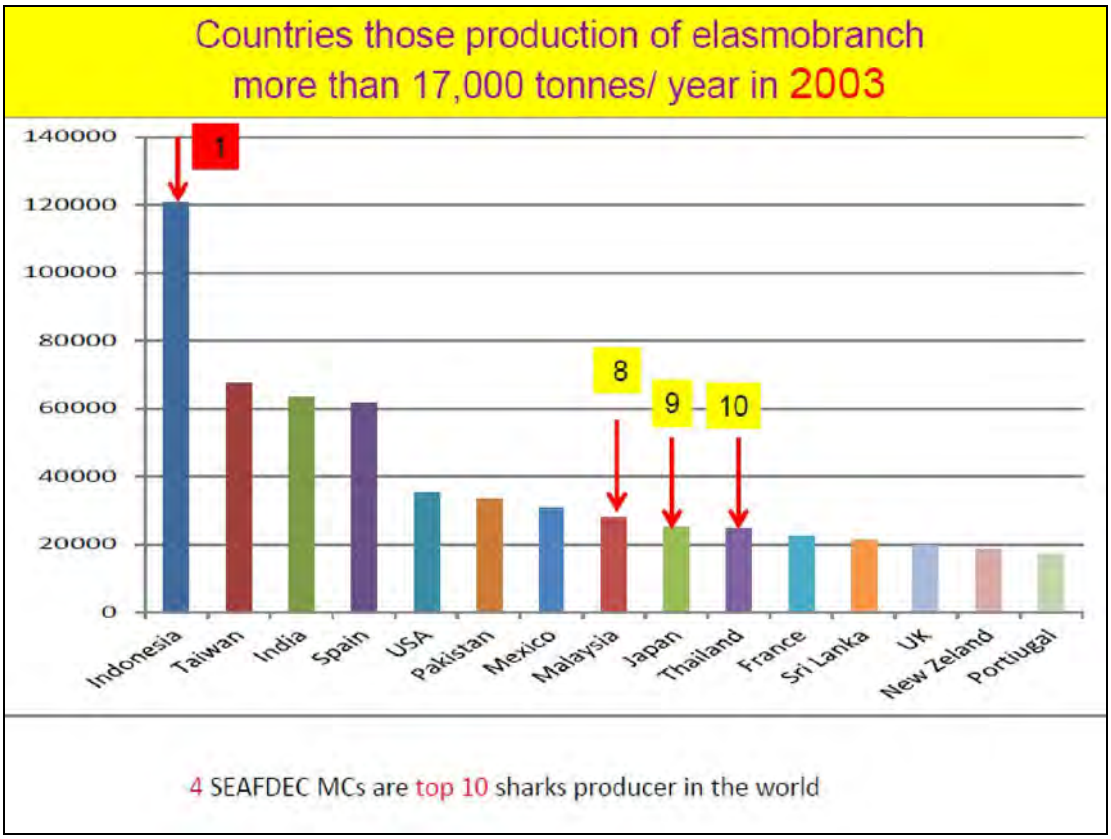
INTRODUCTION

- CITES promotes conservation and protection of endangered species of sharks, skates, and rays to ensure that international trade does not threaten their survival in the wide;
- FAO and SEAFDEC promote IPOA-sharks since 1999, providing a framework for developing national, sub-regional, and regional plans as well as assessment of sharks → NPOA-sharks developed and implemented in AMSs
- Total species of sharks-180; rays-160; and 30 skates in SEA (SEAFDEC 2016)
- All parts of sharks/rays/skates including meat, skin, liver, cartilages, etc. are fully utilized
- SEA waters have one of the richest elasmobranch diversity of the world

OVERVIEW – STATUS AND TREND OF SHARKS/RAYS SPECIES (GLOBAL)




Countries those production of elasmobranch
more than 10,000 tonnes/year in 1997
(Source:FAO Data)
Tonnes
120000
100000
80000
60000
40000
20000
0
2
7
10
17
India
Indon
Pakistan
USA
TaiwanPC
Mexico
Japan
Argentina
Spain
Malaysia
France
UK
N.Zealand
S.Lanka
Korea Rep.
Brazil
Thailand
Maldives
Countries
4 out of 18 countries are SEAFDEC MCs produced more than 10,000 tonnes/yr
3 SEAFDEC MCs are top 10 sharks production in the world


Countries those production of elasmobranch
more than 17,000 tonnes/ year in 2003
140000
120000
100000
80000
60000
40000
20000
0
1
8
9
10
Indonesia
Taiwan
India
Spain
USA
Pakistan
Mexico
Malaysia
Japan
Thailand
France
Sri Lanka
UK
New Zeland
Portugal
4 SEAFDEC MCs are top 10 sharks producer in the world

REVIEWING AVAILABILITY OF STATISTICS AND INFORMATION – SHARKS

SHARKS AND RAYS LANDING IN SEA (TONS)

Production of sharks by quantity (MT)

	2008	2009	2010	2011	2012	2013	2014	2015
Brunei Darussalam	29	15	19	N/A	N/A	6	N/A	N/A
Indonesia	125,336	40,960	49,651	59,403	45,651	56,720	57,521	55,960
Malaysia	7,346	7,236	6,793	14,735	6,536	7,833	8,004	7,624
Philippines	2,380	2,635	2,798	2,556	2,300	2,129	1,955	1,788
Singapore	17	20	10	29	24	24	59	58
Thailand	2,834	2,826	2,936	2,574	2,338	2,064	2,308	2,495
Total	**137,942**	**59,392**	**62,207**	**79,297**	**56,849**	**68,776**	**69,847**	**67,925**

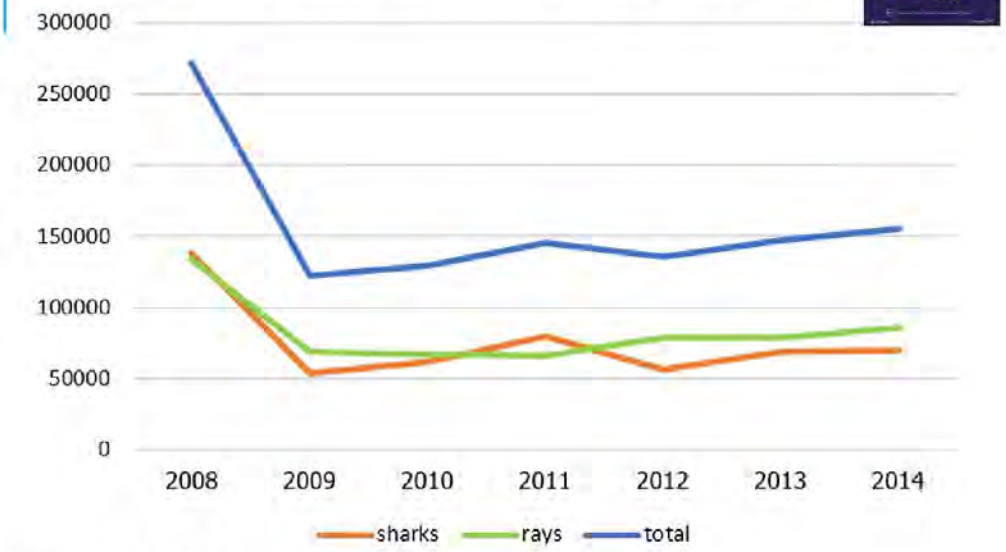
Production of rays by quantity (MT)

	2008	2009	2010	2011	2012	2013	2014	2015
Brunei Darussalam	69	56	63	N/A	N/A	47	N/A	N/A
Indonesia	113,012	44,660	44,478	45,084	56,403	56,067	61,953	59,260
Malaysia	11,642	15,031	13,770	13,021	15,612	15,774	17,275	12,908
Philippines	2,370	2,591	2,713	2,501	2,276	2,163	1,918	1,850
Singapore	117	143	105	112	115	93	77	8
Thailand	6,245	6,219	6,089	5,646	4,296	4,195	4,445	4,652
Total	**133,455**	**68,700**	**67,218**	**66,365**	**78,702**	**78,339**	**85,668**	**78,678**

Source: Fishery Statistical Bulletin of Southeast Asia, SEAFDEC 2017

REVIEWING AVAILABILITY OF STATISTICS AND INFORMATION – SHARKS

SHARKS AND RAYS LANDING IN SEA (TONS)



Source: SEAFDEC 2017
Data included Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, Thailand

REVIEWING AVAILABILITY OF STATISTICS AND INFORMATION – SHARKS

Scientific Name	FAO English Name	Fishing Area	Indonesia	Malaysia	Philippines	Singapore	Thailand
Alopias spp.	Thresher shark nei	57	2,910				
Alopias spp.	Thresher shark nei	71	8,060				
Sphyrna spp.	Hammerhead sharks	57					
Sphyrna spp.	Hammerhead sharks	71				31.00	
Squalus spp.	Dogfish sharks	57	2,530				
Squalus spp.	Dogfish sharks	71	2,720				
Dasyatidae	Stingrays, butterflys rays nei	57	10,440				
Dasyatidae	Stingrays, butterflys rays nei	71	37,620				
Sphyrnidae	Hammerhead sharks, nei	57	660				
Sphyrnidae	Hammerhead sharks, nei	71	20				
Laminidae	Mackerel sharks nei	57	250				
Laminidae	Mackerel sharks nei	71	440				
Carcharhinidae	Requim sharks nei	57	5,280				
Carcharhinidae	Requim sharks nei	71	27,890				
Rhynchobatus australiae	Whitespotted wedgefish	57	550				
Rhynchobatus australiae	Whitespotted wedgefish	71	4,650				
Rhynobatidae	Guitarfishes, etc. nei	57	180				
Rhynobatidae	Guitarfishes, etc. nei	71	810				
Rajiformes	Rays, Stingrays, mantas nei	57		3,212			728
Rajiformes	Rays, Stingrays, mantas nei	71		9,696	1,788	58.00	3,294
Myliobatidae	Eagle rays nei	57	2,120				
Myliobatidae	Eagle rays nei	71	5,290				
Mobulidae	Mantas, devil rays nei	57	1,460				
Mobulidae	Mantas, devil rays nei	71	2,330				
Pristidae	Sawfishes	57	10				
Pristidae	Sawfishes	71	-				
Elasmobranchhii	Sharks, rays, skates, etc. nei	57		2,362			377
Elasmobranchhii	Sharks, rays, skates, etc. nei	71		5,262	1,850	8.00	2,118

REVIEWING RELEVANT REGIONAL INITIATIVES ON SHARKS DATA COLLECTION IN SEA - TD

Information on shark stock status in Southeast Asian Countries is not available because of insufficient long-term data, and limiting knowledges on species identification and stock assessment capacity.

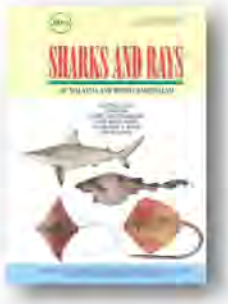
SHARKS AND RAYS DATA COLLECTION MEETING

BANGKOK, 26 May 2015: T
organizing at Bangkok, Thail
(SEC) and Marine Fisheries
Participating Countries (Cam
sharks and ray data collectio
as consider practical solution
participants from SEAFDEC
Meeting. The Meeting output
through Standard Operation

Project "***Improving Data collection of the Commercially-exploited Aquatic and Threaten Species: Sharks and Rays***" (2013 to 2019)

- Build capacity of the fishery researchers/enumerators of AMSs for improvement of their national reporting of statistics on catch and landing of elasmobranches
- Facilitate better understanding of sharks/rays stock status and assessment to further explore conservation/management plan to sustainable utilization of sharks/rays
  - Technical meeting: development of appropriate model for stock assessment of sharks in SEA through improvement of national/regional data collection, including development of a regional database for sharks (from 2017 and onward)

REVIEWING RELEVANT REGIONAL INITIATIVES ON SHARKS DATA COLLECTION IN SEA - MFRDMD



- 1999, MFRDMD initiated a regional project entitled "Biology and Fishery of Sharks in SEA (Brunei Darussalam and Malaysia): major findings through the surveys: 110 species of elasmobranch (56 sharks, 52 rays, and 2 chaemaeras)
- 2003-2004, "Regional ad-hoc study on sharks" implemented under project entitled "Environmental-related tasks in the SEA region": (a) data collection survey in Malaysia, Thailand, and Singapore; (b) denticle study; (c) support development of NPOA-sharks; and (d) onsite training on data collection (Malaysia, first initiative to identify species of sharks/rays at species level)
- 2015-2019, Research for Enhancement of Sustainable Utilization and Management of Sharks and Rays in SEA Region: capacity building for AMSs, DNA study, etc.

SUMMARY ON REGIONAL, SUB-REGIONAL, AND NATIONAL INITIATIVES ON SHARKS DATA COLLECTION IN SEA

- Regional level: Regional fisheries statistics through improvement of reporting data/information via publication, database, etc.
- Sub-regional and national levels
  - Stock assessment program using selected data for some species of sharks based on 1-year data collection
  - Capacity building program for: (1) species identification; (2) stock assessment; (3) development/implementation of NPOA-sharks
  - Sharks database development for sharks/rays in Southeast Asia

CHALLENGES AND WAY FORWARD

- Continuing capacity building programs
- Development and utilization of SEA sharks database
- Establishment of technical working group on sharks to work closely and support AMS under ASEAN mechanism (e.g. common/coordinated position of AMS at international for a such as CITES-COP)
- Medium and long-term financial support to obtain a time series data on sharks landing to support regional study on stock status
- Coordinate with EU through CITES Secretariat to expand the results conducted 2015-16

PROPOSAL FOR REVISION OF QUESTIONNAIRE SEAFDEC FISHERIES BULLETIN - SHARKS

Scientific Name	FAO English Name (ASFIS)
Squalus spp.	Dogfishes nei
Squalidae	Dogfish sharks nei
Alopias spp.	Thresher shark nei
Isurus spp.	Mako sharks
Lamnidae	Mackerel sharks, porbeagles nei
Chiloscyllium spp.	Bamboosharks nei
Carcharhinus spp.	Requiem sharks nei
Carcharhinidae	Requiem sharks nei
Sphyrna spp.	Hammerhead sharks nei
Sphyrnidae	Hammerhead sharks nei
-	Other sharks nei

PROPOSAL FOR REVISION OF QUESTIONNAIRE SEAFDEC FISHERIES BULLETIN - RAYS

Scientific Name	FAO English Name
Pristidae	Sawfishes
Rhynchobatus australiae	Whitespotted wedgefish
Rhinobatos spp.	Guitarfishes nei
Rhinobatidae	Guitarfishes, etc. nei
Rajidae	~~Rays and~~ skates nei
Dasyatidae	Stingrays nei
Gymnura spp.	Butterfly rays nei
Myliobatidae	Eagle rays nei
Manta spp.	Manta rays
Mobula spp.	Mobula nei
Mobulidae	Mantas, devil rays nei
-	Other rays nei

Annex 16

REGIONAL INITIATIVES IN RELATION TO ENHANCE COLLECTION AND USAGE OF FISHERIES STATISTICS DATA AND INFORMATION: CATADROMOUS EELS

By Ni Komang Suryati

SEAFDEC/IFRDMD

REGIONAL INITIATIVES IN RELATION TO ENHANCE COLLECTION AND USAGE OF FISHERY STATISTICS DATA AND INFORMATION ON ANGULLID EEL

SEAFDEC/IFRDMD

Regional Technical Consultation on Fishery Statistics and Information in Southeast Asia 15-18 August 2017, Bangkok, Thailand

Current situation surrounding the Tropical Anguillid Eels in AMSs

- Increasing demands of the tropical anguillid eels
- No statistical records on the status of tropical anguillid eel resources, fisheries and eel farming production
- No effective measures for appropriate resource management
- Concern by CITES on eel resources without appropriate resource management.
- *Establishing catch statistics on eel is indispensable measure to monitor the long-term trend of eel migration and fishery.*

Background

- Rapid decline of temperate eels
- Increasing glass eel catch in tropical zone
- Conservation and management

Objective

- Grasp present status
- Improve data collection and statistics of eel fishery
- Enhance knowledge and capacity for management

2015-2017

- 15 **Surveys** in total (Indonesia, Myanmar, Philippines and Viet Nam
- Held 2 meetings
- **International workshop** (in Palembang Indonesia which 7 countries dispatched officials)
- Approx. more than 50 **government** officials (incl. Local gov.), 30 **fishers and eel collectors**, 15 **eel farmers** and 10 **eel farms** participated in the surveys and workshop.
- Dispatch staffs to **International symposium** on Eels (Aceh and Jakarta, Indonesia) and **preparatory meeting for CITES** (Bangkok, Thailand)
- Questionnaire surveys twice for all SEAFDEC member countries

Cont…

1. the countries where they use eel resources commercially (Cambodia, Indonesia, Philippines, Myanmar, Viet Nam),

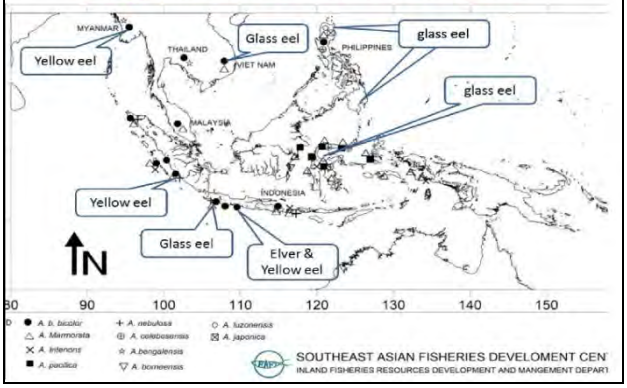
2. major eel species used for fishery/eel farming (Indonesia, Philippines, Myanmar),

3. which stages/sizes of eels are used for eel farming (glass eel: Indonesia, Philippines, Viet Nam; elver and larger: Myanmar),

4. existence or not of any regulations/rules/measures for conserve the eel resources

5. the commodity chain of eel seeds (Indonesia, Myanmar and Viet Nam)

Anguillid Eel Resource in AMS



1st Workshop on Enhancement of Sustainability of Catadromous Eel Resources in Southeast Asia

- Attended by scientists/specialists on Anguilid eel from the Member Countries

Improvement of data collection/statistics

Increasing the survival rate of glass eels in culture condition

Compilation of existing information/researches, unregulated trade

Restocking/resource enhancement measures.

Experts Meeting on Assessment of the Proposed Listing of Commercially Exploited Aquatic Species to the CITES Appendix

- Developing the aquaculture of eels
- Continue to collect more data on the species to prepare for the scientific consultation to be organized between the CITES-CoP 17 and CoP 18
- Develop traceability of eel species to be able to trade
- Obtain good statistics on eels

Meeting for developing the template for data collection

- Directorate General of Fisheries Resources Management-Ministry of Marine Affairs and Fisheries (DGRFM-MMAF) of Indonesia
- Japan International Cooperation Agency (JICA)

- developing the template for data collection
- Making the questionnaire together between IFRDMD and DGFRM-MMAF

Problems on eel catch statistics and measures

PROBLEMS

- **Difficult to collect,**
- **Fragmented and discontinuous,**
- **Difficult to get the latest update,**
- **Difficult to cover all the fishing ground**
- **Lack of indices of fishing effort**

MEASURES

- Request Nat'l/Local Gov. to **develop official statistics**
  - Maintain the database for ***easy access*** to the ***latest data***.
- Search **alternative sources** of data/info

(cont.)

- **alternative sources** of data/info
  - From Fishermen, Collectors, Eel farms, Quarantine Sta.
  - Cross-checking with/compensate for official statistics
  - Indices of **Fishing Effort**
    - No. Fishermen, No. Gears, Working days, …

Search appropriate and easily obtained Fishing Effort indices

For calculating CPUE trend

-> Recommend to adopt these indices in Official Statistics.

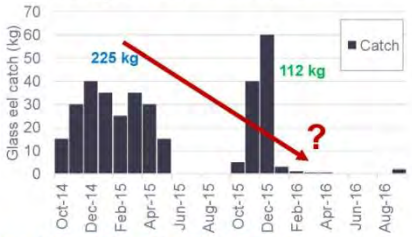
Case study on data gathering

- Merits of collecting "**fishing effort**" with catch data, to calculate **CPUE**

1. CPUE = Catch/fishing effort
2. Advantages of **CPUE**:
   - Get rid of the conditions that are not directly related to the resources: demands, price, etc.
   - No need to survey all the fishers in the fishing site.
   - *<- not complete survey, but **sample survey***

Case study on data gathering

Example Monthly catch of glass eel



- Year-1: Oct 2014 – Sep 2015: 225kg
- Year-2: Oct 2015 – Sep 2016: 112kg (half of the year-1)
- **-> Is that really mean the decline of migration level of glass eel in Year-2?**

Agenda 2.7

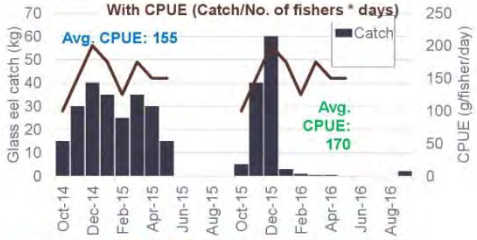
Case study on data gathering

Example Monthly catch of glass eel

- Year-1: Oct 2014 – Sep 2015: 1,450 fishers*day
- Year-2: Oct 2015 – Sep 2016: 648 fishers*day
- **-> Total efforts in Year-2 is less than half of Year-1.**
- **-> Monthly efforts drastically dropped in Jan 2016.**

Case study on data gathering

Example Monthly catch of glass eel

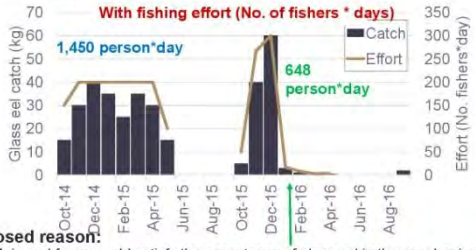


- Year-1: Avg. CPUE: 155g/fisher/day, Year-2: 170g/fisher/day
- **-> CPUE in Y-2 is rather higher than that in Y-1.**
- -> It is not appropriate to assess the migration level based only on the annual catch.

Agenda 2.7

Case study on data gathering

Example Monthly catch of glass eel



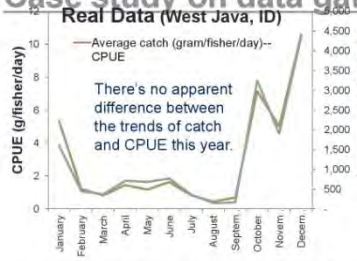
Supposed reason:

- Major eel farms could satisfy the acceptance of glass eel in the very beginning of the Y-2 season then **stop acceptance of glass eel** since Jan 2015.
- **-> Since the demands from eel farms decreased in Jan 2015, No. fishers also decreased drastically.**

Agenda 2.7

Case study on data gathering

Real Data (West Java, ID)



In the preliminary surveys conducted in Indonesia, we check the fitting of the catch trend and CPUE, to find the atypical issues would occur or not.

- To find the good source of "effort" data is rather difficult.
- However, only a few fishers (data sources) is enough for CPUE.
- In the survey, we will seek the possibility to get effort data at each pilot survey site with DoF staffs and local contact/key persons.

Agenda 2.7

Template 1: **Only one-type effort** (No. of fishers)

Arrange the template with data items at each survey site.

Enumerator's name :
Month :
Location :

Effort **Catch**

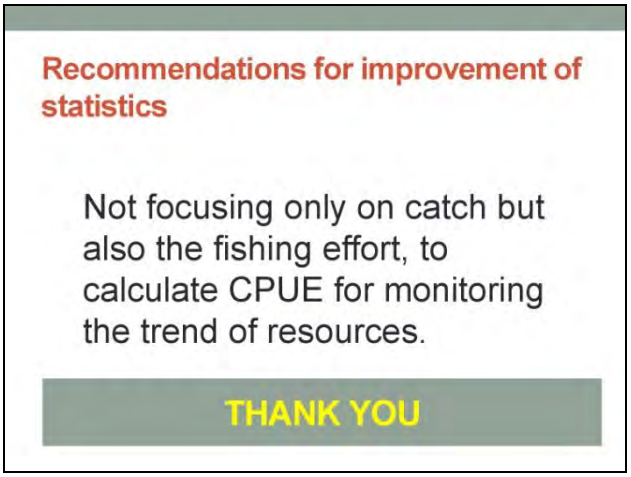
No	Date	Collector's name	Number of Fisherman	Weight (gram)	Note
1					
2					
3					

Template 2. **Several types of efforts** (Trap or Hook&Line x No. x Operation ho

Enumerator's name :
Month :
Location :

Catch **Type of efforts** **Effort-1** **Effort-2**

No.	Date	Name of fisherman	Catch (kg)	kind of Gears	number of gears (unit)	operation time (hours)	Note
1							
2							
3							


Recommendations for improvement of statistics
Not focusing only on catch but also the fishing effort, to calculate CPUE for monitoring the trend of resources.
THANK YOU

Annex 17

REGIONAL INITIATIVES IN RELATION TO ENHANCE COLLECTION AND USAGE OF FISHERIES STATISTICS DATA AND INFORMATION: INLAND CAPTURE FISHERIES

By Dr. Dina Muthmainnah

SEAFDEC/IFRDMD

Regional Initiatives in Relation to Enhance Collection and Usage of Fishery Statistics Data and Information on Inland Capture Fishery

SEAFDEC / IFRDMD

1

1. Overview of the inland capture fisheries

The status and trend of inland capture fishery under the respective sub-agenda in the global/regional/national perspectives.

In present, we can use some kind of catch statistics on inland capture fisheries in Southeast Asian Region at each

- Species
- Country
- Fishing method

(summarized by SEAFDEC, FAO, MRC and so on)

2

Continued 1.

Contribution of Southeast Asian countries' inland capture fisheries to the region's total fishery production in 2014

Country	Inland capture production (MT)	Total capture production (MT)	% of inland capture production to total capture production	Total fishery production (MT)	% of inland capture fishery production to total fishery production
Brunei Darussalam	...	3,186	...	3,947	...
Cambodia	505,005	625,255	80.77	745,310	67.76
Indonesia	446,509	6,413,648	6.96	20,600,772	2.17
Lao PDR	60,237	60,237	100	150,592	40
Malaysia	5,611	1,463,737	0.38	1,988,302	0.28
Myanmar	1,381,030	4,083,270	33.82	5,040,311	27.40
Philippines	211,941	2,343,813	9.04	4,681,418	4.53
Singapore	...	1,433	...	6,695	...
Thailand	209,800	1,769,546	11.86	2,667,309	7.87
Viet Nam	208,100	2,919,200	7.13	6,332,500	3.29
Total	**3,028,233**	**19,683,325**	**15.38**	**42,217,156**	**7.17**

Source: Fishery Statistic 2014, www.seafdec.org

3

Continued 1.

Production of major inland fisheries species in Southeast Asia in 2014

Common name	Quantity (MT)	Percentage total quantity of major inland species to total inland capture production (%)	Value (US$ 1,000)	Percentage total value of major inland species to total inland capture production (%)	Price (US$/MT)
Misc. fishes	2,367,587	78.48	2,653,482	71.8	1121
Striped snakehead	64,929	2.14	135,120	3.7	2081
Freshwater mollusks nei	60,425	2.00	9,094	0.25	151
Nile tilapia	56,737	1.87	87,007	2.35	1534
Tilapia nei	54,180	1.79	68,663	1.86	1267
Silver barb	38,103	1.26	50,877	1.38	1335
Torpedo-shaped catfishes nei	34,750	1.15	51,808	1.40	1491
Snakeskin gourami	33,974	1.12	34,691	0.94	1021
Cyprinids nei	32,236	1.06	31,398	0.85	974
Climbing perch	31,955	1.06	53,191	1.44	1665
Asian redtail catfish	27,157	0.90	61,187	1.66	2253

Source: Fishery Statistic 2014, www.seafdec.org

4

Continued 1.

Inland capture production:

Country	2014 (tones)	2015 (tones)
Myanmar	852,530 F	863,450 F
Cambodia	505,005	487,905
Indonesia	420,190	457,060
Philippines	213,536	203,366
Thailand	181,755	196,600

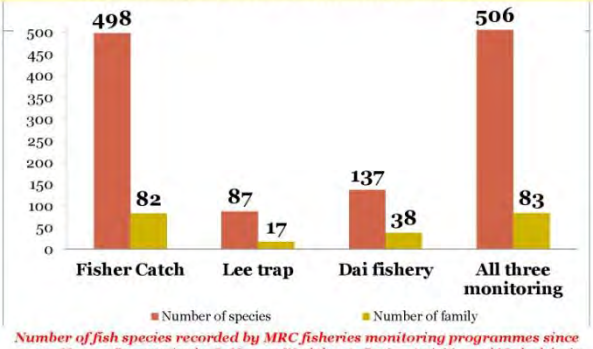
F = FAO estimate

Source: *FAO, 2017. FAO Global Capture Production database updated to 2015 - Summary information. www.fao.org/fishery/statistics/en*

5

Continued 1.

Key finding of MRC Monitoring Programme



Number of fish species recorded by MRC fisheries monitoring programmes since 1990s *(Source: Presentation by So Nam on Workshop to Review Activities and Methodologies for Promotion on Inland Fishery from 8 to 10 August 2016 in Palembang, Indonesia*

6

Continued 1.

Provides rationale why statistics data are necessary to support sustainable development and management of such species in the region, e.g. referring to the resource status, and relevant international or trade-related requirements, etc.

the importance for Monitoring, collecting Info/Statistics & Researches

- To know the present status of Fisheries, Resources & Fishers
- For decision making on Fisheries Management
- Roles and collaboration between management side and researchers side
- Need of evaluation and improvement of the data and statistics

7

Continued 1.

To get the valuable information at each country in Southeast Asia Region regarding Monitoring, collecting Info/Statistics & Researches:

IFRDMD held a Workshop to Review Activities and Methodologies for Promotion on Inland Fishery from 8 to 10 August 2016 in Palembang, Indonesia,

and through the presentation and discussion identified:

8

Country	Already collected?	Start of Data collection	Form of data collection	updating	Method
Brunei Darussalam	√	Unknown	Fishing time, Catch composition, species composisition	Annually	Fishery extension agent
Cambodia	√	1983	Daily production (catch), type of gears	Monthly	Province Fisheries Offices
Lao PDR	√	2003	Number of household, type of gears,	Annually	Fishery Division, Department of Livestock and Fisheries
Indonesia	√	1974	Production (kg), fishing gear, fisher, catch composition, fishing effort	Annually	Enumerator and fishery extension agent
Malaysia	√	1985	Fishing time, Catch composition, species composition	Annually	Fishery extension agent
Myanmar	√	Unknown	Catch per unit effort (CPUE), Fishing time, Catch composition, Average of Fish, Fisher's Income, Fishing Cost, and Profit	Annually	The Central Statistical Organization (CSO)
Philipinnes	√	1960	Trend seasonal distribution, relative abundance, size and species composition, and estimation of population parameter	Annually	Philippines has established National Stock Assessment Program in 1996. The data statistic was establish in 1960
Singapore	√	Unknown	Fishing time, Catch composition, species composition	Annually	Fishery extension agent
Thailand	√	1969	Catch per unit effort (CPUE), Fishing time, Catch composition, Average of Fish, Fisher's Income, Fishing Cost, and Profit	Annually	Monitoring on catch data from logbook and conducted satisfy questionnaire
Viet Nam	X	---	---	---	---

9

2. Review on relevant regional initiatives

Overview of the past, ongoing, and/or future regional initiatives/ activities related to data/information of the inland capture fishery

Background:

to get the present Status of inland fishery of the SEAFDEC member countries.

10

Continued 2.

Method ❶ **Conduct/send the questionnaire**

Duration: May 26 – July 27, 2016

Coverage: AMs and partners to share

Result:

- In many countries, statistics are compiled because they are requested or demanded by central government.

11

Continued 2.

Method ❷ **Hold the workshop**

Duration: August 8 – 10, 2017

Coverage: AMs and partners to share

Result:

- A wide variety of methods are used by the countries, to estimate inland capture fisheries production.

  There are unofficially recognized or officially confirmed, differences between the official systems in place an actual practice.

12

Continued 2.

Method 3 Survey in AMS

1. Visit Department of Fishery in each country to get the **statistical data and information**, and interview the fishers by using close/open questionnaire.
2. Collected information regarding fisheries management by fishermen's committees.
3. Learnt from National Stock Assessment Program (NSAP) in Philippines

Duration: 2015 – 2017

Coverage: Indonesia, Lao PDR, Cambodia, Philippine & Thailand

Results:

- Inland capture fisheries productions are seriously **under-reported**.
- The discrepancy between officially reported catch and estimates based upon independent scientific surveys (i.e. collection of actual data).

13

Continued 2.

Reviews previous discussion and recommendations for improving data collection of the inland capture fisheries

Through the workshop on inland capture fisheries in Southeast Asia on August 2016, SEAFDEC discussed with SEAFDEC member countries the **importance of data collection**, with the understanding of difficulties to collect catch statistics on inland capture fisheries.

14

Continued 2.

Based on the results of the questionnaire/fields surveys and workshop,

IFRDMD will:

- **Continue focusing** on the improvement of the catch statistics and the methods of their collection, including the establishment of the useful databases.
- Share, exchange and analyze the information on co-management and right-based fisheries management in AMS **through the seminars and FGDs** among fisheries experts, officers and stakeholders.
- **Hold a workshop** to formulate guidelines to promote the use of practical and simple indicators for inland fisheries management framework.

15

Continued 2.

Inform the regional initiative(s) that has been undertaken to improve data collection on inland capture fishery by SEAFDEC and the respective countries.

Although IFRDMD has not conducted concrete majors to improve data collection in SEAFDEC members countries yet,

✓ IFRDMD has been **collecting and summarizing** all the components of inland capture fisheries in member countries to extract the key issues what and how we can/should support them.

✓ IFRDMD will publish a printed matter that explains the summary of the features on inland fisheries in the region **as one of the fundamental materials** at the end of this project, that it could refer to a similar publication produced by the Mekong River Commission (MRC).

16

3. Review on availability of relevant statistics and information

IFRDMD identifies data/information that are necessary for analysis of inland capture fishery

- Continuous record of total catch (monthly/annually)
- Combination of catch and effort for monitoring the trend of fish stock by CPUE
- Classify the different species into appropriate category,
  ex: rice-paddy eel vs Anguillid eel
- Commodity chains, where we can get catch data/statistics
- Price at unit weight per piece (motive of fishers)
- Unite and check the unit of the scale of the amount of catch
- Fishers cooperatives/group => community
- Gears used for fishing

17

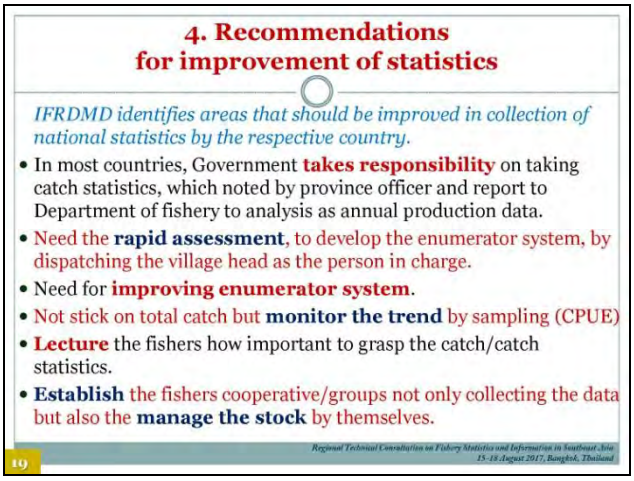
Continued 3.

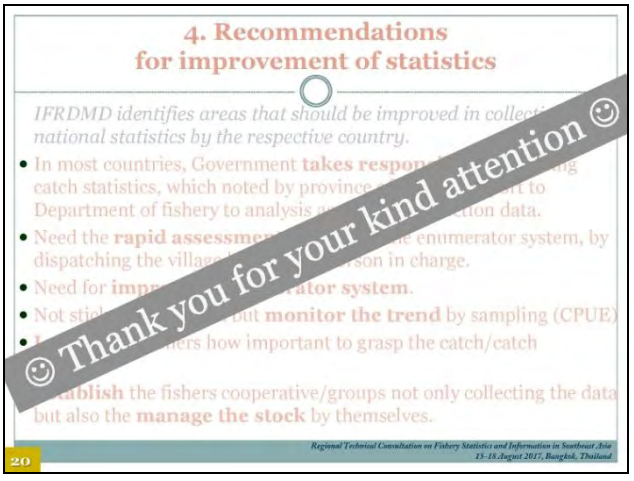
IFRDMD reviews the availability of statistics and other information to serve as inputs for such analysis, as well as issues and challenges, problems and constraints faced in gathering of statistics and information from countries in the region.

Difficulties in data and information collection:

- Small-scale fisheries, involving large number of fishers including occasional fishers,
  - Some of fishers only do part-time fishing activities and catches are not recorded through the market
- Catch comprises multi-species of fish/aquatic animals
  - Catches go to various channel without proper recording
- Large part of the catch is for household consumption
  - Catches are not recorded through the market
- Non-homogeneous nature & seasonal variation of the production
  - Cause the catch statistics were fragmented and discontinuous

18


4. Recommendations
for improvement of statistics
IFRDMD identifies areas that should be improved in collection of national statistics by the respective country.
• In most countries, Government takes responsibility on taking catch statistics, which noted by province officer and report to Department of fishery to analysis as annual production data.
• Need the rapid assessment, to develop the enumerator system, by dispatching the village head as the person in charge.
• Need for improving enumerator system.
• Not stick on total catch but monitor the trend by sampling (CPUE)
• Lecture the fishers how important to grasp the catch/catch statistics.
• Establish the fishers cooperative/groups not only collecting the data but also the manage the stock by themselves.
19

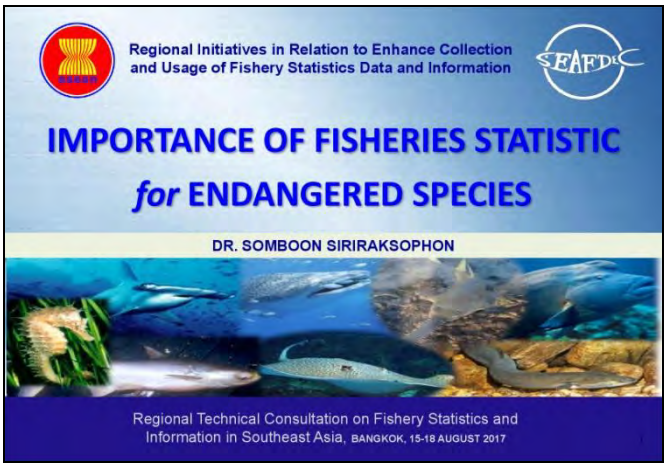

4. Recommendations
for improvement of statistics
Thank you for your kind attention
20

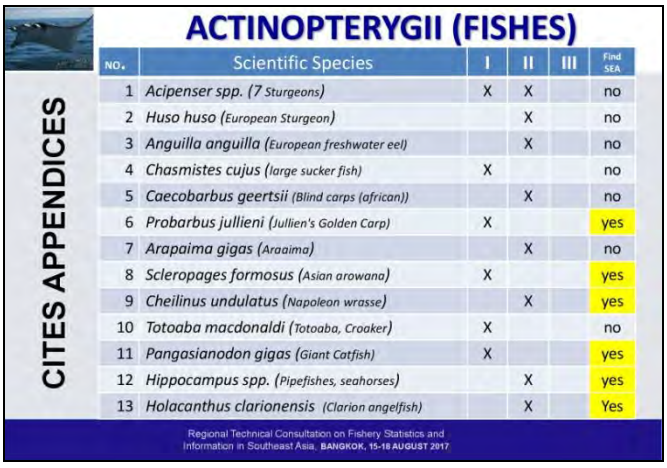
Annex 18

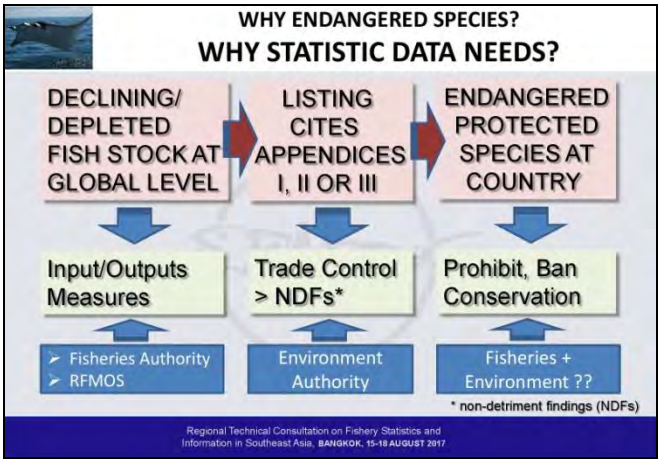
REGIONAL INITIATIVES IN RELATION TO ENHANCE COLLECTION AND USAGE OF FISHERIES STATISTICS DATA AND INFORMATION: OTHER SPECIES UNDER INTERNATIONAL CONCERNS

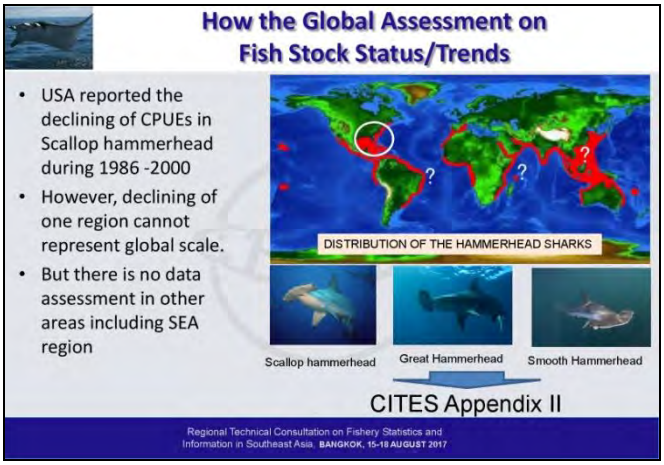
By Dr. Somboon Siriraksophon

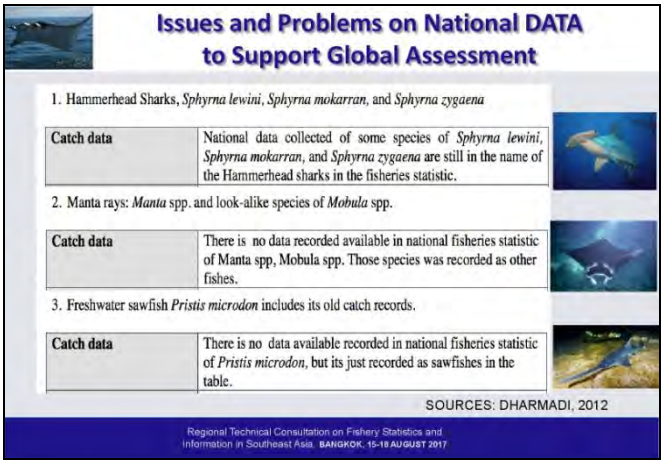
SEAFDEC Secretariat











Fisheries Statistics Requires Explanatory Notes

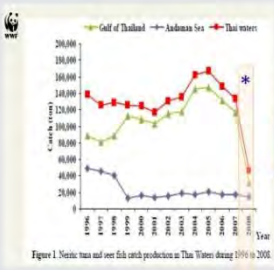


Figure 1. Nertic tuna and neer fish catch production in Thai Waters during 1996 to 2008.

Thunnus tonngol, GoT

Assessment report date: 02/2013
Species: *Thunnus tonngol*
Area: FAO 71 Gulf of Thailand
Gear: Purse seine
(FAD asso. and no FAD)
- WWF Assessment outcome: Red

*Without remarks on the of tonngol production sometimes created big impact to their fisheries industry.

IF species were listed to CITES Appendix MC has to implement Trade Measures and NDFs

I. BACKGROUND INFORMATION

1) Biology
- Biological characteristics: life history, habitat types, role of species in its ecosystem;
- Population: global Population size, current population trends;
- Conservation status: global conservation status (according to IUCN Red List), national conservation status, main threats within the case study country;

2) Species Management within Country.
- Management measures
- Monitoring system: methods used to monitor harvest, confidence in the use of monitoring;
- Legal Framework and law enforcement

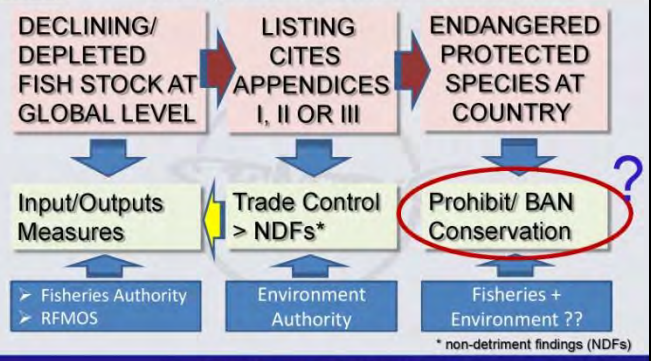
3) Utilization and Trade for range states
- Type of use (origin) and destination (purposes)
- Harvest: harvesting regime, harvest management control (quota, seasons, permit, etc.
- Legal and illegal trade levels

IF species were listed to CITES Appendix MC has to implement Trade Measures and NDFs

II. NON DETRIMENT FINDINGS PROCEDURES (NDFS)

Information needed	Fishery (landings surveys)	Population (field surveys)
which species	are caught	are observed
where (locations, depth, habitat)	at which they are caught	at which they are found
when (time of year)	at which they are caught	at which they are found
how many	are caught PER UNIT EFFORT (including discards)	are observed
size stucture	of captured individuals	of observed individuals
sex (male, female, juvenile)	of captured individuals	of observed individuals
pregnant (yes/no)	of captured individuals	of observed individuals

IMPROVEMENT OF FISHERY STATISTIC DATA, MANAGEMENT MEASURES



Prohibit, Ban or Conservation > No data

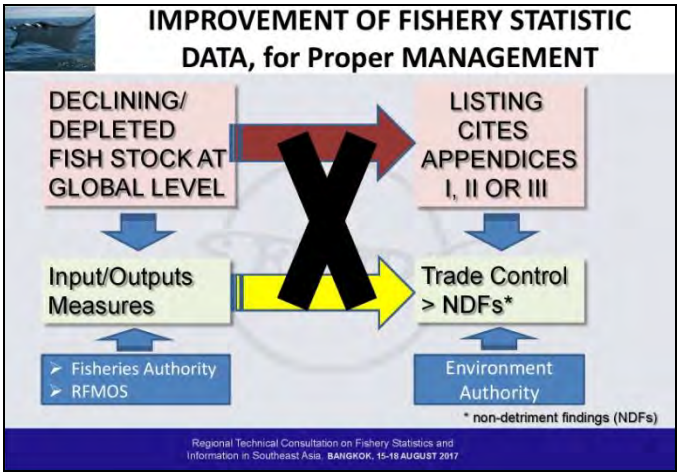
Annual Report to the Commission
Part 1: Information on Fisheries, Research and Statistics
WCPFC-SC9-AR/CCM-03

Table 3 Catch of non-target species by the Chinese LL tuna fishery in the WCPFC Convention Area in 2010 and 2012(Unit of catch: MT)

Species	Billfish			Sharks		
	Striped marlin	Blue marlin	Black marlin	Blue shark	Shortfin mako	Oceanic Whitetip
2010	132	1094	29	506	133	532
2011	370	1226	172	726	408	0
2012	524	1795	255	1126	516	0

Challenges and Recommendations

- IMPROMENT OF DATA COLLECTION SYSTEM TO INCLUDE THE ENDANGERED SPECIES;
- APPLY CATCH DOCUMENTATION SYSTEM TO ENHACE THE DATA COLLECTON AND SPECIES IDENTIFICATION (IN CASE OF SHARK FIN);
- REGULARY CONDUCT THE STOCK-RISK ASSESSMENTs OF ENDANGERED SPECIES AT NATIONAL AND REGIONAL LEVELS TO SUPPORT THE GLOBAL ASSESSMENT;

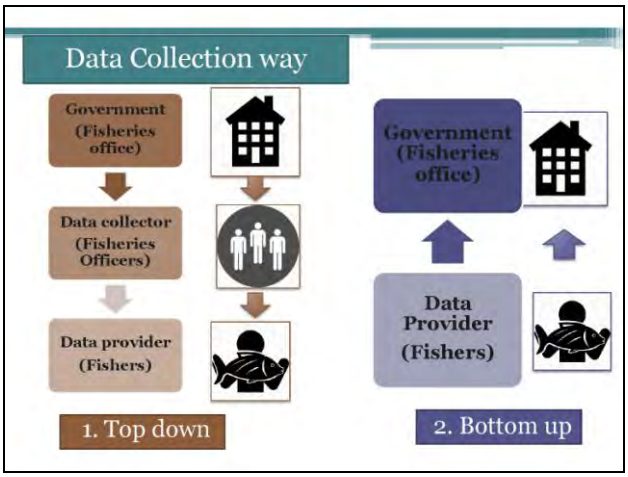

IMPROVEMENT OF FISHERY STATISTIC DATA, for Proper MANAGEMENT
DECLINING/ DEPLETED FISH STOCK AT GLOBAL LEVEL
LISTING CITES APPENDICES I, II OR III
Input/Outputs Measures
Trade Control > NDFs*
Fisheries Authority
RFMOS
Environment Authority
* non-detriment findings (NDFs)
Regional Technical Consultation on Fishery Statistics and Information in Southeast Asia, BANGKOK, 15-18 AUGUST 2017

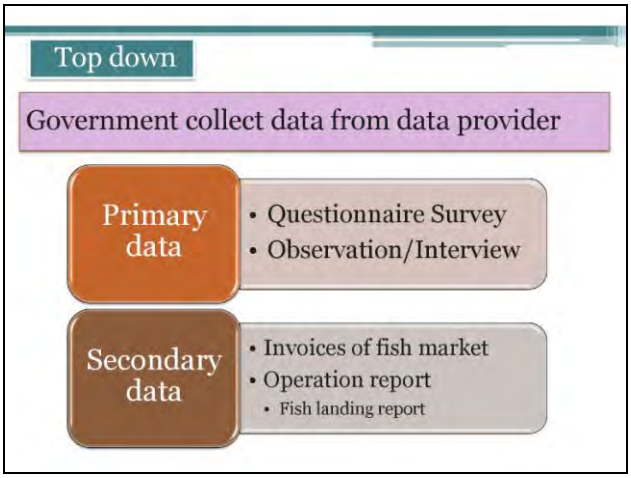
Annex 19

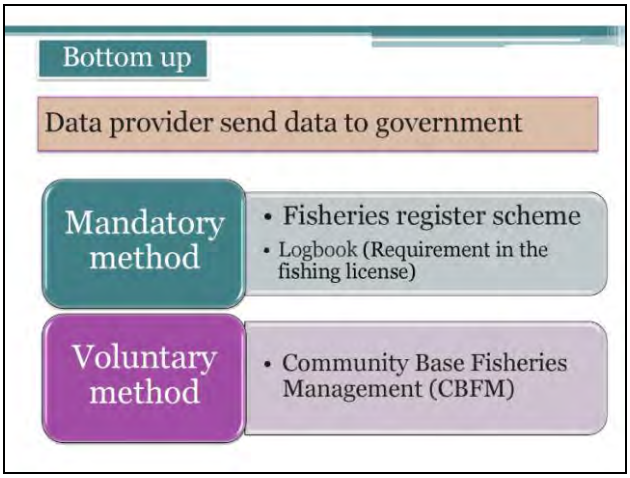
CONCEPT AND EFFECTIVE METHODOLOGY ON DATA COLLECTION

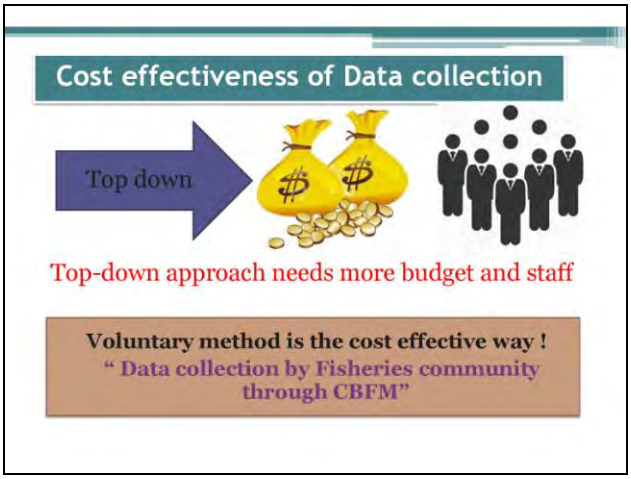
By Thanyalak Suasi

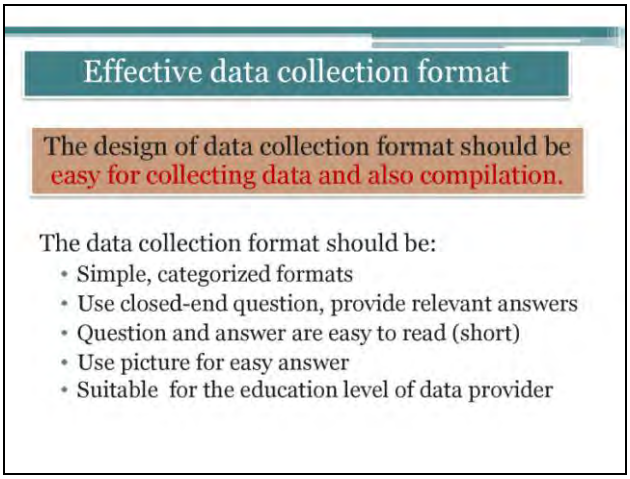
SEAFDEC Training Department











Example of data collection format

Name: _____
Address: _____

Categorize format by table

Easy to read

Part I. General Information		
1. Sex	❑ male	❑ female
2. Age (years)	❑15-25 ❑ 26-35 ❑ 36-45	❑46-55 ❑56-65 ❑ More than 65
3. Marital status	❑Single ❑ Married	❑Widow ❑ Divorce
4. Education	❑None ❑Primary school ❑Junior high school	❑Senior high school ❑College ❑University
5. Major Occupation	❑Fishing ❑Trading	❑Agricultural ❑Laboring
6. Number of Family members (persons)	❑ 1-2 ❑ 3-5	❑ 6-10 ❑ more than 10

Close-end question

Part II: Fisheries

7. Fishing boat

width: (meters)	❑0.1- 0.5 ❑ 0.6 - 1.0	❑1.1 – 1.5 ❑ > 1.5

Use picture

Length: (meters)	❑3.0-5.0 ❑5.1-7.0	❑7.1-9.0 ❑ > 9.1

8. Catch species

Catch species	Amount (kg./trip)
	.....
	.....

Data collection through CBFM

Fishers (Fisheries Communities Organization)

Fishers collect data by themselves

Data Collection (Logbook, Questionnaire, Mapping)

Local Fisheries Officers
1. Provide logbook and guideline
2. Collecting the filled in logbooks

Daily Catching Data, fishing effort data, Fishing ground map

Data collection using Logbook/Questionnaire (1)

- Local officers design and provide daily log sheets for catch and effort (catch, species, vessel, gear)
- Explain "how to fill out the log sheet"
- Fishers record for all fishing and non-fishing day
- Fishers bring monthly logbook to Fisheries Communities Organization

Data collection using Logbook/Questionnaire (2)

- Local Fisheries Officers collect these logbook to analyze the data
- Using data for Catch assessment, monitor Resource condition: spawning season
- Local officers give feedback to fishers on the result

Conclusion

- The cost effective data collection method is Voluntary way through CBFM.
- The data collection format design should be simple & easy to understand by fishers (this will make collection and compilation of the data easier)
- The important factor of data collection design is education level of data provider.
- Data collection format (Questionnaire & Logbook designed for the community) is effective tool for CBFM

Annex 20

NEW GLOBAL FRAMEWORKS RELATED TO FISHERY STATISTICS

By Dr. Stefania Vannuccini

NEW GLOBAL FRAMEWORKS RELATED TO FISHERY STATISTICS

Stefania Vannuccini
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Statistics and Information Branch
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Food and Agriculture Organization
of the United Nations

CONTENTS

SUMMARY

This document provides an overview of the critical role that accurate, timely and comparable statistics play in better monitoring the trends and the progress towards national and international development goals and targets. To enhance information on standards and harmonization capacities is essential and in this respect the major function played by the Coordinating Working Party on Fisheries Statistics will be illustrated. New and forthcoming issues and standards relevant to the fishery and aquaculture sector will also be shown. In addition, a brief overview of the Sustainable Development Goals and the FAO Statistical Quality Assurance Framework will be provided.

THE ROLE OF STATISTICS

Fisheries and aquaculture represent an important source of food, nutrition, income and livelihoods for hundreds of millions of people around the world. This is particularly relevant in Southeast Asia, where fish and fishery products represent the main source of animal protein for most of the population in the region and an important source of income and sustenance.

However, the marine and inland ecosystems and the resources they provide are increasingly threatened by changes in land-use, overfishing, illegal unreported unregulated (IUU) fishing, climate change, bycatches and discards, environment degradation and habitat destruction, poor management and many other factors. These issues can threaten the future expansion of the sector and affect its potentiality to continue to contribute significantly to food security and adequate nutrition.

For example, based on FAO's analysis of assessed commercial fish stocks [1], despite notable progress in some areas, the share of fish stocks within biologically sustainable levels decreased from 90 percent in 1974, to 68.6 percent in 2013. Thus, 31.4 percent of fish stocks were estimated as fished at a biologically unsustainable level and therefore overfished. Global estimates indicate that IUU fishing counts between 11 million and 26 million tonnes each year, with an overall value between USD10–23 billion[2]. Combatting IUU fishing is now firmly on the agenda of leading political initiatives. The United Nations (UN) Sustainable Development Goal (SDG) 14.4, which specifically calls for an end to IUU fishing, together with implementing science-based management plans and effectively regulating harvesting, represents an essential component to restore fish stocks.

Further benefits and the sustainability of fisheries can only be achieved through more cautious and effective fisheries and aquaculture management, with main emphasis in maintaining fully exploited fishery resources and recovering those that are overexploited or depleted. Knowledge of the status and trends of the sector, not limited to production, but encompassing the entire value chain, is key to both sound policy-making and to assess and track the performance of responsible fisheries management. The limited availability of information often constrains policy-making and planning. With information on fish stocks, governance and access to marine resources and markets, countries can gain a fuller picture of activities in their waters and design sound targeting policies to manage the sector. To better monitor the trends of the fishery and aquaculture sector, it is important that statistics are as precise, timely and detailed as possible.

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[1] FAO. 2016. The State of World Fisheries and Aquaculture 2016. Contributing to food security and nutrition for all. Rome. 200 pp. (also available at http://www.fao.org/3/a-i5555e.pdf)

[2] Agnew D.J., J. Pearce, G. Pramod, T. Peatman, R. Watson., J.R. Beddington (2009), "Estimating the worldwide extent of illegal fishing", *PLoS ONE*, Vol. 4(2).

Information often exists but is very fragmented, inaccessible (if not lost) or collected according to different standards. In many cases, the information is collected in isolation and without possibilities for linkages. This constitutes a major challenge to the implementation of cross-sectoral management. There is a need for integration among different data collection initiatives, across different sectors, and throughout the entire value chain, in particular for social and economic valuation in relation to sustainability. Such integration also entails the exchange of expertise and related methods and tools, while catering for particular requirements of aquatic resources.

In a context where information resources, expertise and tools are scattered among multiple organizations, mechanisms enabling efficient information networking are vital. In this respect, the following three components are deemed essential:

1. Enhance information standards and harmonization capacities to facilitate information exchange by enabling the use of common classifications, concepts and data structures;

2. Provide global, regional and national data and information sharing platforms. Existing technologies can manage and analyse huge amounts of data collected through a diversity of methods and sensors;

3. Enhance partnerships and other networking arrangements. This is vital as no single organization in isolation can cover all the requirements.[3]

FAO AND CWP

FAO is the only source of global fisheries and aquaculture statistics, which represent a unique global asset for sector analysis and monitoring.The FAO Statistics and Information Branch of the Fisheries and Aquaculture Department (FIAS) is responsible for the collection, compilation, validation, analysis and dissemination of these statistics, which are structured within different data collections (capture and aquaculture production, fisheries commodities production and trade, fishers and fish farmers, fishing vessels and apparent fish consumption).

FIAS' vision is to ensure that policy making and management decisions in fisheries and aquaculture at global, regional and national levels are based on the best available scientific evidence, information and data.

FIAS' mission is to provide access to global statistics, cross-disciplinary knowledge and analysis on the fishery and aquaculture sector and to enhance the capacity of member states through the provision of standards, guidelines, tools, expertise and training on fishery and aquaculture statistics and information systems.

The structure of the classifications used by FIAS to collate fisheries and aquaculture statistics has been agreed within the Coordinating Working Party on Fisheries Statistics (CWP)[4], of which FAO FIAS serves as Secretariat. Functional since 1960, under Article VI-2 of Basic Text of FAO, CWP provides a mechanism for the coordination of fishery statistical programs of regional fishery bodies and other

[3] For more information, see section on "Data needs for blue growth", in FAO. 2016.
[4] http://www.fao.org/fishery/cwp/en

inter-governmental organizations whose remit relates to fishery statistics. The CWP's main purposes are:

- Continually review fishery statistics requirements for research, policy-making and management;
- Agree on standard concepts, definitions, classifications and methodologies for the collection and collation of fishery statistics;
- Make proposals for the coordination and streamlining of statistical activities among relevant intergovernmental organizations.

The CWP is composed of experts nominated by intergovernmental organizations which have a competence in fishery and aquaculture statistics. There are currently 19 participating organizations in the CWP, including SEAFDEC.

During the last few years, the CWP met every three years with intersessional meeting/s held between the main sessions. Although the initial focus was on fisheries, with the growing importance of aquaculture the Fishery Subject Group (CWP-FS) and the Aquaculture Subject Group (CWP-AS) were established during the twenty-third session of the CWP in 2010, in accordance with the CWP Rules of Procedure. These groups were created to enhance the effectiveness of the CWP to address issues specific to capture fisheries and to aquaculture.

The latest session of CWP (twenty-fifth Session: CWP25) was held in Rome, Italy in February 2016[5], while the Intersessional Aquaculture and Fisheries Subject Group Meetings of CWP (CWP-IS) met in Copenhagen, Denmark between the 19th and 22nd June 2017. The 5th meeting of CWP-AS and the 26th meeting of the CWP-FS were held during this last intersessional meeting.

Since 1960, and with particular emphasis in the last few years, CWP has been active in developing or adapting existing standards to the fishery and aquaculture sector, thus contributing to connecting scattered and multidisciplinary sources of statistics and data.

Selected recent and forthcoming issues and standards discussed within CWP are analysed in the following sections of the document.

[5] The report of the CWP25 meeting is available at http://www.fao.org/3/a-i6261e.pdf

CWP HANDBOOK OF FISHERY STATISTICAL STANDARDS

Since the source and reference documents related to the concepts and definitions used in fishery statistics were widely dispersed and not always readily available, in 1982 CWP proposed that a "Handbook of fishery statistics" be put together. Subsequently renamed as the "CWP Handbook of fishery statistical standards", it covers a wide range of fishery statistical concepts, definitions, classifications and related matters as applied to fishery statistics by the international agencies. The main users are the CWP Member Agencies, national fisheries statistics offices, national administrations and other fishery agencies.

National systems might differ from those used internationally as they might have been developed for specific national purposes. However, it is important that national fisheries statistics programmes are coherent and consistent with common regional or inter-regional sets of statistical standards, and apply internationally recognized definitions, classifications and codes. The CWP Handbook of Fisheries Statistics Standards was created to serve as the basis for this integration and it is intended to assist in the development of national standards as logical extensions of the international standards. In its efforts to develop useful and practical systems, the CWP is consistently keeping these standards under review and welcomes the comments of the national authorities on the application of these international standards at the national level.

The current version of the Handbook is available at http://www.fao.org/fishery/cwp/search/en. It is largely based on the 1990 edition, but includes regular and extensive revisions concerning CWP membership, statistical work, and changes in major fishing areas.

Work is in progress to undertake a major revision of the handbook structure, content and accessibility through a process that started in 2009, with the collaboration and the involvement of the CWP members. The new version will be disseminated in a revised CWP web page structure. A new IT framework will be used to support the dissemination of the CWP Handbook with enhanced capacity of dynamic searching and an improved interface. The preliminary version of the revised version of the Handbook was presented at the CWP intersessional meeting in June 2017. The release is planned to be done gradually as soon as the different sections are finalized and the content is agreed on by CWP members. The needed software developments are underway to have an advanced dynamic structure of the handbook, which is expected to be fully operational by the end of 2018, in time for the CWP 26th Session in 2019.

The Handbook will be a web-based document with continuous and timely updates, and with internal and external links to relevant information, including FAO Technical Reports. For those issues beyond the CWP's expertise, the Handbook will follow UN or other authoritative sources for concepts and will introduce such issues in a way suitable to the fishery and aquaculture framework. The Handbook will continue to not only provide the single authorized standards and concepts, but also to show a range of them where no agreed standards exist. All updates to the Handbook will need to be approved by CWP.

The handbook will contain six main components:

- General introduction including a presentation of the capture fisheries and aquaculture chapters
- General concepts applicable to all relevant statistics (mainly following FAO policy)
- Capture fisheries - specific concepts
- Aquaculture - specific concepts
- Socio-economic section

- GIS Section

Other items that should be also addressed in the handbook include:

- Green accounting and changes to the national accounting system including resource ownership
- Socio-economic data
- Ecosystem approach and ecosystem data
- Automatic data transmissions
- Small-scale fisheries

Each content (split into segments), in addition to being organized according to the pre-defined structure, will be assigned to one of the following four main categories:

- Classifications and Metadata Standards
- Methodological Standards
- Glossary
- References and Additional Bibliography

The classification and metadata standards contain those endorsed or adopted by CWP as standards for fisheries statistics. It also illustrates a range of additional methodologies and practices in use by the CWP members in the case no standards exist.

The methodological standards include the methodologies and practices endorsed by the CWP or in use by the CWP members.

The glossary represents a comprehensive set of definitions of the main data items presented in the Handbook. It also contains definitions of key terminology, concepts and commonly used acronyms.

References and additional bibliography contain the list of references and bibliography cited or suggested in each section of the Handbook.

REVISION OF ISSCAAP

ASFIS, ISSCAAP and role of FAO and CWP

One international adopted classification used to collect capture and aquaculture production statistics, regularly utilized by FAO, is the *List of Species for Fishery Statistics Purposes (ASFIS)*[6] that includes 12 721 species items in the 2017 version, selected according to their interest or relation to fisheries and aquaculture. Since 2000, the ASFIS list has been made available on the Internet to provide external users with a standardized codification system covering most of the species items related to fishery activities. The list is a part of the ASFIS Reference Series which includes the authority lists, rules and guidelines for Aquatic Sciences and Fisheries Abstracts (ASFA)[7]. For each species item stored in a record, the following descriptors[8] are available:

- *3-alpha code*
  - This is a code developed by the CWP for tabulations, questionnaires and publications in which the lack of space may impede the use of adequate descriptors in all the languages required;
  - The 3-alpha identifier is a unique code made of three letters that is widely used for the exchange of data with national correspondents and among fishery agencies;
  - It is assigned to a species item permanently (it is, thus, a permanent reference to that species item);
  - The 3-alpha code is issued only for species of commercial significance;
  - The three letters of the 3-alpha code are only sometimes related to the scientific or English name of the species items. In all other cases, the 3 letters are randomly assigned;
  - FAO is the depository agency for the 3-alpha codes: requests for information and for the allocation of a 3-alpha code to new species should be addressed to FAO.
- *ISSCAAP code* [9]
  - ISSCAAP stands for International Standard Statistical Classification for Aquatic Animals and Plants;
  - ISSCAAP classifies aquatic commercial species into 50 groups and nine divisions on the basis of their taxonomic, ecological and economic characteristics;
  - Currently, all species in the ASFIS List are classified by ISSCAAP group, with the exception of marine birds and snakes.
- *Taxonomic code*
  - The taxonomic code consists of five levels of aggregation (Main groupings, Orders, Families, Genera and Species);
  - Taxonomic information (scientific name, author(s), family, and higher taxonomic classification);
  - The taxonomic code is used by FAO for a more detailed classification of the species items and for sorting them out within each ISSCAAP group.

FAO is the depository agency for the classification and updating of ASFIS, but revision of ISSCAAP is done within the framework of CWP. The version currently in use of ISSCAAP is dated 2001, when a revision of the names and composition of the groups 33, 34 and 37 was implemented following a

[6] http://www.fao.org/fishery/collection/asfis/en
[7] http://www.fao.org/fishery/asfa/en
[8] http://www.fao.org/fishery/static/ASFIS/ASFIS_Structure.pdf
[9] http://www.fao.org/fishery/static/Yearbook/YB2014_CD_Master/root/capture/isscaap.pdf

recommendation of the CWP19[10]. There is currently a plan for a further revision of the classification to be discussed and potentially adopted at the next CWP meeting in 2019.

The rational for the revision

The ISSCAAP classification is widely used for fisheries and aquaculture statistical dissemination and analysis. Through it, aquatic species can be aggregated in a standard format, allowing a better and more coherent utilization of data for monitoring, management and planning purposes. For example, the ISSCAAP classification is used by FAO in disseminating its fisheries and aquaculture data in FishstatJ, online query panel tools, and the Yearbook of Fisheries and Aquaculture and the Status of Fisheries and Aquaculture (SOFIA) publication.

The current number of groups under each division varies between three and nine. For data analysis purposes, a higher number of groups under a division is generally desirable to better illustrate the details of the species composition. The present structure does not accurately reflect the growing importance of aquaculture as it does not allow a detailed monitoring of the sector specific trends. Since the 2000 revision of the ISSCAAP classification, aquaculture production has significantly expanded (more than 136 percent in the 2000-2015 period), while capture fisheries have remained relatively stable. The dominance of freshwater species in aquaculture production (64 percent of total production in 2015) implies the need to add more groups and to revise some of the present ones. These changes would certainly improve the details and clarity of specific types of farmed species groups for data extraction and analysis.

Finfish, crustaceans and molluscs are the most important species for both capture and aquaculture production. However, the number of groups assigned to freshwater species and marine species under the corresponding divisions 1 and 3 for these species are greatly imbalanced. At present, excluding diadromous species, a total of only five groups is assigned to freshwater species vs 22 groups for marine specie under ISSCAAP divisions 1, 3, 4 and 5.

CWP involvement

Taking into account the need to have a better representativeness of aquaculture species in the ISSCAAP classification, the CWP-AS started to discuss this issue in the intersessional period between CWP sessions 24 and 25 and reported its findings at CWP25 in February 2016. CWP-AS recognized that the existing ISSCAAP groupings were not necessarily effective in addressing the need to describe aquaculture production. It also noted that the national and international statistical institutes often created ad-hoc arbitrary species groupings according to their own needs. On the other hand, it also recognized the benefits of establishing well-balanced species groupings with appropriate hierarchies for enhancing harmonization and comparability of global statistics, in particular to support the cases where species-level identification of statistics would cause pragmatic difficulties. Since the issue had relevance for both aquaculture and capture fisheries statistics, the CWP-AS proposed to establish a Task Group for reviewing and developing a proposed revision of the ISSCAAP groupings to be presented at the next Session of CWP in 2019.

[10] In the revision, the species items of the former group 33 "Redfishes, basses, congers" were classified as coastal or demersal fishes and accordingly assigned to the new groups 33 "Miscellaneous coastal fishes" and 34 "Miscellaneous demersal fishes". The species formerly included in group 34 "Jacks, mullets, sauries" were moved to group 37, which was renamed "Miscellaneous pelagic fishes". For further information see FAO report on ISSCAAP groups (pages 42-49 at http://www.fao.org/fi/static-media/MeetingDocuments/cwp/cwp_19/CWP-19-FAO.pdf) presented at CW19 and the ISSCAAP's revision endorsed by the CWP (page 23 of the CWP Report (http://www.fao.org/3/a-y2606e.pdf)

This proposal was accepted by CWP25, with the indication that the proposal for revision should address the following objectives:

- establishing well-balanced species groupings with appropriate hierarchies for enhancing global harmonization and comparability of statistics;
- securing adequate level of segregation of freshwater farmed species;
- mitigating confidentiality, without losing comparability among data collected;
- the proposal will have to take into account a proper balance between CWP-AS and CWP-FS groups.

Preliminary findings and proposal: criteria followed

During the CWP intersessional meeting held in June 2017, the preliminary findings of the analysis undertaken on the ISSCAAP classification were presented, together with a first draft of a potential new structure. The preliminary findings highlighted that some important species and species groups need to be separately reported and that the label of some of the current groups should be modified in order to improve the clarity of the classification and avoid any potential confusion. The proposal included the creation of new ISSCAAP Groups under six divisions, and the revision of the names of several currently existing groups. Out of the nine divisions in current use, no revision was proposed for division 3 (marine fishes), division 5 (molluscs) and division 6 (aquatic mammals).

The criteria used for the proposed revision was the same utilized for the creation of the current ISSCAAP version, which include, among others, the taxonomic classification of aquatic species, the type of water as natural habitat of the species according to the salinity (freshwater vs marine water) and the behaviour and economic importance of the species. In addition, this proposal also took into consideration the feeding habit of the aquatic animal species, which is of vital importance in aquaculture.

In examining the proposal at the intersessional meeting in June 2017, CWP-AS supported the proposal, but recommended to hold further technical consultation with experts and data users with regard to the revisions, and to also submit the proposal to the CWP-FS group. It was decided that FAO would take the lead on this discussion and invite other CWP Members, including SEAFDEC, for an active participation and involvement in the revision process.

The proposal in detail

In examining the proposed amendments in detail, it is important to highlight that the proposal is still in a preliminary phase and more work and consultation is needed to further improve it. In addition the reported new numbering should not be taken into account at this stage as it is arbitrary. The proposed additions/revisions are highlighted in grey.

Division 1: Freshwater fishes

Assessment: Need for the addition of four more groups taking into consideration their importance at international or regional level.

Current	Potential revision
1 Freshwater fishes	**1 Freshwater fishes**
11 Carps, barbels and other cyprinids	11 Carps, barbels and other cyprinids
12 Tilapias and other cichlids	12 Tilapias and other cichlids
13 Miscellaneous freshwater fishes	13 Miscellaneous freshwater fishes
	14 Freshwater catfishes
	15 Freshwater perches and basses
	16 Snakeheads
	17 Characins

Division 2: Diadromous species

Assessment: Milkfish and several species of mullets are important aquaculture species. They are farmed in fresh, brackish and marine water. They are similar in terms of their relatively low position in the food chain, requiring less animal protein if and when artificial feeds are used for cultivation. Additional species of similar characteristics need to be reviewed.

While barramundi is farmed in large volumes in Southeast Asia and Australia, Japanese seabass, a species that also migrates naturally between habitats in inland water and the sea, is an important species farmed in East Asia. Both are carnivorous, requiring high dietary animal protein level for feeding in aquaculture. Along with other similar species (to be assessed further), Japanese seabass could be grouped together with barramundi.

Current	Potential revision
2 Diadromous fishes	**2 Diadromous and euryhaline fishes**
21 Sturgeons, paddlefishes	21 Sturgeons, paddlefishes
22 River eels	22 River eels
23 Salmons, trouts, smelts	23 Salmons, trouts, smelts
24 Shads	24 Shads
25 Miscellaneous diadromous fishes	25 Miscellaneous diadromous and euryhaline fishes
	26 Herbivorous & omnivorous euryhaline fishes
	27 Carnivorous euryhaline fishes

Note:

A number of euryhaline finfish species, including milkfish, mullets, barramundi and Japanese seabass, are globally important species for aquaculture in terms of volume. Their separation into different ISSCAAP Groups is based on their feeding habits.

For the re-assignment of species into the proposed group 26, species such like Milkfish need to be removed from "Group 25 Miscellaneous diadromous fishes" and mullets from "Miscellaneous coastal fishes".

For the re-assignment of species to proposed Group 27, species such as Barramundi need to be removed from "Group 25 Miscellaneous diadromous fishes" and Japanese seabass from "Miscellaneous coastal fishes".

Division 3: Marine fishes

Assessment: The collective name "flat fish" or "flatfish" is commonly used for most of the species under the group "Flounders, halibuts, soles". A number of flat fish species, such as turbot, are farmed commercially

Current	Potential revision
3 Marine fishes	**3 Marine fishes**
31 Flounders, halibuts, soles	31 Flat fishes
32 Cods, hakes, haddocks	32 Cods, hakes, haddocks
33 Miscellaneous coastal fishes	33 Miscellaneous coastal fishes
34 Miscellaneous demersal fishes	34 Miscellaneous demersal fishes
35 Herrings, sardines, anchovies	35 Herrings, sardines, anchovies
36 Tunas, bonitos, billfishes	36 Tunas, bonitos, billfishes
37 Miscellaneous pelagic fishes	37 Miscellaneous pelagic fishes
38 Sharks, rays, chimaeras	38 Sharks, rays, chimaeras
39 Marine fishes not identified	39 Marine fishes not identified

Division 4: Crustaceans

Assessment: Existing group 45 "Shrimps, prawns" refers only to marine shrimps and prawns, causing potential confusion or misleading results for data users.

Similarly, existing group 42 "Crabs, sea-spiders" posed potential confusion or misleading results for data users. Considering that freshwater crabs are also farmed, a word "marine" could be added to define these "crabs".

A new group for "Freshwater shrimps and prawns" needs to be created, because freshwater shrimps and prawns are currently farmed in significant quantity. In the present ISSCAAP classification they are aggregated under group 41 "Freshwater crustaceans".

A new group for crayfish/crawfish species needs to be created. These species are farmed in significant quantities in North America and East Asia, plus Europe and other regions in smaller quantities. The proposed name "Freshwater crayfishes (crawfishes)" is tentative. Use of the word "freshwater" needs to be further discussed, as crayfish/crawfish are generally regarded as freshwater aquatics.

Current	Potential revision
4 Crustaceans	**4 Crustaceans**
41 Freshwater crustaceans	41 Freshwater shrimps and prawns
42 Crabs, sea-spiders	42 Marine crabs, sea-spiders
43 Lobsters, spiny-rock lobsters	43 Lobsters, spiny-rock lobsters
44 King crabs, squat-lobsters	44 King crabs, squat-lobsters
45 Shrimps, prawns	45 Marine shrimps and prawns
46 Krill, planktonic crustaceans	46 Krill, marine planktonic crustaceans
47 Miscellaneous marine crustaceans	47 Miscellaneous marine crustaceans
	48 Freshwater crayfishes (crawfishes)
	49 Miscellaneous freshwater crustaceans

Division 7: Miscellaneous aquatic animals

Assessment: Sea cucumbers are farmed in significant volumes, particularly the cold water species in East Asia. Farming of several tropical sea cucumber species is spreading throughout other regions. Creation of a group for sea cucumber species is desirable.

Current	Potential revision
7 Miscellaneous aquatic animals	**7 Miscellaneous aquatic animals**
71 Frogs and other amphibians	71 Frogs and other amphibians
72 Turtles	72 Turtles
73 Crocodiles and alligators	73 Crocodiles and alligators
74 Sea-squirts and other tunicates	74 Sea-squirts and other tunicates
75 Horseshoe crabs and other arachnoids	75 Horseshoe crabs and other arachnoids
76 Sea-urchins and other echinoderms	76 Sea-urchins and other echinoderms
77 Miscellaneous aquatic invertebrates	77 Miscellaneous aquatic invertebrates
	78 Sea cucumbers

Division 8: Miscellaneous aquatic animal products

Assessment: Current group 81 "Pearls, mother-of-pearl, shells" includes both marine and freshwater species. In value terms, marine pearls have a significantly higher value than the freshwater ones. While marine molluscs are farmed for shells, freshwater species are rarely farmed for their shells only. Their separation through the creation of a group "Freshwater pearls and shells" is desirable.

Live rock is farmed in many tropical countries primarily for aquarium/ornamental purposes. The definition "live rock" for aquaculture production statistics classification needs to be further reviewed due to the multi-species nature of the so-called live rock purpose, causing difficulties in classifying them taxonomically.

Current	Potential revision
8 Miscellaneous aquatic animal products	**8 Miscellaneous aquatic animal products**
81 Pearls, mother-of-pearl, shells	81 Marine pearls, mother-of-pearl, shells
82 Corals	82 Corals
83 Sponges	83 Sponges
	84 Freshwater pearls and shells
	85 Live rocks (ornamental

Division 9: Aquatic plants

Assessment: The existing group 93 "Green seaweeds" also includes micro green algae species. Firstly, the term "seaweeds" (usually refers to marine macro algae) is not adequate for the micro species of green algae. Secondly, many of the micro green algae species are freshwater species (including *Haematococcus pluvialis*) farmed commercially in an increasing number of countries.

Micro algae aquaculture is booming for various uses. It is desirable to create a new group "Aquatic microalgae" to contain micro algae species, including the micro green

algae species *Haematococcus pluvialis*, *Cyanobacteria Spirulina* spp, and others (to be reviewed further).

For existing groups "Brown seaweeds" and "Red seaweeds", it is tentatively proposed to change the word "seaweeds" to "algae". Further review by concerned parties is needed.

Current	Potential revision
9 Aquatic plants	**9 Aquatic plants**
91 Brown seaweeds	91 Brown algae
92 Red seaweeds	92 Red algae
93 Green seaweeds	93 Marine macro green algae
94 Miscellaneous aquatic plants	94 Miscellaneous aquatic plants
	95 Aquatic microalgae
	96 Aquatic macrophytes (ornamental

Table 1. Comparison of ISSCAAP 2001 version with the potential revision

Current ISSCAAP 2001		Potential revision	
Code	**ISSCAAP Groups**	**Code**	**ISSCAAP Groups**
1 Freshwater fishes		**1 Freshwater fishes**	
11	Carps, barbels and other cyprinids	11	Carps, barbels and other cyprinids
12	Tilapias and other cichlids	12	Tilapias and other cichlids
13	Miscellaneous freshwater fishes	13	Miscellaneous freshwater fishes
		14	Freshwater catfishes
		15	Freshwater perches and basses
		16	Snakeheads
		17	Characins
2 Diadromous fishes		**2 Diadromous and euryhaline fishes**	
21	Sturgeons, paddlefishes	21	Sturgeons, paddlefishes
22	River eels	22	River eels
23	Salmons, trouts, smelts	23	Salmons, trouts, smelts
24	Shads	24	Shads
25	Miscellaneous diadromous fishes	25	Miscellaneous diadromous fishes
		26	Herbivorous & omnivorous euryhaline fishes
		27	Carnivorous euryhaline fishes
3 Marine fishes		**3 Marine fishes**	
31	Flounders, halibuts, soles	31	Flat fishes
32	Cods, hakes, haddocks	32	Cods, hakes, haddocks
33	Miscellaneous coastal fishes	33	Miscellaneous coastal fishes
34	Miscellaneous demersal fishes	34	Miscellaneous demersal fishes
35	Herrings, sardines, anchovies	35	Herrings, sardines, anchovies
36	Tunas, bonitos, billfishes	36	Tunas, bonitos, billfishes
37	Miscellaneous pelagic fishes	37	Miscellaneous pelagic fishes
38	Sharks, rays, chimaeras	38	Sharks, rays, chimaeras
39	Marine fishes not identified	39	Marine fishes not identified
4 Crustaceans		**4 Crustaceans**	
41	Freshwater crustaceans	41	Freshwater shrimps and prawns
42	Crabs, sea-spiders	42	Marine crabs, sea-spiders
43	Lobsters, spiny-rock lobsters	43	Lobsters, spiny-rock lobsters
44	King crabs, squat-lobsters	44	King crabs, squat-lobsters
45	Shrimps, prawns	45	Marine shrimps and prawns
46	Krill, planktonic crustaceans	46	Krill, marine planktonic crustaceans
47	Miscellaneous marine crustaceans	47	Miscellaneous marine crustaceans
		48	Freshwater crayfishes (crawfishes)
		49	Miscellaneous freshwater crustaceans

Table 1. Comparison of current ISSCAAP 2001 version with the potential revision (cont.)

Current ISSCAAP 2001		Potential revision	
Code	**ISSCAAP Groups**	**Code**	**ISSCAAP Groups**
5 Molluscs		**5 Molluscs**	
51	Freshwater molluscs	51	Freshwater molluscs
52	Abalones, winkles, conchs	52	Abalones, winkles, conchs
53	Oysters	53	Oysters
54	Mussels	54	Mussels
55	Scallops, pectens	55	Scallops, pectens
56	Clams, cockles, arkshells	56	Clams, cockles, arkshells
57	Squids, cuttlefishes, octopuses	57	Squids, cuttlefishes, octopuses
58	Miscellaneous marine molluscs	58	Miscellaneous marine molluscs
6 Whales, seals and other aquatic mammals		**6 Whales, seals and other aquatic mammals**	
61	Blue-whales, fin-whales	61	Blue-whales, fin-whales
62	Sperm-whales, pilot-whales	62	Sperm-whales, pilot-whales
63	Eared seals, hair seals, walruses	63	Eared seals, hair seals, walruses
64	Miscellaneous aquatic mammals	64	Miscellaneous aquatic mammals
7 Miscellaneous aquatic animals		**7 Miscellaneous aquatic animals**	
71	Frogs and other amphibians	71	Frogs and other amphibians
72	Turtles	72	Turtles
73	Crocodiles and alligators	73	Crocodiles and alligators
74	Sea-squirts and other tunicates	74	Sea-squirts and other tunicates
75	Horseshoe crabs and other arachnoids	75	Horseshoe crabs and other arachnoids
76	Sea-urchins and other echinoderms	76	Sea-urchins and other echinoderms
77	Miscellaneous aquatic invertebrates	77	Miscellaneous aquatic invertebrates
		78	Sea cucumbers
8 Miscellaneous aquatic animal products		**8 Miscellaneous aquatic animal products**	
81	Pearls, mother-of-pearl, shells	81	Marine pearls, mother-of-pearl, shells
82	Corals	82	Corals
83	Sponges	83	Sponges
		84	Freshwater pearls and shells
		85	Live rocks (ornamental)
9 Aquatic plants		**9 Aquatic plants**	
91	Brown seaweeds	91	Brown algae
92	Red seaweeds	92	Red algae
93	Green seaweeds	93	Marine macro green algae
94	Miscellaneous aquatic plants	94	Miscellaneous aquatic plants
		95	Aquatic microalgae
		96	Aquatic macrophytes (ornamental)

THE INTERNATIONAL STANDARD STATISTICAL CLASSIFICATION OF FISHING GEAR

The International Standard Statistical Classification of Fishing Gear (ISSCFG) covers a general categorization of fishing gears and fishing methodologies based on the mechanism used to entangle aquatic species for harvesting. It may be used for fishing gears or fishing effort. ISSCFG was initially designed to improve the compilation of harmonized catch and effort data through questionnaires and fish stock assessment exercises. However, it has also proven to be very useful for fisheries technology and training fishers. In particular, it has been used as a reference in work dealing with the theory and construction of gear and for preparing specialized catalogues on artisanal and industrial fishing methods.

It was developed and adopted by the CWP during the 10th Session of the CWP (Madrid, 22-29 July 1980). The 23rd session of the CWP (Hobart, 22–26 February 2010) decided to review and update this classification. The revision was made in accordance with the effort commenced in 2005 by the International Council for the Exploration of the Sea (ICES)/FAO Working Group on Fishing Technology and Fish Behaviour (WGFTFB) to update the technical contents of the FAO Fisheries Technical Report 222/Rev.1 "Definition and Classification of Fishing gear categories" published in 1990[11].

The draft proposal of the revised classification was developed in October 2010 by the "Ad-hoc group for developing the draft version of CWP gear classification"[12], in which SEAFDEC was part of, held in close collaboration with the WGFTFB. The revised version of the ISSCFG was finally approved at the CWP 25 in 2016.

The current version adopts a two-level structure (categories, gears). It comprises of 11 main categories at two-digit codes, each of which is subdivided into gears. Each gear is assigned a three-digit code:

XX Main category
XX.X Gear

The current version and the correspondence with ISSCFG 1980[13] are reported in the following two tables 2 and 3.

[11] http://www.fao.org/docrep/008/t0367t/t0367t00.htm
[12] ftp://ftp.fao.org/FI/DOCUMENT/cwp/cwp_24/5e.pdf
[13] ISSCFG 1980 is available at ftp://ftp.fao.org/FI/DOCUMENT/cwp/handbook/annex/AnnexM1fishinggear.pdf

Table 2. Revised International Standard Classification of Fishing Gears Revision 1

(ISSCFG, Rev.1 21 October 2010 - Adopted by the CWP at the 25th Session, Rome 2016)

Gear categories	Standard abbreviations	ISSCFG code
SURROUNDING NETS		**01**
Purse seines	PS	01.1
Surrounding nets without purse lines	LA	01.2
Surrounding nets (nei)	SUX	01.9
SEINE NETS		**02**
Beach seines	SB	02.1
Boat seines	SV	02.2
Seine nets (nei)	SX	02.9
TRAWLS		**03**
Beam trawls	TBB	03.11
Single boat bottom otter trawls	OTB	03.12
Twin bottom otter trawls	OTT	03.13
Multiple bottom otter trawls	OTP	03.14
Bottom pair trawls	PTB	03.15
Bottom trawls (nei)	TB	03.19
Single boat midwater otter trawls	OTM	03.21
Midwater pair trawls	PTM	03.22
Midwater trawls (nei)	TM	03.29
Semipelagic trawls	TSP	03.3
Trawls (nei)	TX	03.9
DREDGES		**04**
Towed dredges	DRB	04.1
Hand dredges	DRH	04.2
Mechanized dredges	DRM	04.3
Dredges (nei)	DRX	04.9
LIFT NETS		**05**
Portable lift nets	LNP	05.1
Boat-operated lift nets	LNB	05.2
Shore-operated stationary lift nets	LNS	05.3
Lift nets (nei)	LN	05.9
FALLING GEAR		**06**
Cast nets	FCN	06.1
Cover pots/Lantern nets	FCO	06.2
Falling gear (nei)	FG	06.9
GILLNETS AND ENTANGLING NETS		**07**
Set gillnets (anchored)	GNS	07.1
Drift gillnets	GND	07.2
Encircling gillnets	GNC	07.3
Fixed gillnets (on stakes)	GNF	07.4
Trammel nets	GTR	07.5
Combined gillnets-trammel nets	GTN	07.6
Gillnets and entangling nets (nei)	GEN	07.9

Table 2. Revised International Standard Classification of Fishing Gears Revision 1 (cont.)

(ISSCFG, Rev.1 21 October 2010 - Adopted by the CWP at the 25th Session, Rome 2016)

Gear categories	Standard abbreviations	ISSCFG code
TRAPS		**08**
Stationary uncovered pound nets	FPN	08.1
Pots	FPO	08.2
Fyke nets	FYK	08.3
Stow nets	FSN	08.4
Barriers, fences, weirs, etc.	FWR	08.5
Aerial traps	FAR	08.6
Traps (nei)	FIX	08.9
HOOKS AND LINES		**09**
Handlines and hand-operated pole-and-lines	LHP	09.1
Mechanized lines and pole-and-lines	LHM	09.2
Set longlines	LLS	09.31
Drifting longlines	LLD	09.32
Longlines (nei)	LL	09.39
Vertical lines	LVT	09.4
Trolling lines	LTL	09.5
Hooks and lines (nei)	LX	09.9
MISCELLANEOUS Gear		**10**
Harpoons	HAR	10.1
Hand implements (Wrenching gear, Clamps, Tongs, Rakes, Spears)	MHI	10.2
Pumps	MPM	10.3
Electric fishing	MEL	10.4
Pushnets	MPN	10.5
Scoopnets	MSP	10.6
Drive-in nets	MDR	10.7
Diving	MDV	10.8
Gear nei	MIS	10.9
GEAR NOT KNOWN		**99**
Gear not known	NK	99.9

Table 3. Correspondence between ISSCFG Rev. 1 (2010) and ISSCFG (1980)

Gear categories	Standard abbreviations	ISSCFG Rev 1 (2010)	ISSCFG (1980)
SURROUNDING NETS			
Purse seines	PS	**01.1**	01.1.0
Surrounding nets without purse lines	LA	**01.2**	01.2.0
Surrounding nets (nei)	SUX	**01.9**	-
SEINE NETS	-	**02**	02.0.0
Beach seines	SB	**02.1**	02.1.0
Boat seines	SV	**02.2**	02.2.0
Seine nets (nei)	SX	**02.9**	02.9.0
TRAWLS	-	**03**	03.0.0
Beam trawls	TBB	**03.11**	03.1.1
Single boat bottom otter trawls	OTB	**03.12**	03.1.2
Twin bottom otter trawls	OTT	**03.13**	03.3.0
Multiple bottom otter trawls	OTP	**03.14**	-
Bottom pair trawls	PTB	**03.15**	03.1.3
Bottom trawls (nei)	TB	**03.19**	03.1.9
Single boat midwater otter trawls	OTM	**03.21**	03.2.1
Midwater pair trawls	PTM	**03.22**	03.2.2
Midwater trawls (nei)	TM	**03.29**	03.2.9
Semipelagic trawls	TSP	**03.3**	-
Trawls (nei)	TX	**03.9**	03.9.0
DREDGES	-	**04**	04.0.0
Towed dredges	DRB	**04.1**	04.1.0
Hand dredges	DRH	**04.2**	04.2.0
Mechanized dredges	DRM	**04.3**	11.2.0
Dredges (nei)	DRX	**04.9**	-
LIFT NETS	-	**05**	05.0.0
Portable lift nets	LNP	**05.1**	05.1.0
Boat-operated lift nets	LNB	**05.2**	05.2.0
Shore-operated stationary lift nets	LNS	**05.3**	05.3.0
Lift nets (nei)	LN	**05.9**	05.9.0
FALLING GEAR	-	**06**	06.0.0
Cast nets	FCN	**06.1**	06.1.0
Cover pots/Lantern nets	FCO	**06.2**	-
Falling gear (nei)	FG	**06.9**	06.9.0

Table 3. Correspondence between ISSCFG Rev. 1 (2010) and ISSCFG (1980) (cont.)

Gear categories	Standard abbreviations	ISSCFG Rev 1 (2010)	ISSCFG (1980)
GILLNETS AND ENTANGLING NETS	-	**07**	07.0.0
Set gillnets (anchored)	GNS	**07.1**	07.1.0
Drift gillnets	GND	**07.2**	07.2.0
Encircling gillnets	GNC	**07.3**	07.3.0
Fixed gillnets (on stakes)	GNF	**07.4**	07.4.0
Trammel nets	GTR	**07.5**	07.5.0
Combined gillnets-trammel nets	GTN	**07.6**	07.6.0
Gillnets and entangling nets (nei)	GEN	**07.9**	07.9.0
TRAPS	-	**08**	08.0.0
Stationary uncovered pound nets	FPN	**08.1**	08.1.0
Pots	FPO	**08.2**	08.2.0
Fyke nets	FYK	**08.3**	08.3.0
Stow nets	FSN	**08.4**	08.4.0
Barriers, fences, weirs, etc.	FWR	**08.5**	08.5.0
Aerial traps	FAR	**08.6**	08.6.0
Traps (nei)	FIX	**08.9**	08.9.0
HOOKS AND LINES	-	**09**	09.0.0
Handlines and hand-operated pole-and-lines	LHP	**09.1**	09.1.0
Mechanized lines and pole-and-lines	LHM	**09.2**	09.2.0
Set longlines	LLS	**09.31**	09.3.0
Drifting longlines	LLD	**09.32**	09.4.0
Longlines (nei)	LL	**09.39**	09.5.0
Vertical lines	LVT	**09.4**	-
Trolling lines	LTL	**09.5**	09.6.0
Hooks and lines (nei)	LX	**09.9**	09.9.0
MISCELLANEOUS Gear	-	**10**	10.0.0
Harpoons	HAR	**10.1**	10.1.0
Hand implements (Wrenching gear, Clamps, Tongs, Rakes, Spears)	MHI	**10.2**	-
Pumps	MPM	**10.3**	11.1.0
Electric fishing	MEL	**10.4**	-
Pushnets	MPN	**10.5**	-
Scoopnets	MSP	**10.6**	-
Drive-in nets	MDR	**10.7**	-
Diving	MDV	**10.8**	-
Gear nei	MIS	**10.9**	20.0.0
GEAR NOT KNOWN	-	**99**	99.0.0
Gear not known	NK	**99.9**	-

ZERO STANDARD AQUACULTURE QUESTIONNAIRE

In 2013 a Task Force for elaborating a Zero Standard Aquaculture Questionnaire was established under the CWP-AS group. The three main objectives for the development of the zero standard were:

1. to enable global comparability of aquaculture statistics;
2. to collect meaningful data without duplication and unnecessary burden;
3. to support new aquaculture data collections in their endeavour to produce useful, high quality statistics.

During the following three years, the Task Force compared aquaculture questionnaires from FAO, General Fisheries Commission for the Mediterranean (GFCM), Eurostat and developed the questionnaire with minimum data reporting requirements based on current practices and experience of the participating institutions.

The Zero Standard Aquaculture Questionnaire is structured for the collection of four core data sets:

- A1 – Aquaculture off-farm production (quantity and unit price)
- A2 – Input of seeds (quantity and unit price)
- A3 – Artificial seed production (quantity and unit price)
- A4 - Size of aquaculture facilities (surface area and optionally water volume)

An additional data set is deemed useful, but not yet finalized:

- A5 – Employment (number)

The Zero Standard Aquaculture Questionnaire was analysed by the CWP-25 in 2016. While there was a consensus on the overall structure, it was decided that some concepts and definitions needed further discussion and refinement before being finalized and incorporated into the revised CWP Handbook on Aquaculture Statistics. This activity continued within the CWP-AS group during the CWP Intersessional meeting in June 2017.

The below definitions and questionnaires should be considered as an advanced draft. Due to the relevance of aquaculture in the region, any feedback on the structure of these questionnaires and on the below definitions is more than welcomed. It is also important to mention that, at present, there are no plans to modify the current content/structure of the FAO AQ questionnaire, and so no changes are expected in the joint FAO-SEAFDEC collection.

Definitions/ classification provided by the CWP-AS group on 20th of June 2017:

(a) The questionnaires refer to the production of all aquatic organisms farmed and harvested regardless of final use, including fin fish, crustaceans, molluscs, amphibians, aquatic reptiles, other aquatic vertebrates and invertebrates, macroalgae (seaweeds), microalgae and cyanobacteria, aquatic macrophytes (incl. aquatic ferns for ornamental use, and seagrasses). Materials produced by and used within the aquaculture production sector, for example life larval food, are excluded.

Currently, statistics on aquaculture production, whether on the final output of the cultivation system or on production from hatcheries and nurseries, should be measured by production volumes at first sale at farm-gate as a proxy of real production volumes. This means that data on unsold production, e.g. damage and losses or production for own consumption (subsistence farming) but also on artificial seed for further on-growing by the same facility, are not accounted for. Adult fish being traded

between several on-growing companies is only counted when it is first sold for its final use. If the first sale entails a product processed by the farm-processor or catered by a farm-caterer, the original off-farm weight and price should be estimated. However, if it becomes feasible to collect real production data without unduly increasing the cost and burden of the data collection, this definition may be revised.

(b) Final use (optional information):

- Food use (human consumption).
- Non-food uses
    - live ornamental aquatic animals and aquatic plants;
    - commodities (e.g. skins, pearls, sponges)
    - live species of functional uses within aquaculture (e.g. parasite control, control of overpopulation or self-reproduction of cultured species);
    - release to wild (restocking, ranching, stock enhancement);
    - raw materials for industrial uses, animal feed, and others;
    - bait, live or dead, for fishing;
    - pharmaceutical/ medical uses (e.g. leech);
    - other.
- Unknown

(c) Life stages for seed production (hatchery production):

- fertilised eggs;
- hatchlings or post-larvae;
- fingerling (for fin fish);
- yearling (including +0, +1, +2, +3 year old);
- brooders/ spawners for natural or artificial propagation for hatchery operation;
- seedlings (for aquatic plant).

(d) Source of seed for aquaculture production:

- Artificially produced seed
    - Complete domestic source (hatchery and nursery located within the country);
    - Partial domestic source (using brooders, fertilized eggs, hatchlings or juveniles imported from foreign hatchery/nursery for larval rearing or for nursing within the country for use as seeds for aquaculture).
- Wild seed
    - wild seed through capture fishery within the country's waters;
    - wild seed imported from foreign countries of capture fishery origin.

(e) Farming systems/ culture methods: As defined in the CWP Handbook on Aquaculture Statistics.

The final use of the production should refer either to human food consumption or non-food use. Further breakdown of non-food uses, such as live ornamental, functional (e.g. cleaners, police fish, leech), industrial, feed, and others is optional supplementary data. When one species has multiple final uses, the quantity for human food consumption and the quantity for non-food use should be

recorded separately. When production includes commodities with relatively minor live-weight equivalent but high commercial value, e.g. fish roes or caviar and pearls, it is recommended to record the production of such commodities separately.

Size of active aquaculture facilities during a reference period: a production unit is considered "active" if stocked with a target species anytime during the reference year.

Reference period: all measures should be referred to events occurred during a certain calendar year.

Measurement unit: the aquaculture production volume is expressed in tonnes live weight [TLW]. This weight includes all shells and bones. When utilizing number of individuals as original unit of measurement, the average weight shall be estimated. It is imperative to indicate the unit of measurement. Data for the economic value of the production are reported as unit price in national currency per tonne [NAC_T]. The production of artificial seed is reported in numbers as is the input of seeds. The size of facilities refers to a surface area covered by aquaculture production units and is measured in hectares. In addition, the water volume in cubic metres may be indicated. Employment data are to be given in numbers.

The advanced structure of the A1-A4 Zero standard questionnaire is reported in the following four tables 4-7.

Table 4. Draft of standard questionnaire A1 - Aquaculture off-farm production (quantity and unit price)

A1 Aquaculture production

Year	Country	FAO Major Area	SPECIES			PRODUCTION					
			3-alpha code	Local name	Scientific name	Quantity	Unit of quantity	Price per unit	Currency	Final use	Comment
							TLW (tonnes live weight)				

Instructions:

- This questionnaire collects the **quantity and value of aquaculture production at first sale**.
- The reference period is defined as a period between 1st January and 31st December of the **reference year**.
- This questionnaire includes the **production of all aquatic organisms farmed and harvested**, including fish, crustaceans, molluscs, other aquatic vetebrates and invertebrates, aquatic plants and seaweeds.
- This questionnaire includes only the quantities of products destined for **final utilization**, and does not include any products that will continue to be subject to aquaculture practices.
- **Quantity** of production should refer to tonnes of live-weight equivalent [TLW]. The TLW includes shells and bones. When utilizing number of individuals as original unit of measurement, the average weight shall be estimated. It is imperative to indicate the **unit of measurement.**
- The **price per unit** should refer to the value of products at first-sale. If no commercial value is applicable, the value of equivalent products should be used.
- The **final use** should refer to either human food consumption or non-food use. Further breakdown of non-food uses, such as live ornamental, functional (e.g. cleaners, police fish, leech), industrial, feed, and others (see codes), is optional supplementary data. When one species has multiple final use, the quantity for human food consumption and the quantity for non-food use should be recorded separately.
- When the production includes **commodities with relatively minor live-weight equivalent but high commercial value**, e.g. fish roes or caviar and pearls, it is recommended to record the production of such commodities separately.

Table 5. Draft of standard questionnaire A2 - Input of seeds (quantity and unit price)

A2 Input of seeds

Year	Country	FAO Major Area	SPECIES			INPUT					
			3-alpha code	Local name	Scientific name	Quantity	Unit of quantity	Unit price	Currency	Source	Comment
							numbers			Wild	
										Domestic hatchery	
										Foreign hatchery	

Instructions:

- This questionnaire collects the quantity and value of aquaculture seed introduced from either domestic hatchery, foreign hatchery or wild during a reference period.
- The reference period is defined as a period between 1st January and 31st December of the **reference year**.
- The **source** should be defined either from hatcheries within the country, hatcheries located in foreign countries, or from wild through capture fishery. Sources other than those three and countries of origin for imported seeds can be further elaborated in comment.

Table 6. Draft of standard questionnaire A3 - Artificial seed production (quantity and unit price)

A3 Artificial seed production for culture-base fisheries

Year	Country	FAO Major Area	SPECIES			PRODUCTION					
			3-alpha code	Local name	Scientific name	Stage	Quantity	Unit of quantity	Unit price	Currency	Comment
						Fertilized eggs/hatchlings		numbers			
						Juveniles (ready for stocking)		numbers			

Instructions:

- This questionnaire collects the quantity and value of aquaculture seed production at first sale destined to utilisation on another farm.
- The reference period is defined as a period between 1st January and 31st December of the **reference year**.
- This questionnaire includes the production of all aquatic organisms farmed and harvested, including fish, crustaceans, molluscs, other aquatic vetebrates and invertebrates, aquatic plants and seaweeds.
- Different life **stages** may be distinguished for the input of seeds. No decision on which life stages to use was made (for example, 0+, 1+, 2+, etc. or simply fertilised eggs and juveniles?). The stage separation needs to be applicable to aquatic plant.

Table 7. Draft of standard questionnaire A4 - Size of aquaculture facilities (surface area and optionally water volume)

A4 Size of active aquaculture facilities

Year	Country	FAO Major Area	AQUACULTURE FACILITIES			MAIN SPECIES CULTURED (optional)			SECONDARY SPECIES (optional)			Comment
			Type of production unit	Surface Area	Volume (optional)	3-alpha code	Local name	Scientific name	3-alpha code	Local name	Scientific name	
			Ponds	ha								
			Tanks and raceways	ha								
			Recirculation systems	ha	m^3							
			Cages	ha	m^3							
			Enclosures & pens	ha								
			Lake, Coastal lagoons, Reservoir, Dam, Be	ha								
			Race-fish paddies	ha								
			On-bottom	ha								
			Off-bottom	ha								
			Others	ha								

Instructions:

- This questionnaire collects the size of active aquaculture facilities during a reference period. In other words, the questionnaire refers to all facilities where target species are kept at any time within a reference period.
- The reference period is defined as a period between 1st January and 31st December of the **reference year**.
- The **size of facilities** refers to a surface area and maybe water volume covered by aquaculture production units.
- This questionnaire covers aquaculture facilities, regardless of the type of ownership (private or public), type of registration and nature of the facility, e.g. grow-out, nursery, or hatchery facilities.
- Total volume of water that aquaculture facilities can hold is an optional measure to report.
- Main target species cultured are optional. If one entity is producing different species groups, respondents should either report the size of the production units by target species or provide combined figures for the size of production units.

FOOD FOR THOUGHT: EXPLORING NEW AREAS FOR FISHERIES STATISTICAL COLLECTIONS

Discussion is being held within FAO and in the framework of CWP on investigating other potential data collections, with major focus on capture fisheries. This includes rethinking the way the overall framework of fisheries collection is dealt with at global and regional levels. A discussion on this was held during the CWP intersessional meeting in June 2017. It was decided that to support future analysis of these thematic, the CWP Secretariat would circulate a template to gather inputs from the agencies in the next months and that his subject would be further discussed at the next CWP intersessional meeting in 2018.

The main drivers for this discussion are related to:

- The 2030 Agenda on the SDGs[14], and in particular Goal 14. SDG 14 goes beyond conservation to focus on the people and coastal communities, and provides a special focus on small scale fisheries and the fisheries and populations reliant on this subsector. This goal makes achieving food security and ending malnutrition a global priority.
- The FAO's role as custodian UN agency of four of the ten SDG14 indicators[15] implies that FAO has also to facilitate the process, provide technical support, build capacity (i.e. in supporting required statistics which help the country in progressing on the target), and also ensure that national data used for calculating the indicators are comparable.
- Regarding small-scale fisheries, a number of Regional fishery bodies (RFBs) and countries do collect statistics distinguishing small scale from large scale fisheries. Here the effort on streamlining data workflow, further develop comparable definitions and include fisheries modules in agriculture census and surveys. It is also important to highlight the importance of improving the collection of data on subsistence, small scale and large scale fisheries at national level, exploring their contribution to SDG effort.
- Data on recreational fisheries are limited and need to be improved. The inclusion of recreational vessels could be considered as part of the International Standard Statistical Classification of Fishing Vessels (ISSCFV).
- The possibility to distinguish catch within and outside Exclusive Economic Zones (EEZs).
- New methodologies based on vessels' transmitted data (VMS, AIS) raise the credible prospect for estimating the geographic distribution of fishing effort and catch statistics.
- The value of capture fisheries production is an area to explore, as often this type of data is not collected at national level. In addition, these statistics tend to suffer of problems of comparability among countries and within the same country due either to the different level of detail (by individual species, by groups of species or total) and on the typology of data collected (ex vessel price, wholesale, market price, etc.)
- The implementation of the FAO Statistics Quality Assurance Framework (FAO SQAF)[16]and the discussion on the potential adoption of similar quality indicators within the CWP agencies. It is important to demonstrate that fishery statistics produced by international organizations aim at the best quality, adopting international standards. This will imply the effort to reduce discrepancies among datasets, elaborating best practices in streamlining statistical data workflow and sharing of data. In this context it is important to mention the work CWP is carrying out on reference harmonization.

[14] See pages 32-35 of this document for more information on SDGs.
[15] See pages 36-37 of this document for the list of targets and indicators for SDG 14.
[16] See pages 30-31 of this document for more information on the FAO SQAF framework.

FAO STATISTICS QUALITY ASSURANCE FRAMEWORK (FAO SQAF)

Statistics on food and agriculture provide the foundation for evidence-based policy making both for national governments and the international community. For FAO, a sound statistical basis plays a critical role in designing and targeting policies to reduce hunger, malnutrition and rural poverty. A sound statistical basis is also essential in monitoring progress towards national and international development goals and targets. It is therefore imperative that the data produced by FAO are of the highest possible quality.

FAO has so recently developed a FAO SQAG[17] whose principles encompass the Fundamental Principles of Official Statistics of the United Nations Statistical Commission[18] , as well as the Principles Governing International Statistical Activities endorsed by the Committee for the Coordination of Statistical Activities (CCSA)[19].

FAO SQAF includes a definition of quality, and a series of principles to adhere to, in order to ensure the quality of FAO statistical production processes and statistical outputs. Each principle is accompanied by corresponding good practices, which provide practical guidance on how to assure compliance with the principle. Some reported good practices are already applied by the FAO statistical system, while other aspects are still being developed.

The corporate quality assurance framework will complement the efforts being made to increase coordination and to improve consistency of the overall statistical programme within FAO. It will also help to ensure that sound and internationally accepted statistical concepts and definitions are adhered to, standard methodologies are adopted, and that accurate, high quality, timely and accessible data are produced by FAO.

It is worth noting that, as similar to other international organizations, FAO statistics are mainly based on data supplied by national statistical authorities or by other international organizations, and consequently their quality depends also on the quality of the inputs received.

FAO defines quality in statistics as the degree to which its statistical outputs fulfil requirements and the following quality dimensions are taken into account:

- **Relevance**
  - Relevance is the degree to which statistics meet the current and potential user needs.

- **Accuracy and Reliability**
  - Accuracy refers to the closeness of estimates, to the true values that statistics were intended to measure.

  - Reliability refers to the closeness of the initial estimates to the subsequent or final estimates.

[17] http://www.fao.org/docrep/019/i3664e/i3664e.pdf
[18] https://unstats.un.org/unsd/dnss/gp/fundprinciples.aspx
[19] https://unstats.un.org/unsd/methods/statorg/Principles_stat_activities/principles_stat_activities.asp

- **Timeliness and Punctuality**
  - Timeliness is the speed of dissemination of statistical outputs - i.e. the lapse of time between the end of a reference period (or a reference date) and the dissemination of the statistical outputs.

  - Punctuality refers to the possible time lag existing between the actual delivery date of statistical outputs and the target date when they should have been delivered, for instance, with reference to dates announced in an official release calendar or previously agreed among partners.

- **Coherence and Comparability**
  - Coherence is the adequacy of the statistical outputs to be meaningfully combined in different ways and for various uses.

  - Comparability refers to the extent to which differences between different geographical areas, non-geographical domains, or over time, can be attributed to differences between the true values of the statistical characteristics.

- **Accessibility and Clarity**
  - Accessibility is defined as the ease, the set of conditions and the modalities by which users can obtain data.

  - Clarity refers to the availability of adequate documentation: whether data are accompanied with appropriate metadata, illustrations such as graphs and maps, whether information on their quality are also available (including limitation in use), and the extent to which additional assistance is provided

Currently, work is being carried out by FIAS to adhere to a series of FAO standards, such as for example the development of new questionnaires to collect fisheries and aquaculture data. The ones on capture fisheries and aquaculture have been recently disseminated. While no major changes have been implemented in the way the countries have to report data, they now include improved definitions and instructions and two sheets on metadata and feedback. They will be both useful in order to collect valuable information on data completeness, source of data, frequency of data collection, dissemination media as well as feedback.

More information on the FAO SQAF is available in the document reported in footnote 17.

SUSTAINABLE DEVELOPMENT GOALS (SDGS)

On 25 September 2015, Member States of the United Nations adopted the 2030 Agenda for Sustainable Development and the SDGs, a set of 17 aspirational objectives with 169 targets expected to guide actions of governments, international agencies, civil society and other institutions over the period 2016–2030. The SDGs represent the first global development push in history led by the Member States. They set out specific objectives for countries to be met within a given time frame, with achievements monitored periodically to measure progress and ensure that no one is left behind. To achieve the global transition to sustainable development, countries are now establishing an enabling environment of policies, institutions and governance – grounded in a sound evidence-based approach that takes into account the three dimensions of sustainability (economic, social and environmental) - with closely interwoven targets.

A significant factor in the success of the SDGs will be new and effective ways of collecting data, monitoring targets and measuring progress. The 2030 Agenda has set in place a global reporting structure that includes inputs at local, national and regional levels, and culminates in the UN High-Level Political Forum, an annual intergovernmental meeting that provides guidance and recommendations, identifies progress and challenges, and mobilises action to accelerate implementation of the 17 SDGs.

Indicators are the foundation of this mutual accountability structure. In March 2016, the UN Statistical Commission identified as a "practical starting point" 230 indicators to monitor the SDGs' 169 targets. These global indicators will help countries measure the progress they are making towards achieving objectives, learn from experiences and understand which areas to prioritise and allocate resources to. According to the principle of national ownership, countries are chiefly responsible for gathering data. The sheer weight of indicators, however, represents an immense challenge for countries. International agencies can lend assistance by strengthening national capacities and ensuring that data are comparable and aggregated at sub-regional, regional and global levels. FAO is recognized as having a fundamental global role in developing methods and standards for food and agriculture statistics, and in providing technical assistance that can help countries meet the new monitoring challenges. FAO is

proposed "custodian" UN agency for 21 SDG indicators[20], central to food and agriculture, across SDGs 2, 5, 6, 12, 14 and 15, and a contributing agency for six more. FAO will act as facilitator to assist countries with their reporting and to foster strong and coherent institutional and policy environments

Several SDGs are directly relevant to fisheries and aquaculture and to the sustainable development of the sector, and one goal expressly focuses on the oceans (SDG 14 Conserve and sustainably use the oceans, seas and marine resources for sustainable development)[21]. Along with SDG 14 targets, sustainable fisheries and aquaculture contribute to multiple objectives including ending poverty (SDG 1), ending hunger, achieving food security and improved nutrition (SDG 2), and promoting sustained, inclusive and sustainable economic growth (SDG 8).

Status regarding indicator SDG 14.4.1: Proportion of fish stocks within biologically sustainable levels

This indicator refers to Target 14.4, which indicates: "By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics ".

Currently FAO regularly reports as part of its biennial SOFIA publication the state of fish stocks at global level. The SOFIA methodology for global monitoring is established and the indicator was classified as Tier1 indicator for SDGs. However, the current methodology is applied at a regional level and is not easily applicable to country level assessment, particularly to many developing countries, because (i) stock assessment is highly technical and many countries lack such skills, and (ii) many countries do not have sufficient data to support stock assessment. Although a great effort has been made over the last few years and some methods have been developed, they are still far from being sufficient to realistically evaluate stock status. Continued effort is still required to adapt the indicator in its present form to make it usable by countries and comparable at global scale.

Regarding individual stocks, which can be potentially reported under SDG14.4.1, the scope is as follows:

- National Stocks: countries undertake their own stock assessment. Where countries do have not such capacity, FAO can provide support or the country can ask other organizations for help;
- Regional/shared/straddling Stocks under Regional fisheries management organization (RFMO)/RFB mandate: they should be excluded from countries assessment inside EEZs;
- Regional/shared/straddling Stocks out of RFMO/RFB mandate: FAO could provide a framework proposing various options regarding attribution rules. The FAO Committee on Fisheries (COFI) could be used to endorse one of the options.

In adopting the indicator, countries will be requested to report to the UN on the indicator as a simple percentage value (e.g. "60 percent of national stocks are within biological sustainable levels") possibly with additional information such as the percentage of stocks for which the situation is unknown. However countries would also be requested to provide access to the underlying evidence of the reported status on a stock by stock basis.

[20] See http://www.fao.org/3/a-i6919e.pdf for more about the role of FAO as custodian agency

[21] See table on SDG 14 and related targets and indicators at pages 36-37. More information on the work of FAO with SDG 14 is available at http://www.fao.org/3/a-i7298e.pdf

FAO's action as custodian of SDG indicator 14.4.1

FAO is a custodian of SDG14.4.1. Therefore, FAO has to facilitate the process, provide technical support, and build capacity in member countries towards the reporting of stock status. As custodian, FAO is also responsible for collecting data from national sources, for ensuring that data are comparable and aggregated at sub-regional, regional and global levels, and for providing the storyline for the annual global SDG progress report.

FAO is developing a capacity building plan that will help countries to:

- Understand what SDG 14.4.1 is measuring;
- Know how SDG 14.4.1 is estimated;
- What data and skills are required to estimate SDG 14.4.1;
- What rough and ready methods are available, their advantages and disadvantages;
- What data sources, tools and infrastructures are available to support assessment;
- Reporting framework rules and monitoring capacity.

FAO's general capacity building plan includes the identification of a selected set of stock assessment methods applicable in Data Limited situations (DLM), the guidelines on the monitoring framework, the development of an e-training curriculum, the convening of a global expert workshop where these methods will be peer reviewed for endorsement by regional experts, and where these experts will be themselves trained as trainers.

While facilitating and providing support, FAO however should not over-step its role without considering the real data and technical capacity status in many countries, as emphasized by their pursuance of ownership and self-decision making during the selection of indicators. FAO needs to invest more into developing simple methods that can be used for data-poor situations with fairly reliable results.

The 33rd Session of the FAO Committee on Fisheries (COFI33) in July 2018 will represent a key milestone for countries to reach agreement and provide guidance to FAO on these aspects. The key decisions which will need to be taken in order to establish the SDG14.4.1 framework are:

- The overall reporting methodology;
- The methods to be used, what species should be included, how data should be collected, who should do the assessment, and the reporting framework for SDG14.4.1;
- The role of RFBs in facilitating the capacity building process, and consistency in an inventory based approach should this option be selected.

Role for FIRMS [22]

The Fisheries and Resources Monitoring System (FIRMS) is an information sharing partnership facilitating access to information on the status of stocks, fisheries and their management for which FAO holds the Secretariat. SEAFDEC is a member of FIRMS.

[22] More information on FIRMS is available at http://firms.fao.org/firms/en

FIRMS can represent a key reference instrument to help FAO fulfils its custodianship role[23]. As laid out above, decisions need to be prepared concerning the reporting framework and the related action plan. Ownership of consistent and comparable reporting lies within countries. Ensuring comparability and consistency globally would require FAO to establish a transparent framework with agreed rules. Options for organizing the reporting framework are:

- Implementing a standards' based inventory mechanism with traceability and transparency from national through regional to global level would strengthen SOFIA's indicator on the state of stocks. Such mechanism may benefit from the standards set up by the FIRMS and be further adapted as required;
- A monitoring framework may be set up with support from the FIRMS data dissemination framework for use by countries to enable/facilitate their dissemination of individual stock status;
- The assessment and reporting framework should be discussed and agreed by all countries at COFI 2018.

At the 10th FIRMS Steering Committee meeting (FIRMS FSC10) held in Copenhagen in June 2017, the FIRMS partners decided that FIRMS should offer a support to SDG14.4.1 by offering global monitoring services for national stocks assessed by countries under SDG14.4.1. Such support will be enabled thanks to the enhanced tooling capacity developed as part of the "Global Record of Stocks and Fisheries" developed under the European Union funded BlueBRIDGE project[24], and FIRMS RFB partners will be welcomed to contribute in coordinating this effort in their region.

This general FIRMS extended model after is described in FIRMS FSC10 report[25], in particular on paragraph 103, which also indicates the potential role for RFBs FIRMS partners, including SEAFDEC, in the process, including :

- the RFB FIRMS Partners fulfil the role of reviewing and validating the stock records

and for seafood traceability schemes:

- Countries through RFB FIRMS Partners submit their fishery inventories (as per current practice)

[23] More information on the potential role of FIRMS is available at http://www.fao.org/fi/static-media/MeetingDocuments/FIRMS/FIRMS_FSC10/4de.pdf
[24] http://www.bluebridge-vres.eu/about-bluebridge
[25] The report is available at http://www.fao.org/fi/static-media/MeetingDocuments/FIRMS/FIRMS_FSC10/FIRMS_FSC10_Report.pdf

Table 8. SDG 14: life below water - target and indicators

TARGETS	INDICATORS
14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	**14.1.1** Index of coastal eutrophication and floating plastic debris density
14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans	**14.2.1** Proportion of national exclusive economic zones managed using ecosystem-based approaches
14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels	**14.3.1** Average marine acidity (pH) measured at agreed suite of representative sampling stations
14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics	**14.4.1** Proportion of fish stocks within biologically sustainable levels
14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information	**14.5.1** Coverage of protected areas in relation to marine areas

Table 8. SDG 14: life below water- target and indicators (cont.)

TARGETS	INDICATORS
14.6 By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation	**14.6.1** Progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing
14.7 By 2030, increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism	**14.7.1** Sustainable fisheries as a percentage of GDP in small island developing States, least developed countries and all countries
14.A Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries	**14.A.1** Proportion of total research budget allocated to research in the field of marine technology
14.B Provide access for small-scale artisanal fishers to marine resources and markets	**14.B.1** Progress by countries in the degree of application of a legal/regulatory/policy/institutional framework which recognizes and protects access rights for small-scale fisheries
14.C Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of The Future We Want	**14.C.1** Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in the United Nation Convention on the Law of the Sea, for the conservation and sustainable use of the oceans and their resources

Annex 21

IMPROVING REPORTING OF FISHERY STATISTICS OF SOUTHEAST ASIA

By Saivason Klinsukhon

SEAFDEC/Secretariat

Since 2008, SEAFDEC has been compiling statistics from the ASEAN Member Countries in line with the Regional Framework of Fishery Statistics of Southeast Asia, using the streamlined questionnaires and submission process from countries to SEAFDEC and FAO. Nevertheless, in compiling statistics from the ASEAN Member countries, SEAFDEC has faced with certain issues and difficulties, particularly in order to ensure that statistics could provide pictures on situation of fisheries in the Southeast Asian region.

1. Marine Capture Fishery Statistics

Number of Fishing Boats:

- Currently countries that could provide statistics on number of fishing boats by type and tonnage: are: Brunei Darussalam, Indonesia, Malaysia, Myanmar and Singapore. For Philippines, Thailand and Vietnam, data were obtained by SEAFDEC from other sources, *i.e.* from the Philippines Fisheries Profile, Thai Fishing Vessel Statistics, and the Statistical Handbook of Viet Nam; however, only the total number is recorded without classification to types and tonnage. For Cambodia, there is no data on number of fishing boats presented in the Statistics Bulletin.

Number of Fishing Units:

- For Number of fishing units by size of boat, countries that could provide statistics data are: Brunei Darussalam, Indonesia, Malaysia, Myanmar, Singapore and Thailand.

***Marine capture fishery production by species*:**

- In term of ***production in quantity***, countries that could provide data at species (or species group) level are: Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, and Thailand; while Cambodia and Myanmar reported only total production under the group of marine fishes (*nei*).

- For Viet Nam, SEAFDEC had difficulty in obtaining official statistics data; and in order to get statistics data for publishing in the Bulletin, SEAFDEC currently look for and use official data from other sources *e.g.* "Statistical Handbook of Viet Nam" published by General Statistics Office of Viet Nam. Data is however available only under the group of marine fishes (*nei*) and Others (unidentified).

- In term of ***production in value***, there is no data reported from Cambodia, and Viet Nam (although production in quantity is available). Myanmar also reported the data only as total value under the group of marine fishes (*nei*) without detailed species classification. Some countries also did not report data (*e.g.* only in some years), making it difficult to come up with trends of production in value.

***Marine capture fisheries production by type of fishing gear and by species*:**

- Usually, only four countries could report data, *i.e.*: Brunei Darussalam, Malaysia, Singapore, and Thailand. From such available data, analysis could not be made to come up with trends on fishing gear used in marine capture fisheries.

2. Inland Capture Fisheries

- For the ***production in quantity***, only three countries could report the data at species (or species group) level, *i.e.* Indonesia, Philippines, and Thailand.

- For the ***production in value***, Cambodia and Vietnam could not report the data (although production in quantity is available).

- For the ***production by type of water bodies***, only two countries, *i.e.* Indonesia and Malaysia, could report the data by type of water bodies.

3. Aquaculture

- ***Aquaculture production:*** Statistics on aquaculture production of each species could be classified into three culture environment, making total aquaculture production statistics categorized into three sub-sectors, namely: mariculture, brakishwater culture, and freshwater culture. However, there are differences in classification of aquaculture species into these sub-sectors, for example:
  - *Penaeus monodon* should be reported under brakishwater culture, but Myanmar reported this under mariculture
  - Seaweed culture: some countries *e.g.* Indonesia reported *Gracilaria* seaweeds as brackishwater culture but Philippines reported as mariculture
  - Some of mollusk culture production, *e.g.* green mussels, was reported under marine capture production (*e.g.* Indonesia)
  - No submission of data on production of species (or species group) from countries known to have high production (*e.g.* ornamental fish of Thailand, *Pangasius* sp. of Vietnam)

  However, in the Bulletin, classification of production into sub-sectors was made based on country's input.

- ***Ornamental fishes***: Only three countries could report production of ornamental fishes, namely: Indonesia, Malaysia and Myanmar.

- ***Seed production***: Only Brunei Darussalam, Indonesia, Malaysia, Myanmar, and Singapore could provide data on seed production.

4. Producer price

- Producer price were reported only by Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore and Thailand. Trends of producer prices could be established only for certain species of which data on producer price were reported.

5. Fishers by working status

- Five countries could report data on fishers by working status, *i.e.*: Brunei Darussalam, Indonesia, Malaysia, Myanmar, and Singapore.

REQUIRED CONSIDERATION BY THE CONSULTATION

The Consultation is requested to:

1. Take note on the issues faced by SEAFDEC in compiling statistics from countries;
2. Share view on difficulties in reporting of national statistics for regional compilation; and
3. Provide recommendations ways and means of improving reporting of fishery statistics in the future.

Annex 22

IMPROVING FISHERY STATISTICS BULLETIN FRAMEWORK

By Saivason Klinsukhon

SEAFDEC Secretariat

I. Background and Rational

Since 2004, SEAFDEC has developed a new "Framework for Fishery Statistics of Southeast Asia" in consultation with the Member Countries through a series of Regional Consultation/Workshop. The new Framework includes major changes in the "area of coverage" and "statistics usage" considering the new geo-political set-up of the ASEAN, the changing situation of the region's fisheries as well as the differences in the current national statistical systems. The new Framework also focus on the basic requirements that can be possibly achieved by the countries in the region without putting much burden on the agencies responsible for the collection and compilation of fishery statistics.

It is anticipated that the Framework of Fishery Statistics of Southeast Asia would be beneficial to the countries as this could be use as a guide to facilitate a long-term improvement of their fishery statistics at the national level. The Framework is also envisaged to serve as a comprehensive guide on the "Minimum Requirement" for the Southeast Asian in the development/improvement of national fishery statistics to support sustainable fisheries management and policy planning. In addition, as the Framework is harmonized with the international standards, classifications and definitions, it would also be used as a coordinated structure to facilitate the compilation and sharing statistics and information from Member Countries and contribute to the analysis fishery statistics and information in order to provide a clearer picture on the fishery sector at the regional and global levels.

Nevertheless, after the adoption of the Statistics Framework, there have been new emerging requirements for wider scope of data and information towards sustainable fisheries development and management in line with emerging global/regional initiatives/instruments and directives, *i.e.* the Resolution and Plan of Actions on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 (adopted in 2011), the updated Coordinating Working Parties on Fishery Statistics (CWP) Handbook. Furthermore, there have also been recent development of regional plan of actions, which stipulated the need for fisheries data and information as a basis for sustainable fisheries management. Considering the potential of statistics to support such emerging requirements, it is therefore necessary that the Statistics Framework be improved, taking into consideration such emerging policy frameworks and requirements.

II. Possible Areas for Improving Fishery Statistics Framework

In order to address the aforementioned issues and concerns, it is necessary to revisit the Framework of the Fishery Statistics of Southeast Asia, in different aspects:

A. Harmonization with updated international standards and norms, classification and definitions:

There are areas that the international standards and norms, classification and definitions have been updated (or in the process of updating) based on the new CWP Handbook, and thus the region may consider the necessity to also update the Regional Statistics Framework and corresponding statistics questionnaires, *e.g.*:

- Aquaculture Statistics

  For "aquaculture statistics," although data has been compiled in the Regional Statistics Bulletin, but with not very much details, and could not provide actual status and best picture of aquaculture industry of the region. Currently, statistics are collected for: 1) Aquaculture Production by Species and by Fishing Area, 2) Aquaculture Production by Species of Ornamental Fishes, and 3)

Seed Production from Aquaculture. CWP has therefore develop new "Handbook on Aquaculture Statistics"; and FAO has modified questionnaire on aquaculture statistics in accordance with the new Handbook.

The questionnaire currently used for compilation of statistics on "aquaculture production by species and fishing areas" is the FAO questionnaire **Q8** (below), and data provided by countries were also shared with SEAFDEC:

Existing Q8. FAO questionnaire on Aquaculture Production by Species and by Fishing Area

Q8-AQ-NS :Form for Reporting Statistics on Aquaculture of Fish, Crustacean, Mollusc and Aquatic plant by Species, Production, Environment and Fishing Area

YEAR_____

COUNTRY NAME	3-ALPHA CODE	SCIENTIFIC NAME	FAO ENGLISH NAME	ENVIRONMENT CODE	AREA CODE	UNIT	2010	2011	2012	2013	2014	2015	2016
Brunei Darussalam	FCP	Cyprinus carpio	Common carp	IN	04	Tonnes							
Brunei Darussalam	FCP	Cyprinus carpio	Common carp	IN	04	BND / Kg							
Brunei Darussalam	FCP	Cyprinus carpio	Common carp	IN	04	USD / Kg							
Brunei Darussalam	TLN	Oreochromis niloticus	Nile tilapia	BW	71	Tonnes							
Brunei Darussalam	TLN	Oreochromis niloticus	Nile tilapia	IN	04	Tonnes							
Brunei Darussalam	TLN	Oreochromis niloticus	Nile tilapia	IN	04	BND / Kg							
Brunei Darussalam	TLN	Oreochromis niloticus	Nile tilapia	IN	04	USD / Kg							
Brunei Darussalam	CTO	Clarias spp	Torpedo-shaped catfishes	IN	04	Tonnes							
Brunei Darussalam	CTO	Clarias spp	Torpedo-shaped catfishes	IN	04	BND / Kg							
Brunei Darussalam	CTO	Clarias spp	Torpedo-shaped catfishes	IN	04	USD / Kg							
Brunei Darussalam	PGZ	Pangasius spp	Pangas catfishes nei	IN	04	Tonnes							
Brunei Darussalam	PGZ	Pangasius spp	Pangas catfishes nei	IN	04	BND / Kg							
Brunei Darussalam	PGZ	Pangasius spp	Pangas catfishes nei	IN	04	USD / Kg							
Brunei Darussalam	FRF	Osteichthyes	Freshwater fishes nei	IN	04	Tonnes							
Brunei Darussalam	FRF	Osteichthyes	Freshwater fishes nei	IN	04	USD / Kg							
Brunei Darussalam	GIP	Lates calcarifer	Barramundi(=Giant seaper	BW	71	Tonnes							
Brunei Darussalam	GIP	Lates calcarifer	Barramundi(=Giant seaper	BW	71	BND / Kg							
Brunei Darussalam	GIP	Lates calcarifer	Barramundi(=Giant seaper	BW	71	USD / Kg							
Brunei Darussalam	ENI	Epinephelus coioides	Orange-spotted grouper	BW	71	Tonnes							
Brunei Darussalam	ENI	Epinephelus coioides	Orange-spotted grouper	BW	71	BND / Kg							
Brunei Darussalam	ENI	Epinephelus coioides	Orange-spotted grouper	BW	71	USD / Kg							

However, FAO recently developed a new questionnaire on aquaculture off-farm production, which aims to collect additional data sets (*i.e.* final use of the production):

Proposed New Q8. FAO questionnaire on Aquaculture Off-farm Production

A1 Aquaculture production

Year	Country	FAO Major Area	SPECIES			PRODUCTION					
			3-alpha code	Local name	Scientific name	Quantity	Unit of quantity	Price per unit	Currency	Final use	Comment
							TLW (tonnes live weight)				

Required consideration by the Consultation

- Countries are requested to consider and share view on the possibility to provide data based on the **new Q8** of FAO, which FAO would later on share with SEAFDEC.

(There will be no change to Regional Statistics Frameworks, as SEAFDEC can still extract information from the new Q8 of FAO. But there will be change of questionnaire on "Aquaculture Production" which SEAFDEC need to seek approval of the Council)

For ***statistics on seed production from aquaculture***, currently SEAFDEC is using SEAFDEC questionnaire **Q10** on Seed Production from Aquaculture. In addition to total seed production, the questionnaire also specified usage of seeds, *i.e.* for wild stock enhancement, and for aquaculture practices:

Existing Q10. SEAFDEC questionnaire on Seed Production from Aquaculture

Q10 : Seed Production from Aquaculture

Country :

YEAR __2016_____

Environment CODE	Hatchery/Nursery Production						Units
	3-ALPHA CODE	Scientific Name	FAO English Name	Total	Wild Stock Enhancement	Aquaculture Practices	
				millions pcs	millions pcs	millions pcs	Number of operational units or facilitates

However, FAO has recently also developed a new questionnaire on "input of seeds, which requests for data on inputs of seeds used for aquaculture, *i.e.* quantity, price, and source of seed whether it derived from wild, domestic hatchery or foreign hatchery (without specifying usage of seeds as in SEAFDEC questionnaire).

Proposed new FAO questionnaire on Input of Seeds

A2 Input of seeds

Year	Country	FAO Major Area	SPECIES			INPUT					
			3-alpha code	Local name	Scientific name	Quantity	Unit of quantity	Unit price	Currency	Source	Comment
							numbers			Wild Domestic hatchery Foreign hatchery	

Required consideration by the Consultation

- Countries may consider submission data separately to SEAFDEC based on the existing Q10, and to FAO based on proposed new FAO questionnaires; or
- If country want to harmonize into one questionnaire, FAO may consider combining data on usage of seeds (based on Q10) into FAO questionnaire; and this could be shared between SEAFDEC and FAO --- need to discuss and develop harmonize questionnaire. In this case, there will be change in Regional Statistics Framework and Questionnaire on "Artificial Seed Production," which needs to seek approval of the Council).

- Classification of Aquatic Animals and Plants

The CWP Meeting proposed the revision of the composition of groups of the current International Standard Statistical Classification of Aquatic Animals and Plants (ISSCAAP). The below table shows the existing ISSCAAP (used in Regional Statistics Frameworks), and the proposed updated revision.

Division	Species in Existing Statistics Framework	CWP Proposed ISSCAAP
1	Freshwater fishes 11 Carps, barbells and other cyprinids 12 Tilapias and other cichlids 13 Miscellaneous freshwater fishes	Freshwater fishes 11 Carps, barbells and other cyprinids 12 Tilapias and other cichlids 13 Miscellaneous freshwater fishes 14 Freshwater catfishes 15 Freshwater perches and basses 16 Snakeheads 17 Characins
2	Diadromous fishes ~~21 Sturgeons, paddlefishes~~ 22 River eels ~~23 Slamons, trouts, smelts~~ 24 Shads 25 Miscellaneous diadromous fishes	Diadromous and euryhaline fishes 21 Sturgeons, paddlefishes 22 River eels 23 Slamons, trouts, smelts 24 Shads 25 Miscellaneous diadromous and euryhaline fishes 26 Herbivorous & omnivorous euryhaline fishes 27 Carnivorous euryhaline fishes
3	Marine fishes 31 Flounders, halibuts, soles ~~32 Cods, hakes, haddocks~~ 33 Miscellaneous coastal fishes 34 Miscellaneous demersal fishes 35 Herrings, sardines, anchovies 36 Tunas, bonitos, billfishes 37 Miscellaneous pelagic fishes 38 Sharks, rays, chimaeras 39 Marine fishes not identified	Marine fishes 31 Flat fishes 32 Cods, hakes, haddocks 33 Miscellaneous coastal fishes 34 Miscellaneous demersal fishes 35 Herrings, sardines, anchovies 36 Tunas, bonitos, billfishes 37 Miscellaneous pelagic fishes 38 Sharks, rays, chimaeras 39 Marine fishes not identified
4	Crustaceans 41 Freshwater crustaceans 42 Crabs, sea-spiders 43 Lobsters, spiny-rock lobsters ~~44 King crabs, squat-lobsters~~ 45 Shrimps, prawns ~~46 Krill, planktonic crustaceans~~ 47 Miscellaneous marine crustaceans	Crustaceans 41 Freshwater shrimps and prawns 42 Marine crabs, sea-spiders 43 Lobsters, spiny-rock lobsters 44 King crabs, squat-lobsters 45 Marine Shrimps and prawns 46 Krill, marine planktonic crustaceans 47 Miscellaneous marine crustaceans 48 Freshwater crayfishes (crawfishes) 49 Miscellaneous freshwater crustaceans

Division	Species in Existing Statistics Framework	CWP Proposed ISSCAAP
7	Miscellaneous aquatic animals 71 Frogs and other amphibians 72 Turtles 73 Crocodiles and alligators ~~74 Sea-squirts and other tunicates~~ ~~75 Horseshoe crabs and other arachnoids~~ 76 Sea-urchins and other echinoderms 77 Miscellaneous aquatic invertebrates	Miscellaneous aquatic animals 71 Frogs and other amphibians 72 Turtles 73 Crocodiles and alligators 74 Sea-squirts and other tunicates 75 Horseshoe crabs and other arachnoids 76 Sea-urchins and other echinoderms 77 Miscellaneous aquatic invertebrates 78 Sea cucumbers
8	Miscellaneous aquatic animal products 81 Pearls, mother-of-pearls, shells 82 Corals 83 Sponges	Miscellaneous aquatic animal products 81 Marine pearls, mother-of-pearls, shells 82 Corals 83 Sponges 84 Freshwater pearls and shells 85 Live rocks (ornamental)
9	Aquatic plants 91 Brown seaweeds 92 Red seaweeds 93 Green seaweeds 94 Miscellaneous aquatic plants	Aquatic plants* 91 Brown algae 92 Red algae 93 Marine macro green algae 94 Miscellaneous aquatic plants 95 Aquatic microalgae 96 Aquatic macrophytes (ornamental)

* Need to be discussed with algae taxonomy experts

Required consideration by the Consultation

- As revision of the composition of Groups of ISSCAAP is still subject to consideration by CWP, Countries are requested to take note of the progress of this development, and provide view on the proposed changes for consideration by FAO.

- Marine Capture Fisheries

The revised International Standard Classification of Fishing Gears (ISSCFG) has already been adopted by the CWP at the 25th Session in 2016. The below table shows the existing ISSCFG (with some additional gears that specifically used in the region), and the proposed revision.

Gears in Existing Statistics Framework	CWP Revised ISSCFG
01.1.0 Purse seine - *Anchovy purse seine* - *Fish purse seine*	01 Surrounding nets 01.1 Purse seines 01.2 Surrounding nets without purse lines 01.9 Surrounding nets (nei)
02.9.0 Seine net 02.2.0 Boat seines 02.1.0 Beach seines	02 Seine nets 02.1 Beach seines 02.2 Boat seines 02.9 Seine nets (nei)
03.9.0 Trawl 03.1.1 Beam trawl 03.4.9 Otter board trawl 03.5.9 Pair trawl	03 Trawls 03.11 Beam trawls 03.12 Single boat bottom otter trawls 03.13 Twin bottom otter trawls 03.14 Multiple bottom otter trawls 03.15 Bottom pair trawls 03.19 Bottom trawls (nei) 03.21 Single boat midwater otter

Gears in Existing Statistics Framework	CWP Revised ISSCFG
	trawls 03.22 Midwater pair trawls 03.29 Midwater trawls (nei) 03.3 Semipelagic trawls 03.9 Trawls (nei)
-	04 Dredges 04.1 Towed dredges 04.2 Hand dredges 04.3 Mechanized dredges 04.4 Dredges (nei)
05.9.0 Lift net	05 Lift nets 05.1 Portable lift nets 05.2 Boat-operated lift nets 05.3 Shore-operated stationary lift nets 05.9 Lift nets (nei)
-	06 Falling nets 06.1 Cast nets 06.2 Cover pots/Lantern nets 06.3 Falling gear (nei
07.9.1 Gillnet	07 Gillnets and entangling nets 07.1 Set gillnets (anchored) 07.2 Drift gillnets 07.3 Encircling gillnets 07.4 Fixed gillnets (on stakes) 07.5 Trammel nets 07.6 Combined gillnets-trammel nets 07.9 Gillnets and entangling nets (nei)
08.9.0 Trap - *Stationary trap* - *Portable trap*	08 Traps 08.1 Stationary uncovered pound nets 08.2 Pots 08.3 Fyke nets 08.4 Stow nets 08.5 Barriers, fences, weir, etc. 08.6 Aerial traps 08.9 Traps (nei)
09.9.0 Hook and lines	09 Hook and lines 09.1 Handlines and hand-operated pole-and-lines 09.2 Mechanized and lines and pole-and-lines 09.31 Set longlines 09.32 Drifting longlines 09.39 Longlines (nei) 09.4 Vertical lines 09.5 Trolling lines 09.9 Hooks and lines (nei)
- Push/Scoop net	
- Shellfish and seaweed collecting gear	

Gears in Existing Statistics Framework	CWP Revised ISSCFG
20.0.0 Others	10 Miscellaneous gear 10.1 Harpons 10.2 Hand implements (Wrenching gear, Clamps, Tongs, Rakes, Spears) 10.3 Pumps 10.4 Electric fishing 10.5 Pushnets 10.6 Scoopnets 10.7 Drive-in nets 10.8 Diving 10.9 Gear nei
	99 Gear not known 99.9 Gear not known

Required consideration by the Consultation

- As revision of the ISSCFG has already been adopted by the CWP, Countries are requested to take note of the change, and provide view, *i.e.* whether the gears used in Regional Statistics Frameworks should be changed, and which gear category should be included (based on availability of statistics from countries).

Revision of the composition of Groups of ISSCFG will result in changes to Regional Statistics Frameworks, which SEAFDEC will seek approval of the Council. This will impact Q4 on Marine Capture Production by Type of Fishing Gear and by Species.

B. Inclusion of additional component of statistics:

- Fish Trade (Import & Export)

  Since the adoption of the new Fishery Bulletin Framework, Statistics on fish trade (import & export), has not been compiled considering that such data on fish trade is not collected directly by agency responsible for fisheries, but gathered from the Custom Department. Nevertheless, it is envisaged that regional compilation of statistics on fish trade could be useful to provide picture on intra-regional and international trade of fish and fishery products from Southeast Asian countries.

The Statistics cover the quantities and value of annual exports and imports of all fishery commodities ranging from live fish to preserved and processed commodities. The proposed collection data sets are: 1) Export by Fishery Commodity, 2) Export by Country of Destination, 3) Import by Fishery Commodity, and 4) Import by Country of Origin

Exports by Fishery Commodity *(structure of data based on the Statistics Bulletin of SCS Areas)*

Country	Total		11 Fish, fresh, chilled or frozen									
			Ornamental fish		Fish fry		Live fish		Eels, fresh, chilled or frozen		Tunas, fresh, chilled or frozen	
	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V

Country	12 Fish, dried, salted or smoked						13 Crustaceans, fresh, frozen, dried and salted							
	Other fishes, fresh, chilled or frozen		Shark's fin		Other		Crabs, fresh and frozen		Shrimp, prawns and lobsters, fresh and frozen		Shrimp, prawns and lobsters, dried and salted		Other crustacean, fresh, frozen, dried and salted	
	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V

Country	14 Molluscs, fresh, frozen, dried and salted									
	Squid, cuttlefish and octopus, fresh and frozen		Squid, cuttlefish and octopus, dried and salted		Mussels, fresh, frozen dried and salted		Arkshells, fresh, frozen, dried and salted		Other molluscs fresh, frozen, dried and salted	
	Q	V	Q	V	Q	V	Q	V	Q	V

Country	21 Fish products and preparations, whether or not in airtight containers				22 Crustacean and mollusc products and preparations, whether ot not airtight containers				Oils, fats, waxes, etc., of aquatic animal origin		Meals, solubles and similar animal feedingstuffs and fertilizers of aquatic animal origin	
	In airtight containers		In non-airtight containers		In airtight containers		In non-airtight containers					
	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V

Country	51 Fish, crustacean and mollusc sauces and soups, whether or not in airtight container				52 Miscellaneous edible products					
	Fish sauce		Other fishers, crustacean and mollusc sauces and soups, wheter or not in airtight containers		Frog legs, fresh chilled or frozen		Shrimp pastes		Shrimp crackers	
	Q	V	Q	V	Q	V	Q	V	Q	V

Country	52 Miscellaneous edible products						Inedible fish, ova, waste, offal,etc.		Fish and shark skins	
	Shrimp cracker		Sea cucumber, fresh, frozen, dried, salted, etc.		Jellyfish, fresh frozen, dried, salted, tec.					
	Q	V	Q	V	Q	V	Q	V	Q	V

Country	56 Bones, shells, etc., unworked or simply prepared								Sponges, raw or prepared		Pearls, not set or strung	
	Tortise shell		Corals		Mother of pearl and other pearl		Other bones, shells, etc., unworked or simply preapred					
	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V

Country	Miscellaneous inedible products		6 Product of Aquatic plant origin					
			Agar-agar flakes		Red seaweeds/ products		Miscellaneous products of aquatic plant of origin	
	Q	V	Q	V	Q	V	Q	V

Exports by Country of Destination

1.1 Ornamental fish
1.2 Other fishes, fresh, chilled or frozen
1.3 Fish, dried, salted or smoked
1.4 Shrimps, prawns and lobsters, fresh and frozen
1.5 Squid, cuttlefish and octopus, fresh and frozen
1.6 Squid, cuttlefish and octopus, dried and salted
1.7 Other molluscs, fresh, frozen, dried and salted
1.8 Fish products and preparations in airtight containers
1.9 Crustaceans and mollusc products and preparations in airtight containers
1.10 Meals, soluble and similar animal feeding stuffs and fertilizers of aquatic

(Table for each topic)

US$1,000

Country/ Areas of Destination	Total	Country of Origin									
		Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam

Imports by Fishery Commodity *(structure of data based on the Statistics Bulletin of SCS Areas)*

Country	Total		11 Fish, fresh, chilled or frozen									
			Ornamental fish		Fish fry		Live fish		Eels, fresh, chilled or frozen		Tunas, fresh, chilled or frozen	
	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V

Country	12 Fish, dried, salted or smoked						13 Crustaceans, fresh, frozen, dried and salted							
	Other fishes, fresh, chilled or frozen		Shark's fin		Other		Crabs, fresh and frozen		Shrimp, prawns and lobsters, fresh and frozen		Shrimp, prawns and lobsters, dried and salted		Other crustacean, fresh, frozen, dried and salted	
	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V

Country	14 Molluscs, fresh, frozen, dried and salted									
	Squid, cuttlefish and octopus, fresh and frozen		Squid, cuttlefish and octopus, dried and salted		Mussels, fresh, frozen dried and salted		Arkshells, fresh, frozen, dried and salted		Other molluscs fresh, frozen, dried and salted	
	Q	V	Q	V	Q	V	Q	V	Q	V

Country	21 Fish products and preparations, whether or not in airtight containers				22 Crustacean and mollusc products and preparations, whether ot not airtight containers				Oils, fats, waxes, etc., of aquatic animal origin		Meals, solubles and similar animal feedingstuffs and fertilizers of aquatic animal origin	
	In airtight containers		In non-airtight containers		In airtight containers		In non-airtight containers					
	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V

Country	51 Fish, crustacean and mollusc sauces and soups, whether or not in airtight container				52 Miscellaneous edible products					
	Fish sauce		Other fishers, crustacean and mollusc sauces and soups, wheter or not in airtight containers		Frog legs, fresh chilled or frozen		Shrimp pastes		Shrimp crackers	
	Q	V	Q	V	Q	V	Q	V	Q	V

Country	51 Fish, crustacean and mollusc sauces and soups, whether or not in airtight container				52 Miscellaneous edible products					
	Fish sauce		Other fishers, crustacean and mollusc sauces and soups, wheter or not in airtight containers		Frog legs, fresh chilled or frozen		Shrimp pastes		Shrimp crackers	
	Q	V	Q	V	Q	V	Q	V	Q	V

Country	56 Bones, shells, etc., unworked or simply prepared								Sponges, raw or prepared		Pearls, not set or strung	
	Tortise shell		Corals		Mother of pearl and other pearl		Other bones, shells, etc., unworked or simply preapred					
	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V

Country	Miscellaneous inedible products		6 Product of Aquatic plant origin					
			Agar-agar flakes		Red seaweeds/ products		Miscellaneous products of aquatic plant of origin	
	Q	V	Q	V	Q	V	Q	V

Imports by Country of Origin

1.1 Live fish
1.2 Other fishes, fresh, chilled or frozen
1.3 Shark's fin
1.4 Fish, dried, salted or smoked
1.5 Shrimps, prawns and lobsters, fresh and frozen
1.6 Squid, cuttlefish and octopus, fresh and frozen
1.7 Squid, cuttlefish and octopus, dried and salted
1.8 Fish products and preparations in airtight containers
1.9 Crustaceans and mollusc products and preparations in airtight containers
1.10 Meals, soluble and similar animal feeding stuffs and fertilizers of aquatic

(Table for each topic)

US$1,000

Country/ Areas of Origin	Total	Country of Destination									
		Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam

- Fish Processing

Since the adoption of the new Fishery Bulletin Framework, data on fish processing has also not been compiled by SEAFDEC. However, considering the importance of data on fish processing that could provide picture on utilization of the catch, statistics on fish processing should also be included in the Fishery Statistics Bulletin. Data should include the quantities of preserved and processed products of all aquatic animals produced in freshwater, brackishwater, and marine areas. The raw materials of commodities, whether from domestics or imported products, should be indicated. Statistics would be based on group of commodities *e.g.* frozen, canned, dried, smoked, boiled, fermented, etc.

Number of fish processing Establishments and production (structure of data as in Statistics of SCS Areas)

Country	Year	Frozen		Canned		Dried		Smoked	
		No. of Establishment	Production	No. of Establishment	Production	No. of Establishment	Production	No. of Establishment	Production

Cont'd

Country	Year	Boiled		Fermented				Cured	
		No. of Establishment	Production	Fish sauce		Paste		No. of Establishment	Production
				No. of Establishment	Production	No. of Establishment	Production		

Cont'd

Country	Year	Comminuted				Reduction		Powered/flaked	
		Frozen surimi		Other comminuted products					
		No. of Establishment	Production	No. of Establishment	Production	No. of Establishment	Production	No. of Establishment	Production

Cont'd

Country	Year	Others	
		No. of Establishment	Production

Required consideration by the Consultation

- Countries are requested to consider whether to include statistics on "Fish Trade" and "Fish Processing" in the Regional Statistics Framework. If countries agreed, SEAFDEC will proposed the change of the Regional Statistics Framework.

Note: For the issues that could be agreed that this Consultation, *e.g.* proposed change to the Regional Statistics Framework, inclusion of additional component of statistics, SEAFDEC would propose this to the SEAFDEC Council to seek support in subsequent development of the new questionnaires in consultation with countries.

Annex 23

CLOSING REMARKS

By Dr. Kom Silapajarn

Secretary-General, Southeast Asian Fisheries Development Center

Delegates, ladies, and gentlemen,

On behalf of SEAFDEC, it is my pleasure to join you in the closing of the "Regional Technical Consultation on Fishery Statistics and Information in Southeast Asia." During the past four days, the Consultation had discussed the issues and concerns on enhancing the reporting of regional fishery statistics to provide reliable and comparable statistics as basis for policy planning and management of fisheries. Issues on the need for strengthened statistics on commercially-exploited species and species under international concerns that are important for the region, as well as some modification of the statistics frameworks in response to new standards and requirements were also discussed. We also had opportunity to discuss on further improvement of statistics database in order to enhance the usage of statistics that have been provided by countries and compiled by SEAFDEC in the future.

It is very ambitious that we have put together so many issues within this four-day Consultation, and I would like to take this opportunity to express my deep appreciation to all you for your active participation and valuable inputs that enabled us to accomplish the expectations of this Consultation. Based on the agreement that we could reach, SEAFDEC would further submit issues that require consideration and policy support to the SEAFDEC Council for further guidance.

I am delighted that this Consultation is closing with success. I believe that SEAFDEC and all Member Countries would continue to work hand-in-hand in strengthening our collaboration to overcome the issues and challenges to achieve high quality, accessible, reliable, and timely fishery statistics data at national and regional levels to enhance the sustainability of fishery resources.

With this, I declare the Consultation closed, and I wish you all a safe journey back home. Thank you very much.