



The Republic of The Union of Myanmar
Ministry of Agriculture, Livestock and Irrigation
Department of Fisheries



Fishery Statistics 2019

THE REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF AGRICULTURE , LIVESTOCK AND IRRIGATION

FISHERY STATISTICS

2019

Department of Fisheries

Myanmar

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**MYANMAR FISHERY STATISTICS
2019**



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Fishery Statistics

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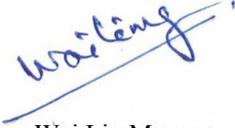
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FOREWORD

Myanmar Fisheries Statistics Publication is annually issued under the ownership of Department of Fisheries, Ministry of Agriculture, Livestock and Irrigation since 2001-2002, now it is coming to the said publication issuance for the fiscal year 2018-19, thus it is saying that we are still keeping and continuing the good and valuable work to support as proper reference for the sector development in the country by the starting year. Main purpose of the issuance of this publication is to present the issuing fiscal year data and information for the fisheries related conditions as well as it includes presenting past ten year fisheries production data, so we can say that this small booklet can support to all users who are directly or indirectly working in the fisheries in order to receiving the current and previous production data for the sector in the country. Besides that this booklet can also support as reference in order to making the short/medium and long term plan to meet with the purpose of sustainable fisheries management together with the sustaining for the natural aquatic resources in the country which is very linkage to the secure fishery production, income generation, fishery dependent livelihoods as well as linkage to the proper management and conservation for the fishery resources now and in the future.

On behalf of the Department of Fisheries, I would like to express my gratitude to the Dr. Aung Thu, Union Minister for the Ministry of Agriculture , Livestock and Irrigation or his valuable and kind guidance. We also thank to U Hla Kyaw , Deputy Minister and U Kyaw Min Oo, Permanent Secretary for the Ministry of Agriculture , Livestock and Irrigation.

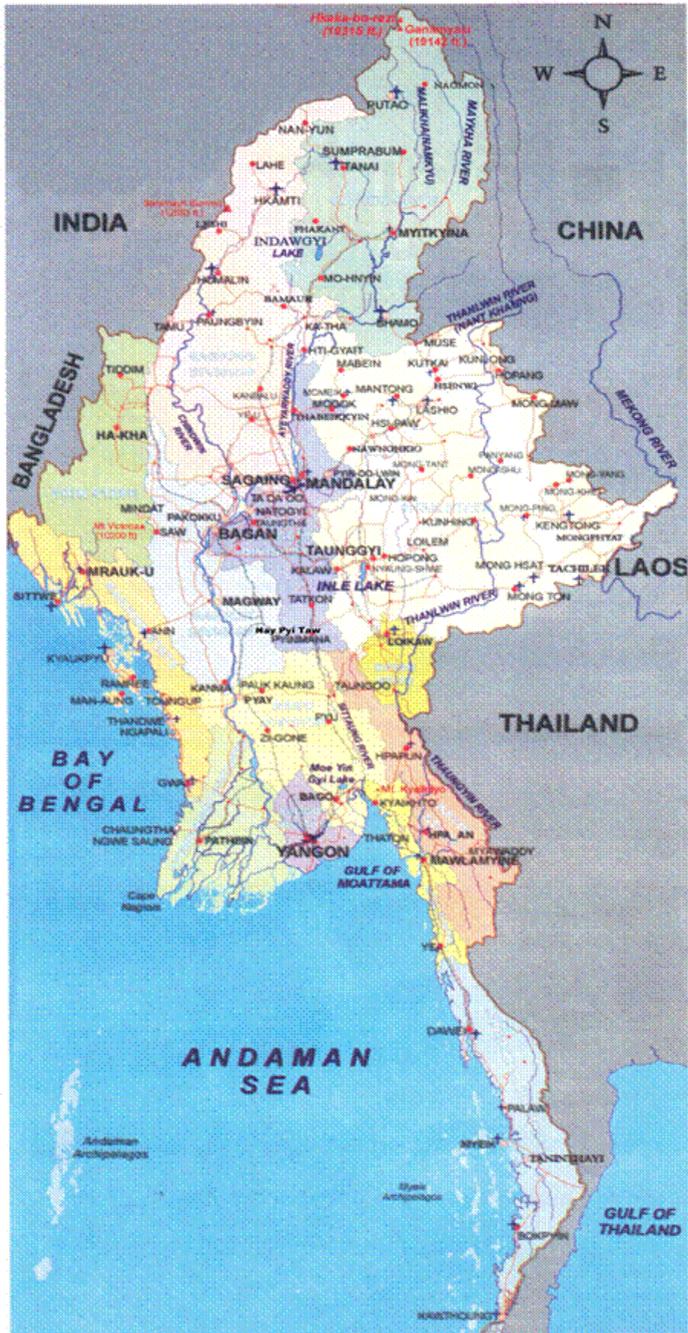
Moreover, Special thanks to U Myint Zin Htoo, Deputy Director-General and all of the Directors of the Department of Fisheries as well as all my staff for their contribution and hard working as completed the success of this publication.



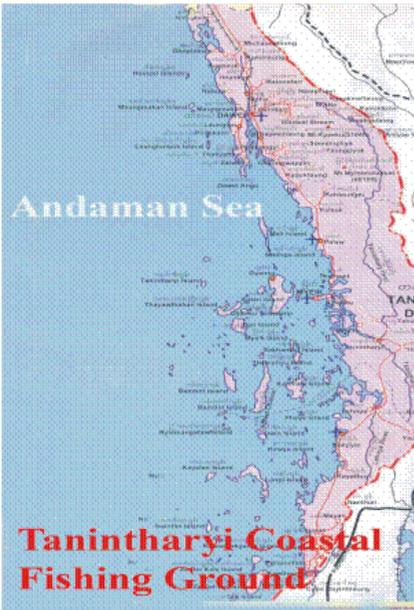
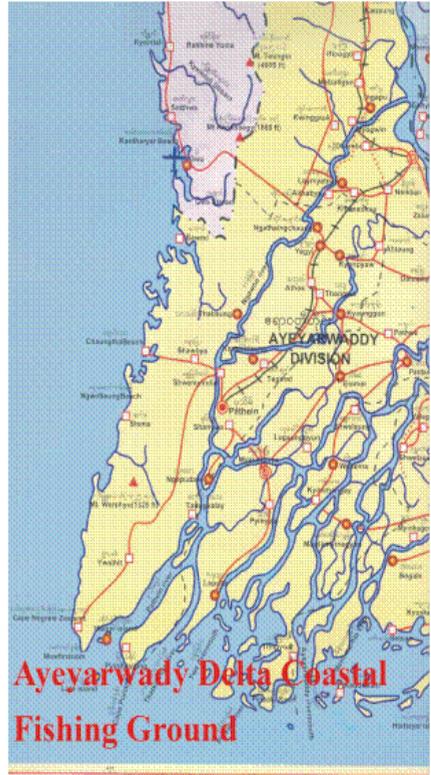
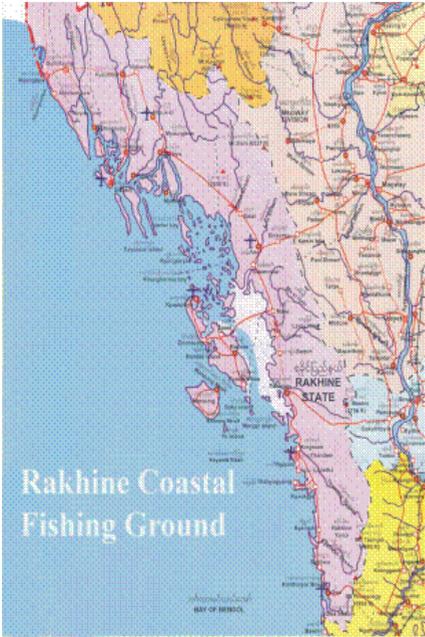
Wai Lin Maung
Director General
Department of Fisheries

September 10, 2020

THE REPUBLIC OF THE UNION OF MYANMAR

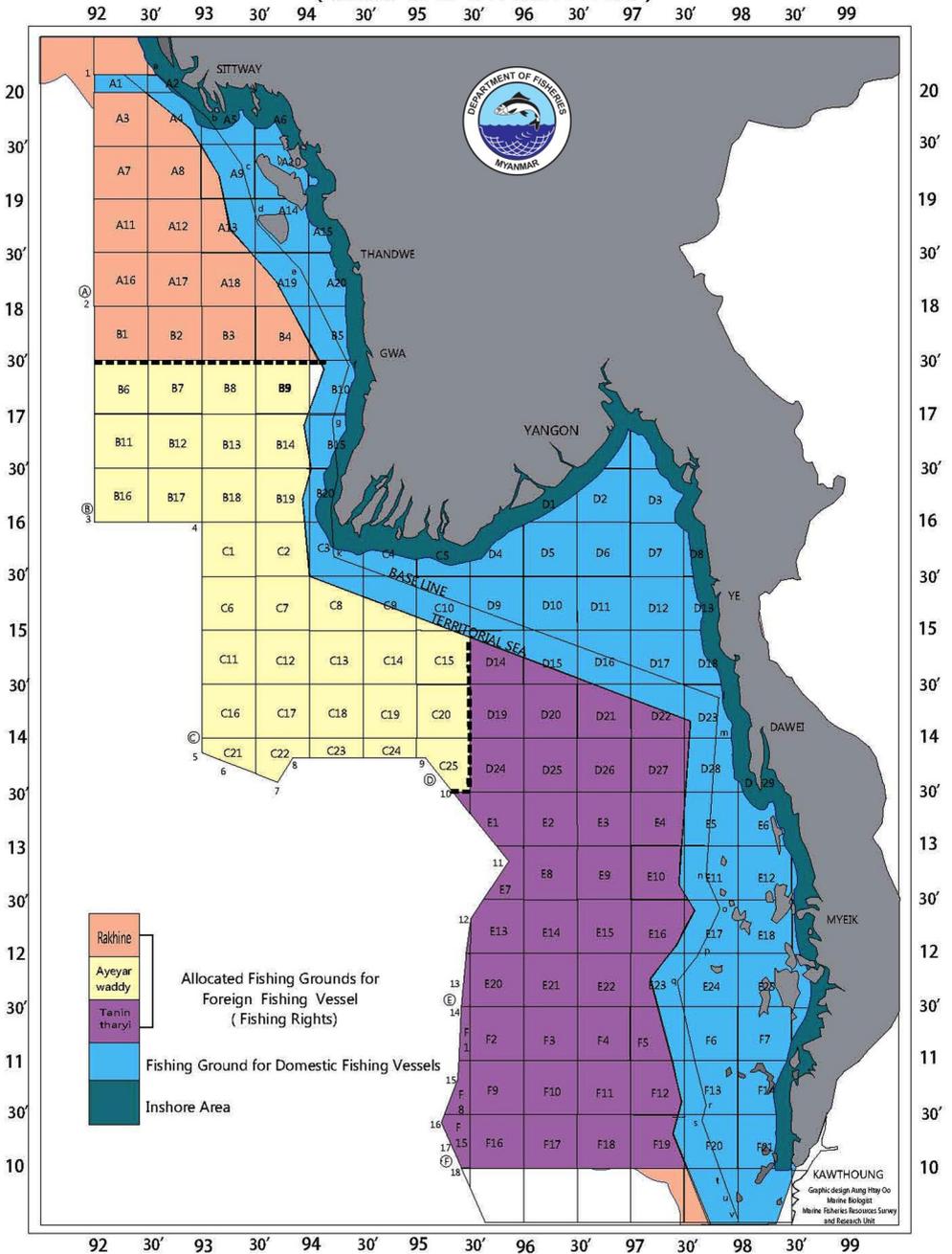


MAPS OF FISHING GROUNDS

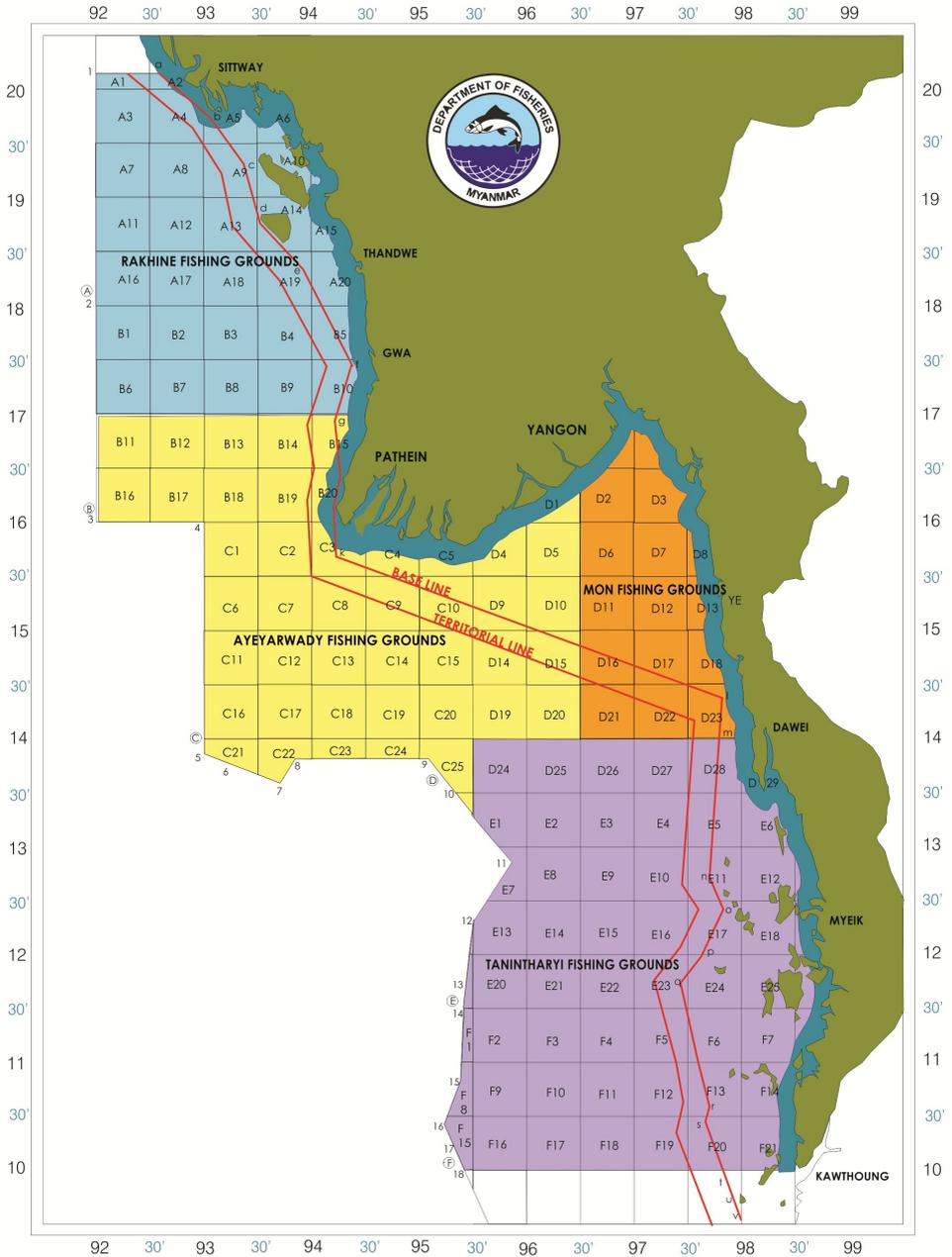


IV

Department of Fisheries Fishing Grounds of Myanmar (State and Division wise)



Department of Fisheries Fishing Grounds of Myanmar



VI

SHARE OF GROSS DOMESTIC PRODUCT CURRENT PRICES

Sectors	2018(April to September) GDP(%)
Agriculture	10.2
Trade	18.4
Processing & Manufacturing	21.0
Livestock & Fishery	10.2
Transportation	13.7
Construction	5.4
Rentals and Others Service	4.3
Social and Administrative Service	4.6
Communications	2.9
Mining	1.4
Forestry	0.1
Energy	5.3
Financial Institutions	0.5
Electric Power	2.0

Source: Planning Department

FISHERY BRIEF IN MYANMAR

Background History of Department of Fisheries

Originally, Department of Fisheries is organized with the objectives of the conservation of fisheries resources, food security of sustainable fish consumption and contribution of aquaculture technology for the people.

As the fisheries project section, Department of Fisheries was established with 6 officers and 70 staffs under Land and Rural Development Cooperation since June, 1954. On the date of 24th March 1961, Department of Fisheries was extended as Fisheries Division under Land and Rural Development Cooperation leading by one director including 9 officers and 183 staffs.

After emerging of new administrative system, Fisheries Division was transformed as Department of Fisheries leading by Director General with 9 officers and 183 staffs since 15th March 1972. In November 1984, temporary task force for the plan of action on revenue of fishing gear licenses was temporarily organized with the number of 216 staffs within 1984-85 fiscal year and 1986-87 fiscal year. Since April, 1985, the total numbers of 89 staffs from aquarium staffs under People's Workforce Rehabilitation Association were transferred to Department of Fisheries under the Ministry of Agriculture and Forestry Affair.

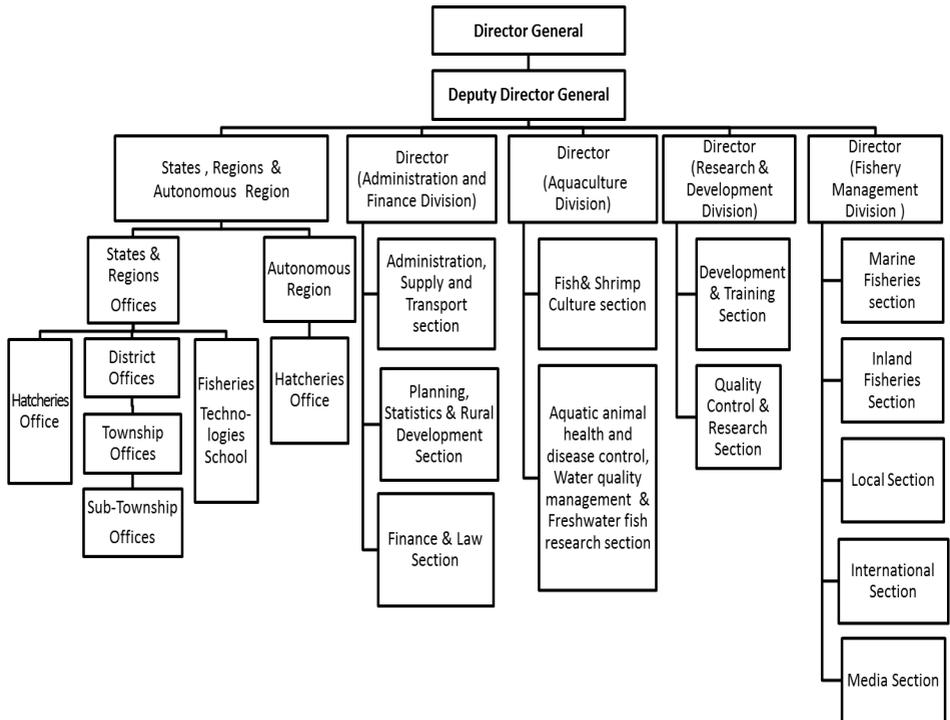
Under the State Law and Restoration Council, the Department of Fisheries was allowed to extend his organization structure with 103 officers and 1251 staffs in line with the increasing duties and responsibilities at 31st January 1990. Since April, 1990, total numbers of 129 employees from resources survey section, aquaculture research and production section and Institute of fishing technology from Myanmar Fisheries Enterprise were transferred to Department of Fisheries under the Ministry of Livestock and Fisheries.

Then, two officers and 82 staffs from Fisheries Institute of Agriculture Industry and Vocational Education Department under Ministry of Education were transferred into the workforces of Department of Fisheries under Ministry of Livestock and Fisheries on 1st January 1997.

The organization structure of the Department of Fisheries was again reorganized with 191 officers and 1638 staffs in April, 2002. In August 2012, the Department of Fisheries was extended with the 196 officers and 1704 staffs introduced with the new organization structure of Nay Pyi Taw Council Area (5 officers and 66 staffs). Since May, 2014, the recent organization structure of the Department of Fisheries was restructured again with 365 officers and 2104 staffs.

ORGANIZATIONAL STRUCTURE OF DEPARTMENT OF FISHERIES, MYANMAR

Officer	Other	Total
365	2104	2469



Vision, Objectives, Policy and Plans

The Vision, Objectives, Policies and Plans are as follows;

Vision

Sustainable development of fisheries sector for security, improvement of the socio-economic of rural people and contribution to the economic development of the nation based on fisheries industry.

Objectives

- a. Promulgation of fisheries laws and implementation of action plans in line with the sustainable development goals.
- b. Availability of qualified information and collection of statistical data related to fisheries sector in line with the standard indicators.
- c. Systematic implementation of fisheries co-management and ecosystem approach to improve the fisheries management.
- d. Development of aquaculture industry by implementation of advanced techniques including Good Aquaculture Practices.
- e. The implementation of research and development, extension and awareness services, and human resources development oriented towards sustainable use of fisheries resources.
- f. The compliance with quality standards of fishery products aligned with the market requirements.

Policy

Ensuring food security, food safety and sustainable development of fisheries sector by conservation of fisheries resources in accordance with the fisheries laws.

Plans

- a. For fisheries development, collaboration with local, international organizations and development partners to implement plans and projects formulated in accordance with the policies.

- b. The compliance of the fisheries laws and rules and regulations amended, updated and aligned with international standards, best practice and provisions.
- c. Processing of fisheries statistical data to meet the requirements of the standard indicators of related Ministries.
- d. Obtaining technical assistance from local and international organizations for the development of a system for data collection, analysis and information dissemination system for fisheries management.
- e. The establishment of accurate operational frame work for systematic improvement and implementation of fisheries co-management and ecosystem approach to fisheries management.
- f. Implementation of the fisheries co-management and ecosystem approach to fisheries management, by promoting community fisheries organizations and their fisheries co-management committees, capacity building, gender promotion (women empowerment) and provision of technical assistance to fisheries sector.
- g. Implementation of National Plan of Action Combating Illegal, Unreported and Unregulated (IUU) Fishing.
- h. Promoting collaboration with related Ministries, Local, Regional and International Organizations for the implementation of the International, and Regional provisions, ASEAN declarations and commitments.
- i. Promotion of conservation areas for marine and freshwater resources in critically important habitats.
- j. Promotion of community fisheries organizations for improved fisheries resource management and rural development.
- k. Allowing import of high quality fish/ shrimp seeds and brood-stock and producing genetically improved fish species.
- l. Conservation of indigenous fish species and conducting research in breeding and culture of those species.
- m. Cooperation with public, private and local/ international organizations for the promotion of sustainable fresh water and marine aquaculture industries.
- n. Adoption of climate-smart fish species and their related breeding and culture techniques.

- o. Cooperation with regional and international organizations for preventing and controlling of fish and shrimp diseases.
- p. Encouraging the production and extensive application of qualified compound feed in aquaculture sub-sector.
- q. Strengthening human resources development, by enhancement of fisheries related technical and vocational training (T-Vet), pre-employment training (PET), and on job training (OJT).
- r. Conducting routine research on marine and freshwater habitats for fish species identification and stock assessment.
- s. Enhancing research activities in support of fisheries management and development.
- t. Conducting research in conservation and protection of enlisted endangered aquatic species and their habitats.
- u. Strengthening development and research by promoting cooperation with international and regional scientific and best practice organizations.
- v. Facilitating export of fishery products in accordance with the regional and international market requirements, and in compliance with Sanitary and Phyto-Sanitary (SPS) agreements and standards of the World Trade Organization.
- w. Monitoring and controlling the production and processing of fishery products in line with the food safety standards of importing countries, and as documented in the official control manual of Department of Fisheries.
- x. Providing technical assistance to Small and Medium Enterprises for the improvement of quantity and quality of fishery products.
- y. Ensuring maintenance and enhancement of the capacities of Laboratories recognized by international ISO: 17025 certification for control and inspection of quality fishery products.

Fisheries in Myanmar

Type of Fisheries in Myanmar

Fisheries sector classified into three categories, there are namely fresh water inland fisheries, marine fisheries and aquaculture. Inland fisheries consist of leasable fisheries and open fisheries. Leasable fisheries are prominent and mainly produce the freshwater fish. Leasable fisheries can be conducted for the management of indigenous fish and fisheries habitat conservation, capture based system for sustainable fish production. Open fisheries can be permitted for small scale and subsistence fisher only.

Marine fisheries include in-shore fisheries and off-shore fisheries. In the in-shore fisheries, the fishing boats operate within from shoreline to (10) nautical miles .In this area, the fishing boat which is built by traditional type with not more than 30 feet long or using less than a 25 HP engine power, operates for fishing. The fishing gears for using are driftnet, gillnet and long line. In offshore fisheries, the offshore fishing vessels operate beyond from outer limit of the inshore fishing zone to the Exclusive Economic Zone (EEZ). The fishing vessels are more than 30 feet long or using more than 25 HP engine operating in off-shore area. In this area, the commercial fishing gears are trawl net, purse seine, and long line.

There are two major aquaculture systems practiced in Myanmar i. e freshwater pond and brackish water pond culture. Aquaculture especially freshwater fin-fish farming is mainly conducted with pond based culture system. In addition to pond based aquaculture, soft-shelled crab and seaweed farming operated coastal areas. There are over 27 government hatcheries managed by the Department of Fisheries and over 70 private hatcheries producing fish and shrimp/prawn post larvae operating in Myanmar. Marine cage fish farming initiate in Tanintharyi Division support by Norway Development Group.

Management of Fisheries

Department of Fisheries (DoF) is responsible for the management of fisheries, conservation of fishery resources, providing extension services, conduct research, compilation of fishery statistics and to upgrade the socio-economic status of fishery communities by Department itself as well as through collaboration/ corporation arrangement with fishery related agency/organization both

local and abroad in order to meet with sustainable fishery development in the country.

Legal Affairs

There are four relevant fisheries laws promulgated by the Government of Myanmar to manage the fishery industry and to protect the fishery resources more efficiently.

No.	Year enacted	Name of Fisheries Laws
1	1989	Law relating to the fishing rights of foreign fishing vessels
2	1989	Aquaculture Law
3	1990	Myanmar Marine Fisheries Law
4	1991	Freshwater Fisheries Law

After enacted these four fisheries laws, the Government of Myanmar promulgated the two amending laws. These are as follows:-

No.	Year enacted	Name of Amending Laws
1.	1993	Law amending the Myanmar Marine Fisheries Law
2.	1993	Law amending the law relating to the fishing rights of foreign fishing vessels



Among four existing fishery laws, have empowered Freshwater Fishery Law to respective regions and states authorities and combined Law Relating to the Fishing Rights of Foreign Fishing Vessels and Myanmar Marine Fishery Law and amending to Union Fishery Law (Draft). Also, amending draft of Aquaculture Law for modernization.

The last situation of Marine Fisheries law (bill), Myanmar Fisheries Federation (MFF), fisheries experts and other experts sent the suggestion about the Myanmar marine fisheries law (bill) to the Amyotha Hluttaw's law draft committee and then Amyotha Hluttaw's law draft committee has been discussed Myanmar marine fisheries law (bill). And also Aquaculture law (bill), Amyotha Hluttaw's law draft committee prepared on the Aquaculture law (bill) and changed the name of Aquaculture law (bill) as Aquaculture development law (bill) and then sent to the Pyi thu Hluttaw.

FISHERIES MANAGEMENT DIVISION

Department of fisheries is responsible for the development of fisheries sectors including the conservation and rehabilitation of fisheries resources, promotion of fisheries resources survey, collection of fisheries statistics and information, supervision of fisheries sectors. Taking into account for these responsibilities, Fisheries Management Division has been conducted marine fisheries management plans for sustainable utilization of marine fisheries resources.

Conservation of Marine Fisheries Resources

Department of Fisheries had been conducted the closed season and closed area for marine capture fisheries imposed annually to protect the spawning season of marine fish species spawned during these periods. In order to agree and impose close season, Department of Fisheries, Myanmar fisheries federation, member of Parliament and other relevant stakeholders were participated and inclusive workshop that conducted in March 2018. The workshop had been agreed on to impose a closed season from 1st June to 31st August during 2018-2019 fishing season.

Prevent, deter and eliminate of IUU Fishing in Myanmar

Department of Fisheries collaborates with International and Regional organizations to manage the marine capture fisheries by applying the international law and existing Myanmar Marine Fisheries Law.

The council of European Union established the regulations 1005/2008 and 1010/ 2009 a community system to prevent, deter and eliminate the IUU fishing. The European Commission started the program for catch certification scheme to export the fisheries products in 1-1-2010 and Myanmar included in the list of flag state notification since 31-3-2010. Follow by the EU regulations 1005/2008 and



1010/ 2009, Department of fisheries had been implemented the catch certification scheme for combating IUU fishing in line with EU regulations assisted by EU consultant. Therefore Myanmar initiated to issue the catch certificate in May 2010. In total, 7244 catch certificate had been issued by Department of Fisheries to export 16 nations.



Since 2018, ASEAN Catch Documentation Scheme, eACDS pilot program has been progressed in two landing sites in 2018 at Yangon. Ei Phyo Yadana Landing site and Ngwe Pinle Landing Site. DoF, Myanmar has been trying to establish the electronic reporting system linked with Fisheries Information System (FIS) and Vessels Monitoring System (VMS). The SEAFDEC eACDS team has been visited to Myanmar three times during 2018 and 2019 to collect necessary information and analyze. Myanmar supports to promote application of eACDS to combat IUU fishing and enhance intra-regional and international trade in fish and fishery product. In addition, it will develop the information sharing within the regional as well as international for combating IUU fishing and illegal trade.

Implementation of Vessels Monitoring System in the offshore fishery

VMS implementation plan under the MCS in Myanmar, Department of Fisheries has been established VMS control system in order to sustain marine resources, maintain native species and protect threaten species, comply fishery regulation and take actions on IUU fishing vessels, sustainable fisheries resources, implement fisheries policy and achieve objectives.

On 23rd March 2018, DOF has been conducted VMS implementation plan and notified about directive No.5/2018 regard to install and use of type-approved E-MTU/ Transponder on offshore fishing vessels, carrier vessels in 2018-2019 fishing season. While implementing VMS system, DOF has been conducted all-inclusive conferences in March, 2019 which was concerning to impose closed seasons and closed areas although the major discussing topic was the implementation of VMS in the offshore fishery.

In order to identified technical specification, Fishery consultant company, named MEP has been hired that supported by the Denmark-Myanmar Country Programme, Sustainable Coastal Fisheries Program in order to implement VMS system such as establishing VMS control Centre, inviting to tender for equipment procurement, proceeding VMS Service provider and approving E-MTU/Transponder units, conducting training. Transponder installation process has been started in 1st September 2019 and main VMS control center in Naypyitaw and VMS sub-control center in five Regions and States in coastal area started to surveillance on 1st Jan,2020.

ASEAN Guidelines to Prevent the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain

The ASEAN Member States (AMSs) continued to prevent, deter and eliminate illegal, unreported, and unregulated (IUU) fishing in the region. Apart from MCS, trade-related measures are important to combat IUU fishing. The AMSs need to strengthen measures to exclude IUU fish and fishery products from the supply chain. SEAFDEC/MFRDMD in collaboration with SEAFDEC/Secretariat started the project in 2013 with funding support from Japanese Trust Fund VI (JTF VI) to formulate and to disseminate the “ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain”. Throughout several meetings involving all AMSs, experts from national and regional organizations, the ASEAN Guidelines was developed and finalized in 2014. The Guidelines was endorsed through the ASEAN protocol and finally endorsed up to ministerial level in 2015 at the AMAF meeting. As the ASEAN Guidelines was voluntary in nature, the Guidelines were implemented in AMSs according to the capacity of each AMSs.

After its endorsement, MFRDMD continued to promote the implementation of the ASEAN Guidelines since 2016. The status of implementation of the ASEAN Guidelines in AMSs was assessed based on self-evaluation by each AMS during 2017-2019. An interim report of the feedback and self-evaluation conducted on the implementation of the ASEAN Guidelines was published in the first quarter of 2019 and reported at the 51st Meeting of SEAFDEC Council in Surabaya, Indonesia in March 2019. The 51CM, MFRDMD took note of the advice on the engagement of external evaluators to see the real achievement of the Guidelines implementations in AMS, can be considered depending on availability of fund in the future. Later on, the final result of the status of implementation of the ASEAN Guidelines in all 10

AMS was discussed at the project terminal meeting which was organized from 3-5 September 2019. The self-evaluation scores of each country (% of total score) were as follows: 1) Brunei Darussalam, 84.8%; 2) Cambodia, 86.4%; 3) Indonesia, 97.6 %; 4) Lao PDR, 80%, 5) Malaysia, 98.4%; 6) Myanmar, 94.8 %; 7) Philippines, 99.6 %; 8) Singapore, 84.8%; 9) Thailand, 98%; and 10) Viet Nam, 96.4%. This indicates that all of AMSs have actively implemented national program and activities relevant to the Articles in the ASEAN Guidelines. The comprehensive result of this evaluation is appended as the annex of the final project report which was published in December 2019.

Myanmar cooperated with experts from MFRD-MD in self-evaluation program in 2018. In 2018, Myanmar has just started the initial stage for the establishment of VMS so that the score for the implementation of VMS and improvement of MCS were not much. After establishment of VMS, the score will rise due to implementation of VMS and improvement of MCS. Thailand, Philippine, Indonesia, Malaysia, Vietnam have established the VMS system and they are patrolling and doing fisheries research regularly. This system will promote the prevention of illegal trade of fisheries products and IUU fishing.

To support the implementation of guideline, Myanmar has initiated the eACDs system in two pilot sites namely New Pinle Jetty and Ei Phyo Yadanar Jetty in Yangon. This system will be benefit for the data collecting in landing site, issuance of catch document and catch certificate. Though guide line is the voluntary nature, implementation of this guide-line will be supported the prevention of illegal trade as well as encouragement for the economic growth in each AMS. Therefore, for Myanmar, self-evaluation is useful as standard norm for the implementation of ASEAN Guidelines and it will be conducted annually. Moreover, to be effective of implementation, Myanmar needs to set up the fisheries management plan and annual work plan for sustainable fisheries. Myanmar shall encourage many efforts to be sustainable fisheries and to be in line with international instruments and regional agreements.

SELF EVALUATION ON IMPLEMENTATION THE ASEAN GUIDELINES ON PREVENTING ENTRY OF FISH AND FISHERY PRODUCTS FROM IUU ACTIVITIES INTO THE SUPPLY CHAIN

ASEAN GUIDELINES ACTIONS	Myanmar Score RTC 2017	Score Myanmar	Notes	Remarks
ACTION 1: MANAGING FISHING ACTIVITIES WITHIN AN ASEAN MEMBER STATE (AMS)			0 =Not implemented 1 = 1 - 20 % implemented 2 = 21 - 40 % implemented 3 = 41 - 60 % implemented 4 = 61 - 80 % implemented 5 = 81 - 100 % implemented	
1.1 Controlling Fishing Access				
a. Evaluate existing systems that control fishing access	4	4		Myanmar stop issuing fishing license for new fishing vessels. All fishing and carrier vessels must be registered and all fishing gears must be licensed for small and commercials fishing vessels.
b. Conduct capacity building to share / exchange experience among AMSs for controlling fishing access	5	5		Myanmar have MOU with DOF, Thailand for the fishery cooperation especially for the IUU fishing.
c. Revise policy, fisheries regulation, legal framework and procedures when and where appropriate	4	5		Myanmar willing to revise the policy, fisheries regulation, legal framework and procedures when ever necessary.
d. Request SEAFDEC for capacity building on electronic database system	5	5	5 = request or does not request because has own electronic database system, 0 = did not request but required by the country	Myanmar already requested SEAFDEC
e. Encourage AMS to share their experience to help other member states developing their national electronic database system including for fishing license	5	5	5 = Yes, 0 = No	Myanmar already developed the electronic software for the database but not started yet.

1.2 Promotion of Responsible Fishing Practices / Methods				
a. Promote responsible fishing practices / methods in the region accordance to CCRF	4	5		On-going program
b. Consider developing and implementing NPOA – IUU and NPOA – Capacity	4	4		NPOA-IUU already developed and implemented but for NPOA-Capacity still on-going.
c. Review and strengthen capacity building for MCS	4	4		On-going program
d. Promote awareness program on responsible fishing practices / methods	5	5		On-going program
1.3 States are Encouraged to:				
1.3.1 Update related laws and regulations as well as system of reporting catch and compiling appropriate logbook information				
a. Evaluate and strengthen the regulations on catch declaration	3	4		Will use eACDS in future
b. Develop, implement and improve a systematic catch declaration through logbook / e-logbook	3	4		Will use eACDS in future
1.3.2 Monitor all fishing vessels by maintaining records and their performance with respect to compliance to national laws and regulations				
a. Strengthen fishing vessel inspection and enforcement program	4	5		On-going program
1.3.3 MCS for implementation of VMS				
a. Consider developing the national strategic plan to monitor fishing vessels movement and activities	4	4		On-going program
b. Consider equipping appropriate fishing vessels with suitable fishing vessels monitoring system	2	4		VMS program for foreign fishing vessels since 2012 and for local vessel to start in 2019. On-going PDS (Pelagic Detection System) program for smaller vessels.

c. Request SEAFDEC for advice on the principle of fishing vessel monitoring systems	2	5	5 = request if needed or does not need to request, 0 = did not request but required by the country	Already received the information from DOF Thailand and DANIDA project.
1.3.4 Intensify efforts to address IUU fishing, including destructive fishing and promote co – management approach				
a. Promote co-management approach for fisheries management	5	5		Co-management and MCS project by DANIDA, WCS (Wildlife Conservation Society) and FFI (Flora and Fauna International).
b. Strengthen capability of fisheries enforcement staff and agency to combat IUU fishing	3	4		On-going program by DOF Myanmar
1.4 Intensify Surveillance during Fishing Operations and Port State Control at Designated Landing Ports				
a. Enhance capacity building for MCS	3	4		PSM training under SEAFDEC and FAO.
b. Consider intensifying surveillance during fishing operations by increasing the frequency of inspection at sea	3	4		On-going program by Maritime Police and Navy.
c. Consider implementation of relevant port state measures	4	4		Myanmar already signed for PSMA since 2010
ACTION 2: REGULATING TRANSSHIPMENT AND LANDING OF FISH / CATCH ACROSS BORDERS				
2.1 Establish Formal Arrangements with Respect to Landings between Bordering Countries				
a. Strengthen cooperation and collaboration between bordering countries with respect to landing	5	5	Y=5, N=0	All Myanmar fishing vessels should landed catches at Myanmar port. No foreign fishing vessels were allowed to fish in Myanmar waters. No foreign fishing vessels were allowed to land in Myanmar fishing ports.
b. Request assistance from SEAFDEC to facilitate formal arrangement with respect to landing between bordering countries	5	5	Y=0, N=5	No request

2.2 Regular Bilateral / Multi-lateral Meetings to Agree on Licensing System / Data Recording and to Share Relevant Information and Fishing Vessel Registration Database				
a. Consider active participation in bilateral / multi-lateral meetings with bordering countries in licensing system / data recording and sharing of relevant information	4	5		Myanmar cooperate with SEAFDEC and AMSs in licensing system / data recording
b. Consider sharing relevant information among AMSs especially RFVR program including vessel less than 24 meters in length	5	5		Myanmar cooperate with SEAFDEC and AMSs in RFVR program
2.3 Port States Should Strengthen Measures to Regulate Fishing Vessels Accessing their Ports for Trans-shipment and/or Landing Catch and Collect and Exchange Relevant Information including Origin of Catch, among Neighboring Countries				
a. Consider developing and implementing an appropriate regional catch documentation scheme (ACDS) including an electronic system	3	5		On-going program
b. Enhance capacity building on port state measures and catch documentation scheme	4	4		On-going program
c. Consider formulating SOP / manual for better understanding and implementation of FSM, PSM and CSM	4	4		On-going program
d. Consider strengthening effective monitoring at landing sites including preventing entry of fish and fishery product from IUU fishing	4	5		On-going program
ACTION 3: PREVENTING POACHING IN THE EEZS OF ASEAN MEMBER STATES				

3.1 Actions against Fishing Vessels Operating Illegally beyond their Designated Areas, for Example by Using Some System of Vessel Monitoring System (VMS), Implementation and Strengthening of Flag States Measures, Port State Measures and Coastal State Measures				
a. Encourage cooperation with other AMSs on VMS data sharing upon request	5	5		On-going program
b. Strengthen inspection and surveillance against fishing vessels operating illegally beyond their designated areas	5	5		On-going program
c. Enhance cooperation among national management and enforcement agencies	5	5		On-going program
3.2 Cooperate in Compiling a Black List of Illegal Vessels Operating beyond their Respective EEZs and Sharing the Black List among AMSs				
a. Share information among AMSs on the black listed vessels engaged in IUU fishing	5	5		On-going program
3.3 Regular Update of Information for the Regional Fishing Vessels Record (RFVR)				
a. Share and update regularly information for fishing vessels 24 meters in length and over to the Regional Fishing Vessels Record (RFVR) Database System	5	5		On-going program
b. Request SEAFDEC to consider developing the RFVR Database System for fishing vessels less than 24 meters in length	5	5	Y=5, N=0	On-going program
3.4 Establish Bilateral / Multilateral Agreements for Permission to Fish in Each Other's Fishing Areas				

a. Consider establishing bilateral / multilateral agreements for permission to fish in AMSs waters	0	5	Y=0, N=5	Not considering to do so
ACTION 4: CONTROLLING ILLEGAL FISHING AND TRADING PRACTICES OF LIVE REEF FOOD FISH (LRFF), REEF-BASED ORNAMENTALS AND ENDANGERED AQUATIC SPECIES				
4.1 Conduct Regular Inter- and Intra- Meetings among Relevant Authorities (including Customs Departments) and Exporting Companies for Agreements on Harvesting Practices and Data Reporting of Live Reef Food Fish, Reef-based Ornamentals, and Endangered Aquatic Species				
a. Strengthen collaboration among relevant agencies and stakeholders including exporting company for agreements on harvesting practices and data reporting of live reef food fish, reef-based ornamentals, and endangered aquatic species.	5	5		On-going program
4.2 Appropriate Mechanisms for the Monitoring and Data Collection of Live Reef Food Fish and Reef-based Ornamentals Trades				
a. Apply co-management mechanisms for collecting information on live reef food fish and reef-based ornamentals trades	3	4		On-going program
b. Strengthen data collection and analysis of live reef food fish and reef-based ornamentals trades	3	4		On-going program
4.3 State Should Ensure that Export of Endangered Aquatic Species is Avoided, Except for Research and Experimental Purposes for which such Export Should be Accompanied by Appropriate Documents				

a. Strengthen regular monitoring and surveillance on the export of endangered aquatic species	5	5		On-going program
b. Encourage AMSs to review existing regulation to comply with CITES and strengthen awareness building program for stakeholders	5	5		On-going program
c. Enhance collaboration among relevant agencies monitoring and surveillance on the export of endangered aquatic species	5	5		On-going program
4.4 Encourage Participation of Small- scale / Artisanal Fishers, who Account for Majority of LRFF Production, in Co-management and to Enhance their Awareness of the Impacts of IUU Fishing and Trading of Such Aquatic Species				
a. Encourage development of co-management program for participation of small – scale or artisanal fishers in LRFF production	5	5		On-going program
b. Create, promote and implement the awareness program on the impact of IUU fishing and trading of such aquatic species	5	5		On-going program
4.5 Should Consider Establishing a Network between the LRFF Importing and Exporting Countries, also to Strengthen LRFF Management at the Regional Level				
a. Request SEAFDEC to expedite establishment of the regional LRFF network	5	5	Y=5, N=0	Agreed during the RTC on ASEAN Guidelines
b. Encourage AMSs to join and actively participate in the regional LRFF network once it has been established	5	5	Y=5, N=0	Agreed during the RTC on ASEAN Guidelines
ACTION 5: STRENGTHENING THE MANAGEMENT OF FISHING IN THE HIGH SEAS AND RFMO AREAS				

5.1 Strengthening Port State Measures				
a. Request capacity building for better understanding and implementation of PSM for relevant AMS officials	5	5	Y=5, N=0	Two Myanmar participants attended the PSM training conducted by SEAFDEC.
5.2 Implement, where Appropriate, Observer Programs in Accordance with Relevant National, Regional or International Regulations with Respect to High Seas Fisheries				
a. Encourage AMSs to develop and implement observer programs in accordance with relevant national, regional or international regulations with respect to high seas fisheries	5	5	Y=5, N=0	At present, Myanmar not a member of any RFMO organisations. For future, Myanmar willing to develop the observer program in collaboration with other AMSs.
b. Enhance capacity building for implementation of observer programs	5	5	Y=5, N=0	At present, Myanmar not a member of any RFMO organisations. For future, Myanmar willing to develop the observer program in collaboration with other AMSs.
5.3 Cooperate with the Relevant RFMOs in Complying with their Catch Documentation Schemes to Prevent the Landing of Fish and Fishery Products from IUU Fishing in the RFMO Areas				
a. Encourage AMSs to cooperate with the relevant RFMOs in complying with the RFMOs Catch Documentation Schemes	5	5	Y=5, N=0	At present, Myanmar not a member of any RFMO organisations. In the future, Myanmar consider to fish in the RFMO areas.
b. Explore the possibility of harmonizing the Catch Documentation Schemes	5	5	Y=5, N=0	At present, Myanmar not a member of any RFMO organisations. In the future, Myanmar consider to fish in the RFMO areas.

Aquaculture Division

Aquaculture is important for contribution to food and nutrition security in Myanmar. Myanmar depends heavily on the aquaculture sub-sector, as a critical contributor to national and regional social and economic development with contributions to the rural economy and foreign income.

The structure of Aquaculture Division comprises with Fish and Shrimp Culture Section, Aquatic Animal Health and Disease Control Section, Freshwater Fish Research Section and Crocodile Farm. The main responsibilities of Aquaculture Division are:-

- ⇒ to produce good quality fish and prawn/shrimp seeds for fish farmers,
- ⇒ to ensure replenishment of fish and prawn seeds into the natural water bodies such as rivers and lakes and men-made water bodies such as reservoirs and dams for enrichment of fisheries resources,
- ⇒ to conduct researches of potential marine and fresh-water aquatic species for aquaculture development,
- ⇒ to contribute and transfer of basic and applicable aquaculture technology to fish farmers and
- ⇒ to conduct environment-friendly and sustainable aquaculture methods such as Good Aquaculture Practices (GAqP)

Duty and function of Aquaculture Division

- a. Producing of good quality fish and shrimp seeds by DoF fisheries stations,
- b. To ensure conservation of fisheries or aquatic resources not to be depleted by the releasing of hatchery produced fish and shrimp seeds to natural water body,
- c. Formal services of analyzing water and soil quality for fish pond management and of diagnose the fish and shrimp diseases, giving guidance of fish disease control and prevention for fish farmers,
- d. Monitoring, control and given good management and regulation on aquaculture industry,
- e. Strengthening good management for the development of environment-friendly aquaculture system and the encourage of cultured based capture fisheries to increase of fish production,
- f. Issuing the amendments of aquaculture laws, legislation and regulation as the requirements of current situation,
- g. Supervision of expertise for the establishment of short-term and/or long-term aquaculture development programs,
- h. Data collecting, recording and analyzing on aquaculture areas and fish and shrimp seeds production from DoF fisheries stations,
- i. Applying the international and ASEAN guidelines (Good Aquaculture

Practices-GAqP) of sustainable aquaculture development compliance with Myanmar weather and environmental conditions,

- j. Support to conduct trainings of basic fish farming and fish breeding technology for local fish farmers and capacity building of skillful technology and techniques of aquaculture systems,
- k. Seeking the improved technologies of aquaculture and providing extension and training for sustainable development and expanding of aquaculture industry as a whole,
- l. Implementing and managing to be able to fully imposing of revenue for aquaculture registration,
- m. Regularly observing the aquaculture industry development as a whole and recording and reporting the extraordinary phenomenon of climate change impacts on aquaculture industry and emerging fish diseases to prevent and adapt from these impacts.

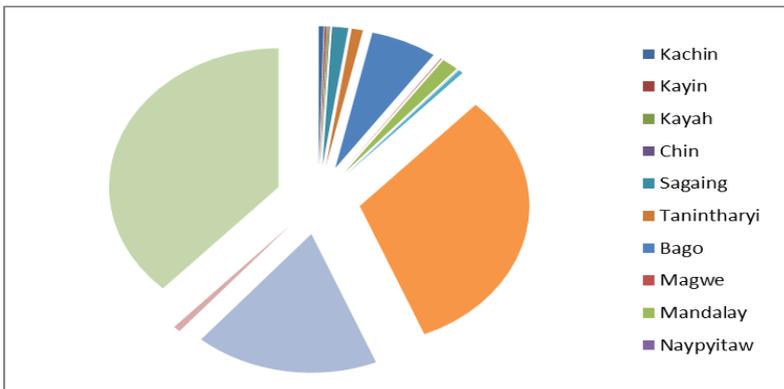
Freshwater Aquaculture

First attempts of fish culture were made in 1954 with the exotic species like common carp, tilapia and gouramy. Myanmar has high quality fishes like major carps such as rohu (*Labeo rohita*), catla (*Catla catla*), mrigal (*Cirrhinus mrigala*), butter fish (*Silondia spp*) etc, but biotechnology was not well established among the local farmers. Later, in 1968, induced breeding of indigenous major carps was successfully conducted. Currently over 20 species of freshwater fishes including common carp, Indian major carps, Chinese carps, Tilapia, Pangasius and walking catfish and Pacu are being cultured. Rohu (*Labeo rohita*) withstands as the most common and commercial cultured species which is native to Myanmar. Actually the collection of fry and fingerlings has not been permitted so as to conserve and enhance the natural fish stocks. This is as a measure to follow-up of the law relating to aquaculture that was promulgated in 1990. However in order to develop aquaculture particularly in production and productivity of quality fish seeds, hatchery concerned farmers are allowed to collect the fry and fingerlings prior to permission of DoF. As a result, rohu aquaculture industry becomes more developed and promising. In order to promote and distribute the quality fish seed, DoF has tried to upgrade the broodstocks quality by proper management through its 27 fishery stations that are conducting seed production and providing technical assistance to farmers.

The potential important freshwater fishes such as *Heteropneustes fossilis* (Catfish),

Ompok bimaculatus (Sheat fish), *Notopterus chitala* (Spotted feather back), *Cyprinus intha* (Nga phane), *Trichogaster pectoralis* (Snake skin gouramy), *Pangasius bacourti* (Basa catfish), *Prochilodus lineatus* (Taung paw nga tha lott), *Leptobarbus hoevenii* (Sultan fish), *Anabas testudineus* (Climbing perch) were successfully induced breeding by experimental scale.

In Myanmar, aquaculture areas have been increased from 30282 acres in 1990-1991 to 174293 acres in 2000-2001 and then to 448608 acre in 2010-2011 and 494353 acre in 2018-2019. Aquaculture production has also been increased steadily from 6397 MT in 1990-1991 to 128225 MT in 2000-2001 and 1121350 MT in 2018-2019 annually.



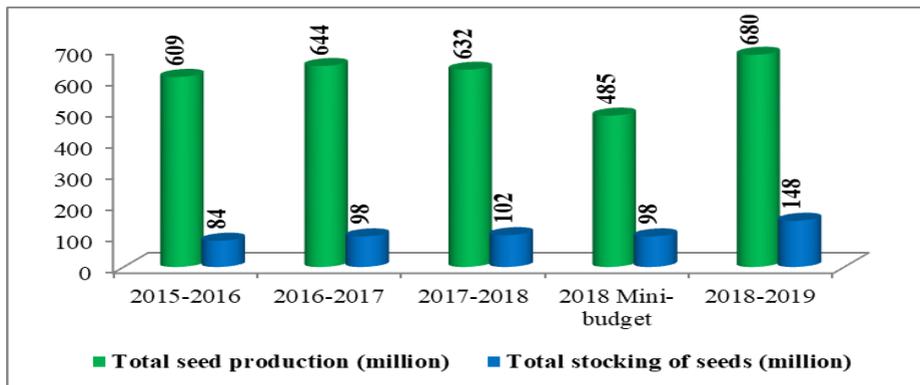
Aquaculture pond area in acre

Workforce

In the field of aquaculture, a total of 49230 fish and shrimp farmers were involved in various aquaculture systems. Due to Myanmar's aquaculture is mainly based on pond cultured system, mostly men labours are working in fish/shrimp ponds. There are 59518 numbers of permanent men labours working in 2018-2019 fiscal year.

Fish Fry and Fingerling Production

At present 27 freshwater fishery stations under Department of Fisheries are established in all strategic areas, and conduct seed production and research works in order to enhance aquaculture industry. In 2018-2019 Department' 25 hatcheries produced 680.032 million freshwater fish fry and fingerling whereas 13 private hatcheries around Myanmar had produced an impressive amount of 981.42 million fry and fingerling.



The Department of Fisheries has made a resource management strategy that is to conduct stock enhancement in the natural water body including men-made reservoirs. Thus the quality fish species may establish in these waters and may assist in the food security and improvement of livelihood of people in the rural areas. Data on production and stocking of fish/shrimp seeds from 2006-2007 to 2018-2019 appears as a graph there under.

At the same time in order to increase fish production and supplementary income, Department also initiated the paddy cum fish farming in appropriate regions through demonstration 14391 acres of paddy field in States and Regions were stocked with fish seed in 2018-2019.



Freshwater Prawn Culture

The most common and prioritized species is commercially important giant freshwater prawn, *Macrobrachium rosenbergii*. Monoculture of *M. rosenbergii* was conducted on semi-intensive level by a few farmers and productivity was better than polyculture system. Due to constraints of the availability of sufficient amount of fresh water prawn at local area, technical expertise of monoculture system, most of the prawn farmers are practiced the polyculture system stocked with fresh water prawn and

fish to minimize the operational cost. There was total area of 8863.61 hectares of prawn and fish polyculture farms in the whole country. Only few areas of prawn monoculture farms are registered. The hatchery operation and culture technique become well established in government and private sector. Recent year, many fish farmer's benefits from poly-culture of freshwater prawn and major carps due to reasonable price of freshwater prawn. Therefore, freshwater prawn seeds requirement is increasing in recent years. Many backyard hatcheries for freshwater prawn are being set up to fill up the gap of high demand freshwater prawn seeds but last year, most of the freshwater prawn hatcheries were encountered the low survival rate due to disease infection from the brood stock.

Shrimp Culture

Penaeus monodon has been initiated since early 1980 practicing trap and hold method particularly in western coastal area. Natural post-larvae of *Penaeus monodon* were trapped into the pond during the high tide period through sluice gates. There were no inputs in terms of pond preparation, eradication of predators, water fertilization, feeding etc. However 70 to 123 kilograms of large size of shrimp per hectare of culture area were harvested. As the ponds were usually as large as 50 to 100 hectares, the shrimp production could make more than enough money for the shrimp farmers. Having no laws concerned with aquaculture, those shrimp ponds existed as illegal ponds up to 1990. In the year 2000, the Ministry of Livestock and Fisheries reinforced and encouraged many potential investors to be involved in the shrimp aquaculture development. At the same time, the Union of Myanmar formed a State Level Committee to promote a drastic development of shrimp aquaculture industry by formulating first three-year plan from 2000 to 2003 and second plan from 2003 to 2005. Since 2000, a number of semi-intensive and intensive shrimp farming emerged. Up to 2002, there was founded success and failure in semi-intensive and intensive shrimp culture. In the year 2002, a pilot demonstration on Mangrove Friendly Shrimp Culture was conducted as a measure of verification of semi-intensive shrimp culture technique through collaboration of Myanmar DoF and SEAFDEC-AQD. Demonstration pond with 1.4 ha and 0.72 totaling 2.12 ha could produce 11.1 metric ton of shrimp with average size of 50 pcs / kg. At the same time, private shrimp farms nearby the demonstration pond suffered failure due to severe occurrence of white spot disease. The private farmers were invited and disseminated the comprehensive technology. But they were not so much interested in mangrove friendly aquaculture-MFA technology. Similar demonstration was repeated in 2005 and also gained the success. A few private shrimp farms applied the MFA technology with success but later due to market and shrimp price constraints shrimp farming has been done only by a few farmers.

As of 2018-2019 Myanmar have three types of shrimp farming: Semi-intensive

shrimp ponds 6429.85 acre, extensive plus shrimp ponds 65805.77 acre and extensive or traditional shrimp ponds 172202.44 acre totaling 244438.06 acre. The total production of fresh water prawn and marine shrimp in 2018-2019 were 38223.88 MT. Recently, the Department of Fisheries encouraged to development of fish and shrimp culture in every states and regions for self-sufficient of local consumption and increasing for export market.

Status of Shrimp Hatcheries

In the year 2000, total numbers of shrimp hatcheries amounted to 13 only and in 2003 altogether 26 shrimp hatcheries (include in Backyard Hatcheries) were fully operating with capacity of 190 million shrimp post-larvae. Hatchery system is mainly based on clear water system. The breeders are available from Bay of Bengal and Andaman Sea. It is well famous that the brood stocks from Andaman Sea are supreme in terms of quality and size. However, recent years, many hatcheries including private and public are facing the difficulties of the availability of the sufficient amount of shrimp brood stocks when required. Therefore, local shrimp hatcheries could not produce sufficient amount of shrimp seeds for local demand and shrimp post larva had to import from neighboring countries such as Thailand and Bangladesh. Import numbers of shrimp larva from Bangladesh was not yet available. In 2018-2019, giant freshwater prawn, tiger shrimp and white shrimp larva were imported in the amount of 138.78million, from Thailand. Thus, brood-stock management for shrimp hatcheries is needed.

White shrimp culture

Penaeus vannamei has the many advantageous factors for culture but it may also cause the negative impact to other shrimp aquaculture industry. DOF has been aware that *P. vannamei* may carry and outbreak the Taura Syndrome Virus (TSV). After a regional workshop in 2005 at Manila, that assessed the culture of *P. vannamei* ASEAN countries agreed to culture at reasonable documentation. At present 3-4 private farms are culturing of experimental scale of *P. vannamei*. Only PCR negative the Pacific



white shrimp SPF *P. vannamei* seeds has been permitted to import for culture in domestic water. In 2018-2019, the total numbers of 100.53 acre shrimp culture is in Tanintharyi Region at Pyay Pho Tun Co. Ltd. Pyay Phyo Tun Co., Ltd initiated the white shrimp farming in 2016 and increasingly invested for more production of white shrimp farming for more production. In 2017-2018, the company produced 1006.19 MT of white shrimp and 1579.80 MT in 2018-2019.



Marine Fin-fish Culture

In terms of marine fin-fish farming, seabass, red snapper and grouper are the most common and commercial species in Myanmar. Stock fish or the fish seed are usually collected from the wild. But the seed production technology of seabass has been succeeding since 2004 in both DoF and private sectors. First the broodstocks were collected from the wild and later induced breed



seabass are used as broodstocks. However the grow-out culture of seabass is done by only a few farmers. It is due to the fact that adequate supply of seabass seeds, trash fish and formulated feed is inconsistent. Induced breeding of Grouper spp., was also conducting at Marine Research Station of DoF, Tanintharyi region by experimental scale but survival rate is very low. Now, upgrade of Marine research station and technologies are

requested for development of marine aquaculture.

Others Mariculture

Others aquatic species such as oyster, clam, seaweed culture are initial stage in Myanmar. The farming of *Eucheuma* Seaweed has been started since 2003 through the collaboration of DoF, a Korean private company. The Korean company brought in the seaweed of *Eucheuma cottonii* and domesticated as the seed stock for other private farmers. Upon the whole, DoF Myanmar is carefully assessing in the promotion of proper new stock strains to produce better quality seed. Recently, Make Smart Company has already constructed a processing plant and storage building. The new endeavor will create employment opportunity for local people and also technology transfer to the local entrepreneurs and communities. The production of dried seaweed in 2018-2019 was 11.422 tons.



Mud crab seed production

Mud crab fattening has become the booming industry as domestic consumption and export demand are growing rapidly. Soft shelled mud crab farming has become

very popular as it commands high price. At the same time, supply of crab juveniles from nature is decreasing due to over exploitation, habitat deterioration caused by man impact and world climate change. Adequate supply of mud crab seed for soft shell mud crab farming has become urgent need and included in the future plan. Myanmar DoF has initiated the mud crab hatchery since 2009. However hatchery operation performs very low survival rate. There needs to do more research and extension work for dissemination of mud crab culture techniques to local small scale farmers and conservation of mud crab resources as setting up the protected area of no crab fishing zone or conservation of mud crab habitats such as mangrove.



Cold Water Species Aquaculture

Some cold water aquatic species naturally exist in the northern most part of the country where temperature is very low. DoF is established a backyard hatchery for breeding of potentially important local indigenous fish species since 2012 and for dissemination of basic fish culture technology to the local ethnic group.

Ornamental fish

The ornamental fish industry is one of the main sectors to generate income through export. The production of ornamental fish was 51000 pieces and US\$ 0.017 million in 2018-2019.

Aquaculture for rural development

Promote aquaculture as an integrated rural development activity within multiple use of land and water resources available through inter-agency coordination in policy formulation, project planning and implementation, stakeholder consultation, extension services and technology transfer. One of the national policy is the poverty alleviation and to carry out rural development through agriculture and other sectors. Actually about 70 percent of the country people are living in country -side and rural areas. JICA incorporated and collaborated with DoF by establishing JICA unit at DoF and started its project plan in 2005. The strategic project plan is firstly conducting on-site training at appropriate areas to the villagers on small-scale aquaculture. Then secondly it implemented demonstration based on self-participatory approach.

Thirdly JICA provides 70 percent of the cost for village level community farming that shared 30 percent. Profit sharing basis is to keep 50 percent for next operation, 20 percent for donation to the nearby school or village clinic and 30 percent is to share for community members. The first phase of JICA project completed in 2013 June. Based on evaluation of effectiveness and capacity needs, JICA was continued projects from 2014 March to 2019 February in Dry Zone Myanmar. JICA will provide one fishery development advisor to advise development of fisheries and aquaculture sector in Myanmar. Moreover, ACIAR, KOICA, EU-GIZ, JIRCAS also supporting and cooperation with DoF for improving research & development of Myanmar's Inland & coastal fisheries.

Fisheries sector of evergreen village development project supported 30 million kyats as revolving fund for each villages of 390 villages where have potential to develop in fisheries sector in 15 Regions and States in this fiscal year from the funding sources of government's capital budget and Department of Fisheries will try the best to achieve the objective of the development of fisheries sector for rural people.

Application of Good Aquaculture Practices (GAQP)

The GAQP is a series of considerations, procedures, and protocols designed to foster efficient and responsible aquaculture production and expansion, and to ensure final product quality, safety, social aspects and environmental sustainability. GAQP is regarded by the FAO as a necessary tool in the overall development of a sustainable aquaculture sector. For Myanmar the introduction of GAQP will lead to a paradigm change from traditional to modern sustainable production.



The DoF is therefore striving to introduce GAQP for the whole aquaculture sector in Myanmar, especially in following up previous work which had concentrated on the food safety component of GAQP.

The Department of Fisheries established as National Task Force for implementation of GAQP application in Myanmar and considered to follow up and practices on ASEAN's Standard on GAQP for shrimp farming in compliance with the current status of shrimp farming practice in Myanmar. Myanmar learns and tries to follow the Strategies Plan on the Development and Implementation of ASEAN shrimp GAQP. Support to GAQP, DoF established the Directives and



Regulation for prohibiting the use of chemical in aquaculture. The Department of Fisheries has issued GAQP certificates on 9254.77 acre for 8 farmers during in 2018-2019. For the trade promotion of the aquaculture products, EU gave the awareness

training of GAqP,(22) times for capacity building of DoF staff and stakeholders (923 numbers) and also (22) times for GAqP awareness to (1595) fish farmers in 2018-2019.

The process of GAqP introduction was prepared through several meetings with government officials and private sector representatives and contains of three closely interlinked steps: First, the drafting of a GAqP official standard, followed by guidelines for farmers to implement this standard and audit guidelines for the competent inspection unit within DoF and secondly, capacity building for DoF officers. The third step is the future establishment of a GAqP demonstration farm in Maubin township, Ta Lote La fishery station. DoF has agreed to renovate and upgrade the existing hatchery and facilities to ensure on-location GAqP capacity building of farmers and other stakeholders.

The National GAqP Standard is a fundamental tool in the intensification of a sustainable aquaculture sector and the setting up of such is a prominent activity in the National Aquaculture Development Plan (NADP) of Myanmar.

Aquaculture support services

Under supervision of aquaculture division, aquatic animal health and disease control section and Freshwater fish research section formed groups of Mobile Team giving on-site support services for fish farmers who want to check their ponds water/soil parameters and health condition of their cultured fish for preventing the fish disease and farm management. In addition, Aquatic animal health and disease control section also provides PCR check on shrimp diseases of shrimp seeds for shrimp farmers. In 2018-2019, Freshwater fish research section gave services of water quality analysis on 379 cases and soil analyses on 2 cases including Twan tay Lab and Mandalay Regional Lab. Aquatic animal health and disease control section provided support services of on-site field analyses on 24 cases, lab disease analysis on 323 cases , PCR check for disease on 235 cases and Health Certificate issued on 3139 cases.

Freshwater Aquaculture Research and Extension Centre

Collaboration between Department of Fisheries, Ministry of Agriculture, Livestock and Irrigation and KOICA had established Freshwater Aquaculture Research and Extension Centre from 2014 to 2018 under the project of “Development of Inland Fish Farming Technology in Myanmar” and the Centre was opened on 19-1-2018. Moreover, it had conducted “Training for Advanced Inland Fish Farming Technology” from 8-1-2018 to 2-2-2018 to conduct training for farmers, to research with Universities by utilization

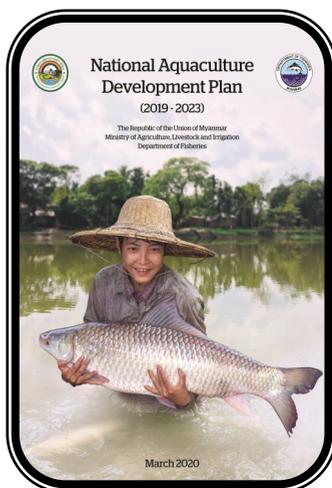


this Centre. By implementing this Freshwater Aquaculture Research and Extension Center, from experience of Korea and Myanmar human resources and technical support, it will improve modern technology in freshwater aquaculture sector and this Centre is the first research Centre in Myanmar. Current activities such as Tilapia YY super male brood stocks production, live food culture such as Rotifer(*Brachionus calyciflorus*), Chlorella, Moina have been conducting in FAREC.



Develop Activities for Aquaculture Sector

Myanmar Sustainable Aquaculture Programme (MYSAP) seeks to support the sustainable intensification of the aquaculture sector, there by realizing its potential for food security, nutrition and livelihoods. The specific objective "Sustainably intensified aquaculture" with 6 results, covering the dimensions of food and nutrition security. Result areas 5 (Nutrition and food security) covers nutritional activities according to MYSAP's overall objective to contribute to improve the nutritional status of children under 5 years and women of reproductive age. This will be achieved by raising awareness for a well-balanced diet and advocating consumption of fish and fishery products. Promotion events have been conducted in Ayeyarwady and Sagaing Regions as well as Shan State.



An Aquatic Education Centre (AEC) was established on the grounds of the DoF hatchery in Nyaung Shwe, utilising a previous building on the hatchery premises. The Centre deals with the conservation of indigenous fish species of the UNESCO Biosphere Reserve Inle Lake, provides a platform for the display of the local culture, traditional fishing methods and, due to its wet lab, functions as a research facility. The AEC with its aquaria displays several Inle Lake species is open for national and international visitors as well as student researchers from national universities. It was inaugurated by DoF and the German Ambassador in November 2019. Seven students from the local Taunggyi University (TU) have conducting their master's thesis at the AEC in 2019-2020. In near future, the AEC will be supportive to small-scale fish farmers at the lake, for monitoring the status of indigenous fish species and for introducing innovative technology at the hatchery. The purpose of the National Aquaculture Development Plan (NADP) is to provide the policy and institutional framework for sustainable development of aquaculture sector in Myanmar

in close alignment with the vision of Myanmar Sustainable Development Plan (MSDP), principles of Agriculture Development Strategy(ADS), strategies of National Export Strategy (NES)and other national frameworks. NADP represents determinations and aspirations of all stakeholders of the sector and the nation as a whole to support the long-term sustainable development goals of Myanmar while the agriculture policy states that, “by 2030, Myanmar achieves inclusive, competitive, food and nutrition secure, climate change resilient, and sustainable agricultural system contributing to the socio-economic well-being of farmers and rural people and further development of the national economy. NADP provides a thoughtful list of actionable priorities to address some of the urgent needs of the aquaculture sector and demonstrates Myanmar’s commitment to attaining aquaculture development in sustainable and inclusive way. This plan is officially launched at 13th March 2020 by inviting multilevel stakeholders and decision makers.

RESEARCH AND DEVELOPMENT DIVISION

Quality Control and Research Section

Department of Fisheries has been implementing to promote exported fishery products to ensure food safety and sustainable development of fishery sectors by conservation of fisheries resources accordance with Vision, Policy and Work Plans of Department of Fisheries based on the fisheries laws. Department of Fisheries has already organized Quality Control and Research Section including Inspection and Certification Unit and Analytical Laboratory Unit under the Research and Development Division.

Inspection and Certification Unit

Department of Fisheries is responsible Government Organization for seafood safety activities to ensure the quality and safety of exported fishery products. Inspection and Certification Unit has responsibility to Monitoring, Controlling and Surveillance activities the production and processing of fishery products in line with the food safety standards of importing countries to ensure the quality and safety of fish and fishery products.

Therefore, Inspection and Certification Unit has formed inspection teams and regularly examined the implementation of food safety management systems of fisheries activities through the supply chain like that fishing vessels, aquaculture farms, landing sites, auction markets, Ice making plants for fishery products, processing establishments due to the official control plan.

Food safety management system such as GMP/HACCP are implemented enforcing by Inspection and Certification Unit, under the Research and Development Division, Department of Fisheries to operate in fishery establishments according to exerting with ASEAN Regional Guidelines, importing countries' requirements and Codex Standards and compliance with Sanitary and Phyto-sanitary (SPS) Agreement of the World Trade Organization too.

The Inspection and Certification Unit issued the factory registration for (123) processing establishments in 2018-2019 fiscal year to monitor and control the procedures of establishments to ensure the food safety requirements and quality assurance. Currently, (27) fishery establishments have approved to export Myanmar Fishery Products to EU member countries, (33) fishery establishments have registered to export fishery products to Vietnam after verifying the product flow, food safety hazard control system by the National Agro – Forestry Fisheries Quality

Assurance Department (NAFIQAD),(6) fishmeal plants and (94) processing establishments including dried fishery product warehouses and chilled product stations have been registered export to China.

Myanmar has approved to export frozen wild caught fishery products to EU member countries from approved establishments Quality Control and Research Section, Inspection and Certification Unit has been implementing the National Residue Monitoring Plan since 2014-2015 fiscal year and submitting the future plan and progress report to Directorate- General for Health and Food Safety (DG SANTE) before 31st March annually. National Residue Monitoring Plan (2018-2019) and progress report for (2019-2020) have been submitted to DG SANTE. Currently, aquaculture fishery products such Rohu, Mrigal, Pangash, Katla, Tilapia, Puti, Carfu, Black Tiger Shrimp, Vannamei Shrimp, Soft Shell Crabs from aquaculture farms participated in National Residue Monitoring Plan have approved to export to EU member countries.

Department of Fisheries has issued the “Technical Regulation for Export and Import of Fishery Products” based on the WTO-SPS Agreement after updating by the assistance of EU as per Directive 8/2018. Operators shall comply with the Directive – 8/2018 in fishery activities through the supply chain like that Aquaculture farms, fishing vessels, landing sites, auction markets, feed plants, ice making plants for fishery products and processing establishments.

Quality Control and Research Section, Research and Development Division has been introduced the Information Management System in order to monitoring data for National Residue Monitoring Plan, Inspection Report and Pre-export Verification since 2016. In-addition, QCRS website was launched and developed in 2018. The Information Management System and QCRS website were supported by EU-GIZ under the Trade Development Program.

ASEAN Rapid Alert System on Food and Feed (RASFF) is ongoing network for notification of direct or indirect risks to human health deriving from foods and feeds between Competent Authorities. Department of Fisheries has participated in Pilot Rapid Alert System for Food and Feed since 2007 and participated with regional activities. National Contact Point Meeting and Steering Committee Meeting have celebrated annually by rotate system between ASEAN member countries as per Alphabet of countries .Myanmar is going to prepare to celebrate National Contact Point Meeting and Steering Committee Meeting as host country.

As Myanmar is one of the member countries of ASEAN, Inspection and Certification Unit has implemented the ASEAN Regional Guidelines such as implementation of

the ASEAN Common Principle and Requirement for Food Hygiene, Implementation of the ASEAN Common Principle and Requirements for the labeling for pre-package food and Implementation of the ASEAN Common Principle for food systems in establishments, Guideline on Good Aquaculture Practices for shrimp farms and fish farms, Guideline for ASEAN Audit and Certification of food hygiene, Guideline for the use of Chemical in Aquaculture and measure to eliminate of use of Harmful Chemical, Regional guideline on Traceability System for Aquaculture Products in South East Asia.

Otherwise, according to ASEAN Economic Blue Print, Inspection and Certification Unit has been implementing food safety issues related priority 25 integrated sectors to harmonies in trading between ASEAN countries, Inspection and Certification Unit has been implementing the minimum requirement for seafood trade in ASEAN particularly the farming system requirement for seafood trade in ASEAN particularly the farming system requirements, product standards, laboratory accreditation and health certification requirements.

Activities of Analytical Laboratory Unit

Continuously Maintain the Accredited Laboratory Comply with ISO 17025:2005 (2018-2020)

The Laboratory, Analytical Laboratory Section of Quality Control and Research Section, Research and Development Division of Department of Fisheries (Yangon, Myanmar) Accreditation No. 1225/55 has been continuously maintain of accreditation Code HP 255/54 in accordance with ISO/IEC 17025:2005. Accreditation were 16 parameters of Microbiological Test (APC, Coliform, *E.coli*, *Salmonella*, *Staph.aureus*, *Vibrio cholerae* and *Listeria monocytogenes*) and Chemical Test (Nitrofurantoin (AHD, AOZ, AMOZ, SEM) Chloramphenicol ,Tetracycline) and Heavy Metal (Cadmium, Lead and Mercury). Now, Laboratory prepare to reassessment for ISO/IEC 17025:2017 (New Version) (2020-2022) and the current certification valid has been September 2020.

Participation the Proficiency Test (PT) Programme

Laboratory had participated the Proficiency Test once a year for all accredited parameter. In detail, Microbiological testing include TPC, Coliform, *E.coli*, *Salmonella*, *Staph.aureus* , *Vibrio cholera* and *Listeria monocytogen*) spp; in Fish and Milk

Powder dated on (May 2019 to November 2019) , Heavy Metal Testing dated on (5.5.2019) were participated PT from Central lab (Thailand). Chemical Testing included Nitrofurantoin Testing dated on (14-10-2019) with FAPAS (UK) and Chloramphenicol Testing dated on (21.2.2019) with Central lab (Thailand) in detection of Shrimp.

Calibration Certificate for Measuring Equipment and Devices

For 2019-2020 program of calibration by ISO17025:2005 accredited laboratory's maintenance was prepared and calibrated at year 2020 with calibration provider, Central Laboratory (CLT) from Thailand. All measuring equipment and instruments are 66 items.

Preventive Maintenance

The laboratory had contracted every year for Regular Preventive Maintenance (RPM) between DoF and Sciex(Thailand) Co., Ltd from Thailand and AMTT Co., Ltd from Myanmar for LC/MS/MS of 2019 program for one times .

Preventive Maintenance of Non calibrated Equipment /Instrument items (39) for Microbiological Lab's equipment and remaining chemical equipments as HPLC and GC/MS/MS also finished preventive maintenance by AMTT Co., Ltd from Myanmar dated on August 2019.

Action Plan for Future

- National Residue Monitoring Program(NRMP)
 - ◆ Analytical laboratory have still implement to National Residues Monitoring Program and already done for Progress report(2018-2019) and Annual plan(2019-2020) submit to EU, DG-SANTE.
 - ◆ In addition , Analytical Laboratory send to Central Laboratory (Thailand, Songkhla Branch) for other chemical testing .
 - ◆ 170 sample (165 samples to Central Lab (Thailand) & 5 samples to Euro fin lab (Germany) will send to analyze for NRMP testing of 2019-2020.
- Accreditation status of ISO/IEC 17025:2017 (New Version)
 - ◆ In April 2020, analytical laboratory have to assessment the ISO/IEC 17025:2017 (New Version) for 2020-2022 of accreditation.
- Monthly surveillance program for processing plant in Yangon Region.
- Regular Preventive Maintenance (RPM) of GC/MS/MS Maintenance between DoF and Sciex(Thailand)Co.,Ltd from Thailand and AMTT Co., Ltd from Myanmar.
- In 2020, analytical lab have to construct the new microbiological lab building (2019-2020 Budget).

Environment and Endangered Species Conservation

Sea Turtle Conservation and Management

The department of fisheries has established Sea Turtle Conservation Station, Themihla Island, Ngaputaw Township, Ayeyawaddy Division since 1963. This Island is the year-round nesting area for Green turtles. The regular activities have four headlines of tasks as safety, Incubation, research and awareness at the station. The adult female turtles, the hatchlings and the nests are saved from danger of human or predators and the nesting ground is protected from invaders.

Two main methods, the turtle eggs are incubated by natural and relocation nests. After the hatchlings emerge from the nest, the nest is examined.

While a turtles is found by workers of station, it is attached one pair of Inconel Tag_s, or it is searched serial number of Tag_s on its flippers. (2018-2019 Condition Of Accomplishment Task: below) Besides that the turtle is measured curve carapace Length and curve carapace width. The station workers held ceremonies to talk about sea turtle conservation and write sea turtle news, sea turtle articles on newspaper, journal or social media.

By collaboration with Fauna and Flora International (FFI), special activities were measurement of nest temperature, measurement of depth nest, measurement of nest site by GPS, getting for tissue sample of turtles and training for sea turtle conservation, survey of nesting area and public awareness along costal Ngaputaw, Bogalay and Pyar Pon township.



2018-2019 Condition Of Accomplishment Task

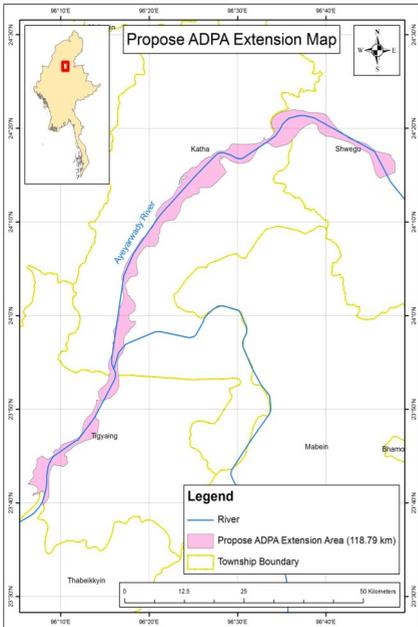
No. of Turtles arrived	No. of Turtles laid	No. of Nests	No. of Eggs Collected	No. of Nests Incubated	No. of Eggs Incubated	No. of Hatchlings Released	No. of Turtles Tagged	No. of Turtles Recovered Tag _s
170	87	87	7032	91	7532	5809	23	15



Ayeyarwady Dolphin Conservation Conducted by Department of Fisheries in Ayeyarwady River

Ayeyarwady (Irrawaddy) River is one of the biggest rivers in Southeast Asia, and it's the most dominant feature in Myanmar (Burma). This arises from Northern hill streams and through steep gorges upstream of Bhamo, and then flow the entire length of country, for approximately 2,200 km, before the reaches of Andaman Sea.

Ayeyarwady Dolphin Protected Area 1



The 19th century naturalist John Anderson described Ayeyarwady (Irrawaddy) dolphin in the Ayeyarwady Rivers as morphologically distinct from *Orcaella brevirostris*.

In 2005, the Department of Fisheries (DoF) established and defined as protected area for Ayeyarwady dolphin (72 km) river segment between NannTaw Kyun in Mandalay Region and Kyauk Myaung in Sagaing Region.

The Ayeyarwady dolphin conservation team conducted patrolling within the protected area twice a month and also conduct educational program in the protected area to prevent illegal fishing techniques and fishing gears which can harm the dolphin and fishes along the river.

During the survey, the team distributed produced posters and pamphlets for awareness and educational purposes regarding Ayeyarwady dolphin and conservation activities to the local communities who live along the both river side. The Conservation team provided souvenir things such as; Ayeyarwady Dolphin T - Shirt, pencil, Ball pen,

note books, etc to the students from 60 villages of protected areas.

Wildlife Conservation Society (WCS) staff in collaboration with the Department of Fisheries staffs conducted the Ayeyarwady dolphin visual boat-based survey between the Mandalay in Mandalay Region to Bahmo in Kachin State every year and the team always counted and estimated



the population and group size and threats to the dolphins.

WCS in collaboration with DOF for watching the Ayeyarwady dolphin and conducted workshops regarding community-based eco-tourism. In Myanmar, tourists can study and enjoy cooperative fishing activities with Ayeyarwady dolphin and cast-net fishermen as a eco-tourism development. During the open season, at the upper reaches of the Ayeyarwady river, the cast net fisherman who conduct cooperative fishing practices cooperation with dolphin, it is one of the famous fishing practices in Myanmar.

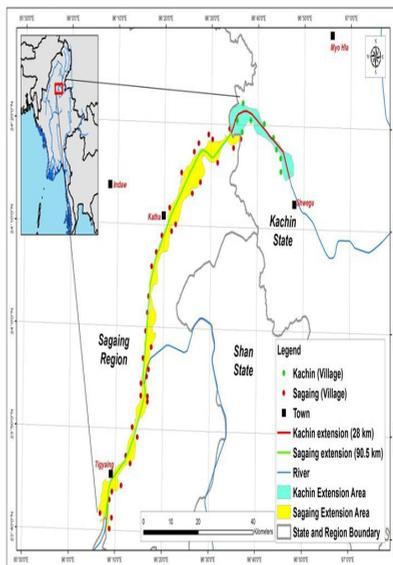


In 2018, The Irrawaddy dolphin conservation to further improvement of the Irrawaddy dolphin species, the longest river of the pastures spread over the Irrawaddy dolphin, the maximum number of ayeyarwady dolphin. The Department of Fisheries (DoF), Ayeyarwady dolphin Protected Area stretches (118.5 km) is being tried to extend upstream of Ayeyarwady river segment between Htee-gyint Township, Katha District, Sagaing Region and ShweGu Township, Bhamo District, Kachin State where is the most population of Ayeyarwady dolphin.

Dolphin community lodge has been opened on 15th May 2019, to develop Ayeyarwady dolphin based ecotourism and conservation process inaugurated at Sagaing region, Shwebo District, Wat Lat Township, Indoung village, Ayeyarwady Dolphin Conservation Area– I between Mandalay and Kyauk Myaung.

In 26th June, 2019, The Ayeyarwady Dolphin research vessel-2 which will be used in Ayeyarwady Dolphin Protected Area-II between (Htee Chaint and Shwe Gu) Wildlife Conservation Society- WCS was hand over to the Department of Fisheries. Workshop on amendment to Management Plan of Ayeyarwady Dolphin protected extension areas in basic level including local communities, held at Singu Township, Mandalay Region, Katha Township, Sagaing Region and Shwegu Township, Kachin

Ayeyarwady Dolphin Protected Area 2



state. A wide range of research and conservation activities have been implemented in the protected area under a guidance of Department of Fisheries.

Marine program

Department of Fisheries (DoF) with Wildlife Conservation Society (WCS) in collaboration and other conservation partners implementation the project, Securing marine fisheries, livelihoods and biodiversity in Myanmar through co-management in Kyeintali area, Thandwe District, Rakhine State.

The activity for holding the ceremony for awarding the certificate of inshore fishery co-management area in Kyeintalia area, and seniors official from DoF and technical experts from WCS visited to observe the situation of established Pon Nyet inshore fishery co-management area, and also the same participants attended the ceremony of the installation of VTS/PDS in inshore fishing boat in Kywe Gyaing area.

The 14 units of VTS/PDS (Vessel Tracking System/Pelagic Data System) installed in Jate-taw village, Thandwe township and Pyin Phyu Maw Village, Kyaukphyu Township by collaboration with District officer, DoF and support training and equipment to fishers for shark and ray bycatch data collection, rent a speed boat to Kyeintali Inshore fisheries co-management committee for monthly patrolling in their area, conducted the preliminary meeting with the fishers who are northern villages of Gwa Town for future Gwa Township Inshore Fisheries Co-management Area establishment. WCS will extent her conservation activities in collaboration with DOF.

Research studies counted for fisheries sector and Shark NPOA development

According to research and development (R&D) extension, sustainable use of fisheries resources and awareness services that Myanmar department of fisheries in collaboration with SEAFDEC implemented four sites of research work for shark and ray one year landing data collection ,namely 1)Yangon region Landing Sites , 2) Long Lone township , The Bowk Seik village at Tanin Thar Yi Region, 3) Ye Township ,A sinn village landing site at Mon state, 4)Hi Gyi Kyun Township laningsite ,Ayarwady Division in August 2018 to July 2019 . Future plan of year five of from 2020 to 2024 will high priority to conduct shark and ray data collection, shark socioeconomic and capacity building of shark Taxonomy training with SEAFDEC-MFRDMD and all member country together to continuous conduct it.

Myanmar is a residence to a rich diversity of sharks, rays, and skate (Class Chondrichthyes). According to the research results, more than 44 species of Chondrichthyans comprising 18 sharks, 25 rays, 1skates, belonging to 7 families of sharks, 11 rays, 1 skate. The high diversity of sharks was recorded from the Order Carcharhiniformes with 14 species, Lamniformes with 2 species and Orectolobiformes with 2species. As for batoids, high diversity was recorded for the Order Myliobatiformes with 21 species followed by 4 species Rhinobatiformes respectively. Only 1 species were recorded from the Order Torpediniformes. Even though the number of chondrichthyans species recorded in Myanmar was more than 44, the actual status of its biodiversity is still unknown. With new species continuously discovered, the number is expected to increase in the future.

At present the deep water species are mostly unknown due to limited research activity. Most sharks and rays species landed especially from the Families Carcharhinidae and Dasyatidae and are very difficult to identify up to species level by untrained and inexperienced enumerators. Only trained staff will be better able to make the right and valid identification of species in the future.

Conducted the activity for Shark and Ray of NPOA(Nation Action Plan) workshop program from (11-1-2019) to (12-1-2019) with NGO ,INGO at Thingaha Hotel at Nay Pyi Taw.To develop policy and a draft of new notification under Marine Fisheries Law prepared in year one is high priority and Freshwater Fisheries Laws to protect, conserve and enhance sharks species listed under CITES appendices as well as



2018-2019 a year data collection on Yangon Landing Sites of EPY Jetty.

endangered freshwater shark and ray species .Local community public awareness program such as fisheries forum in relative coastal region and dissemination pamphlet with stakeholders and NGOs at selected township organised in year two. Two notifications gazetted in year two and fully enforced in year three.

Shark NPOA Workshop was held at (31-5-2019) in Dawei Township, Dawei district, Tanintharyi Region and at (30- 9 -2019) in, Yangon Western District, Yangon Region. And then General discussed with Regional and state government, coastal local communities, coastal University of marine department , stakeholder , NGOs , parliament of representatives were joined and 28-11-2019 had already discussed and held of final approve of Shark NPOA workshop in Nay Pyi Taw .

Survey Results of The Fishery Resources and Marine Ecosystems of Myanmar By the Research Vessel (R/V) Dr Fridtjof Nansen

About The Nansen Surveys

Surveys carried out by the R/V Dr Fridtjof Nansen are an integral part of the EAF-Nansen Programme which, through different phases and objectives, has been running since the mid- 1970's. The first assessments of the state of the fishery resources of Myanmar were conducted through two survey periods between 1979–1980. Results from those surveys were used as a basis to estimate a Maximum Sustainable Yield (MSY) for the marine fisheries of the Myanmar's EEZ.

In 2013, 2015 and 2018, the R/V Dr Fridtjof Nansen returned to Myanmar to conduct new surveys. These three surveys were planned and executed in close collaboration with the Directorate of Fisheries in Myanmar and other partners, such as the BOBLME for the 2013 survey. Several universities in Myanmar, including Mawlamyine, Myeik and Patheingyi, and local NGOs have also participated in the survey planning and execution. The surveys covered pre-monsoon, monsoon and post-monsoon seasons, to ensure that possible seasonal variations could be captured and analyzed. **Note that the surveys do not cover waters shallower than 20 m.** The 2018 research survey took place over the course of 63 days, involving 25 Myanmar scientists.

Year	Survey title	Period and season
1979	Marine Fisheries Resources Survey and Exploratory Fishing	Sep-Nov (Post Monsoon)
1980	Marine Fisheries Resources Survey and Exploratory Fishing	Mar-Apr (Pre Monsoon)
2013	Myanmar Fishery Resources- Ecosystem Survey	Nov-Dec (Post Monsoon)
2015	Myanmar Ecosystem Survey (verification)	Apr-Jun (Pre Monsoon)
2015	Habitat Mapping on the Myeik Archipelago	June (Pre Monsoon)
2018	Survey of Fishery Resources and Ecosystems	Aug-Sep (Monsoon)



MSY is the maximum level of catch that can be sustained by the fishery in the long term, without jeopardizing its productivity. Continuous extraction above this level will lead to reduction of the fisheries' productivity and a decline in yield, which will result in overfishing.

The three *Dr Fridtjof Nansen* vessels that surveyed Myanmar waters in 1979–1980 (top), 2013 & 2015 (middle) and 2018 (bottom). © FAO

Survey Objectives

The 1979–80 surveys aimed at obtaining an estimate of the marine standing stock biomass in Myanmar's waters, as the basis to assess sustainable yields. Environmental work included recording the type of bottom and hydrographic conditions.

For the 2013 and 2015 surveys, the objectives were expanded to cover/ add more comprehensive ecosystem-related data.

These included:

- Distribution, abundance, and diversity of fish(pelagic and demersal)
- Size distribution, further biological information, and genetic material from selected species
- Distribution, abundance, and composition of phyto-and zooplankton, fish eggs and larvae
- Environmental conditions in the survey area(temperature, salinity, oxy gen, chlorophyll, nutrients and sediments)
- Bathymetric mapping

The 2018 survey formed part of the new phase of the EAF-Nasen Programme, with the focus on “ Supporting the Application of the Ecosystem Approach to Fisheries Management considering Climate and Pollution impact.” Hence, sampling was further expanded to also include marine debris and microplastics, ocean acidification and food safety, and nutrition. The study of egg and larvae was a key priority in 2018.

Main Findings of The Surveys

The most striking feature when comparing the different estimates over time is the **major drop in fish biomass**, visible in the most recent surveys, as compared to those carried out in 1979-1980.

The surveys provided a good insight into the seasonality in the fish resources, with changing patterns in distribution and availability of several species, as surveys were conducted during different times of the year. **Important seasonal variations** were observed, possibly due to the changing hydrographic conditions linked to the annual monsoon cycles. These affect fish distribution patterns and such changes are well-known to the fisheries. Seasonal variations also affect biomass estimates as fish becomes less available to the research vessel by, for example, migrating into shallower waters or to neighboring countries.

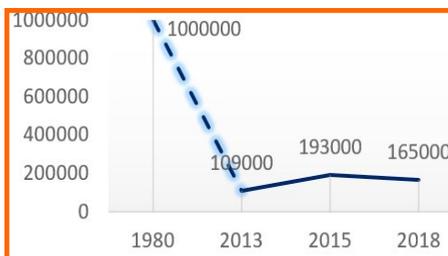
The **seasonal variations were much less significant than the major decline** observed in biomass of both pelagic and demersal fish when compared with the results of the 1979–1980 surveys. The 2018 survey, carried out in the post-monsoon season, had a stronger focus on fish early life stages than previous surveys. Some probable retention areas were identified, but the number of eggs and larvae collected was low.

Other findings from the 2018 survey include the **observation of micro-plastic particles** throughout the region, some areas with higher concentrations than others.

Fish Biomass

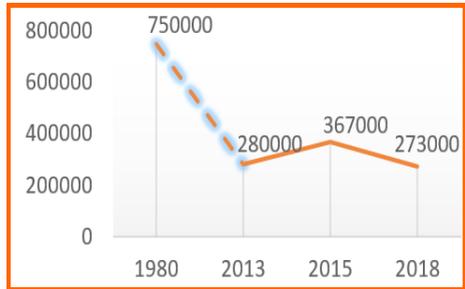
Pelagic fish abundance

The average pelagic biomass in the 1979-1980 surveys was estimated at about 1 million tonnes. In the 2013-2015 and 2018 surveys, the average was estimated only 160 000 tonnes, which represents an 80 % decrease from the 1970-1980 surveys.



Demersal fish abundance

The average demersal biomass in the 1970-1980 surveys was estimated at about 750 000 tonnes. In the 2013-2015 and 2018 surveys, the average was estimated at 310 000 tonnes, which represents a 60% decrease from 1970-1980.



Distribution Patterns

Changes in species composition

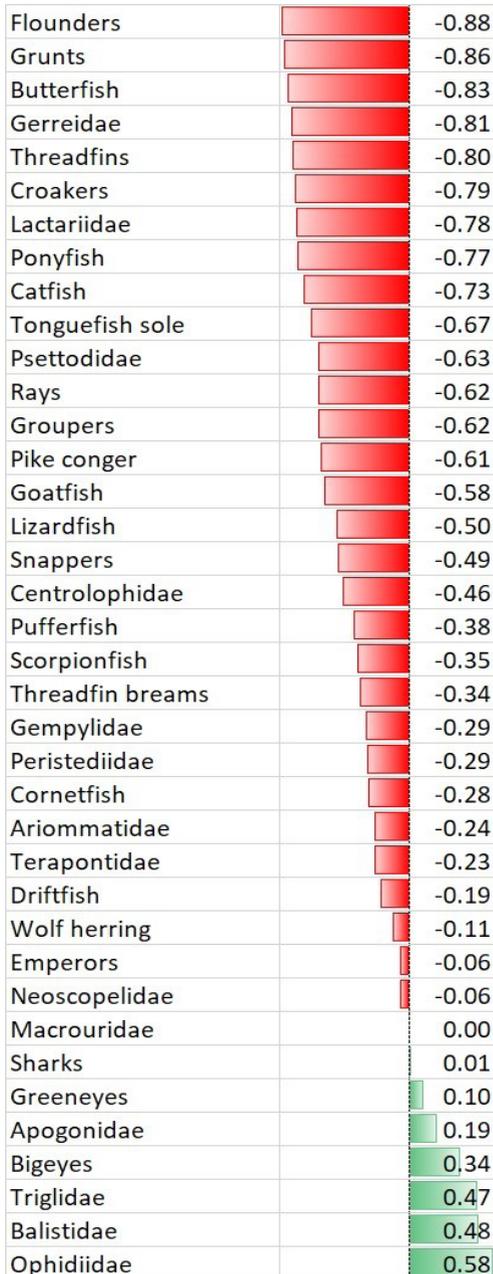
The change in abundance of the different demersal fish families, expressed as percentage between the two survey periods 1979-1980 and 2013-2018 is considerable and shows a significant reduction of most species, including those of commercial importance. At the same time there is a significant increase in some families commonly found in deeper waters.

This is probably a consequence of the fishing pattern as the deeper waters are less accessible for the Myanmar trawl fleet.



Symphysanodon xanthopterygioides and *Penaeus pulchricaudatus*

Many of these species also have lower commercial value. increase in occurrence of smaller fast recruiting, less valuable species, such as pufferfish, scorpionfish, bigeyes, lizardfish, etc.



Abundance of the different demersal fish families, expressed in percentage between the two survey periods 1979–1980 and 2013–2018. © FAO

Microplastics

In the 2018 survey, micro-plastic particles were widespread, with highest numbers recorded in the Rakhine area in the shallowest stations. Less particles were found in the Delta region, despite the fact that usually highest concentrations are found in the proximity of river outlets. This could be explained by the higher amount of freshwater during the monsoon season.

Key Observations and Recommendations

- Current biomass of demersal and pelagic stocks is well below the levels observed during the first surveys with the RV Dr Fridtjof Nansen in 1979–1980.
- Furthermore, a significant change in relative abundance of demersal species has taken place, with considerable decline also observed for commercially important species.
- The above represents a clear indication of overfishing. Management actions, such as reduction in fishing effort, are urgently required to rebuild overexploited stocks, consistent with the Myanmar vision.
- It is recommended that Myanmar tasks a dedicated working group with further analysis of available information, with the aim to provide specific scientific advice for appropriate management action to address overfishing and rebuild fish stocks.
- The three surveys 2013, 2015 and 2018 show that Myanmar has an unusually high diversity of fish (and most probably other marine organisms) with several rare and endemic species. This places a special responsibility on Myanmar to protect this marine biodiversity for future generations.
- To obtain a better understanding of spawning and nursery areas future surveys should be planned in the pre-monsoon season to complement the information already available from previous surveys.
- To ensure sustainability, priority should be given to address factors that may undermine management efforts, such as Illegal, Unreported and Unregulated (IUU) fishing, and possible interactions with other sectors (e.g. oil and gas, mining, mariculture etc.) that impact marine resources and the environment.

Fresh and Marine Biodiversity Conservation Activities

Fauna & Flora International (FFI) signed Letter of Agreement (LoA) with the Department of Fisheries in December 2014 and implementing biodiversity conservation projects in Kachin State, Ayeyarwaddy Region and Tanintharyi Region base on the vision of the sustainable future for the planet, where biodiversity is effectively conserved by the people who live closest to it, supported by the global community. Through implementing biodiversity conservation projects, FFI is finding out opportunities for sustainable livelihood development through village consultation processes together with the Department of Fisheries for the sustainability of aquatic resources for the sustainability of livelihood opportunity and food security of local communities.

Biodiversity

FFI is undertaking aquatic biodiversity inventories in the projects in collaboration with the Department of Fisheries, local universities and local communities. Coral and marine fauna surveys have been started since 2013 in the Myeik Archipelago. A total of 287 hard coral species, 495 marine fish species, 230 marine invertebrates were identified and published.

In the freshwater fish inventory, (95) species in Indawgyi basin, (48) species in Putao District, (113) species along the Tanintharyi River and (54) species in Lenyar River were recorded between 2013 to 2019. Among them, (6) species in Indawgyi basin, (7) species in Putao District, (9) species along the Tanintharyi River and (5) species in the Lenyar River were identified as a new species to the science. Out of (27) new fish species identified as new species for the science, (11) species were named and published.

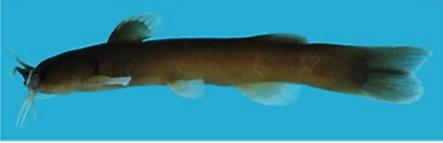
FFI started freshwater mussel and associated organisms to the freshwater mussel from 2016. 24 new freshwater mussel and 5 new fresh water leech species were identified from the Ayeyarwady, Sittaung, Haungtharaw, Chindwin, and Dawei rivers. List of the new freshwater fish, mussel and leech species to the science published until 2019 are shown in Fig. (1) and Fig(2).



Acanthocobitis linypha



***Devario* sp.**



Amblyceps improcerun



Exosroma sectile



Lepidocephalichthys eleios



Mustura celata



Schistura indawgyiana



Macrognathus orthosemos



Schistura wanlainensis



Schistura nubigena



Malihkaia aligera

List of the new freshwater fish species to the science published until 2019



Leoparreyisia whitteni

Leoparreyisia canefrii

Lamllidens brandti

Some of the List of new mussel species to the science published until 2019

Conservation

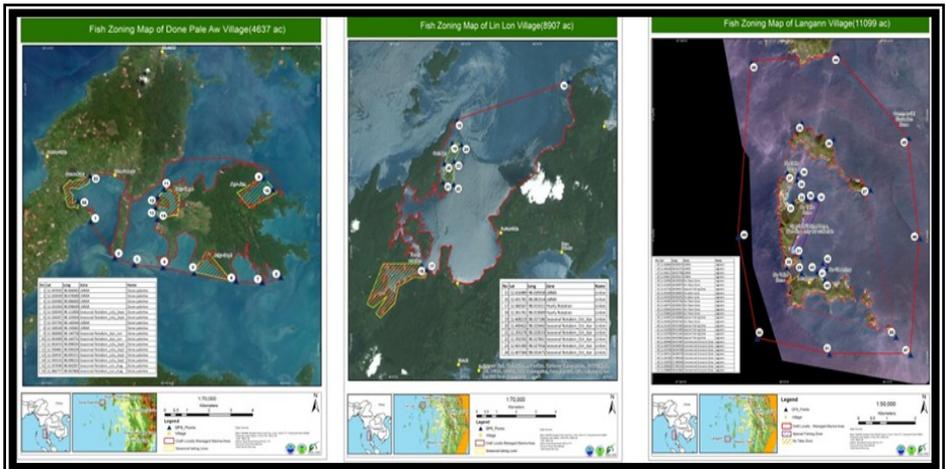
FFI identified crucial areas in the marine and freshwater together with the Department of Fisheries and local communities to establish conservation areas for the sustainability of aquatic resources, sustainability of fisheries business, and food and nutritional security for Myanmar people. The Department of Fisheries designated (3) areas in the Myeik Archipelago as the first Locally Managed Marine Areas-LMMAs in Myanmar supported by the Tanintharyi Regional Government for the sustainability of the livelihood and food security of the local communities. The LMMAs were notified by the notification number (1/2017) for Done Pale Aw Village (4637 Acre), (2/2017) for Langann Village(11099 Acre) and (3/2017) for Lin Lon Village (8907 Acre) by the Department of Fisheries on the 31st March 2017. These LMMAs are managing by the local communities along with the support of the local Department of Fisheries for effective law enforcement, leading to the sustainability of the aquatic resources.

FFI is working closely with the local communities supported by the Department of Fisheries for the designation of new Marine Protected Areas (MPAs) in the Myeik Archipelago for the sustainability of aquatic resources for the businesses such as artisanal fisheries for the local fishers, fishing industry, food processing plants, and tourism industry relying on the fisheries resources. FFI and the Department of Fisheries are implementing stakeholder consultation processes supported by the local government in the Tanintharyi Region to achieve the conservation goal.

For endangered species conservation, sharks and rays NPOA for Myanmar has been developing supported by the Department of Fisheries since 2014. Marine turtle conservation is also implementing in the Ayeyarwady and Tanintharyi regions together with the local Department of Fisheries for the sustainability of the globally endangered turtle species. Series of training, surveys, public consultations and research have been conducted supported by the Department of Fisheries.



Activities of LMMAs establishment processes in the Myeik Archipelago



For the sustainability of freshwater aquatic biodiversity, stakeholder consultation processes have been done in collaboration with local communities, relevant government departments and concerned stakeholders supported by the Department of Fisheries since 2013 in Indawgyi and Putao District in the Kachin State and Myeik and Kawthaug districts in the Tanintharyi Region to establish Fish Conservation Zones (FCZs). The objectives of the FCZs are the sustainability of freshwater fish resources, subsistence livelihood of local communities, food security and nutritional balance of local communities.



Activities of FCZs establishment processes.

Livelihood

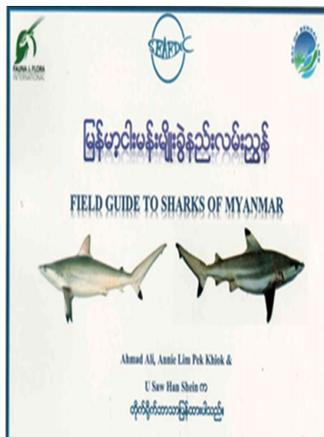
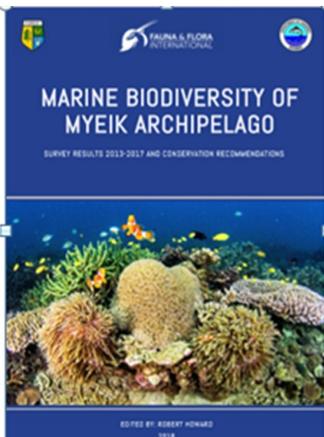
FFI is implementing a small grant programme in the projects to reduce stress to natural resources through the provision of new home gardening vegetables, marketable plants and husbandry animals. For effective cultivation in the remote villages in the Putao District, tilling machines are distributed and conducted the machine maintenance training to the communities. Veterinary training was conducted in collaboration with the Putao District Department of Fisheries and Veterinary Department and distributed husbandry vaccination kits to the communities to care for their farm animals.



Small grant provisions and training

Publications

A collective effort of international scientists, relevant government departments, local universities, the Department of Fisheries and FFI, two publications, Marine Biodiversity of Myeik Archipelago: survey results and conservation recommendation 2013 to 2017 and Field Guide to Sharks of Myanmar were published. Several international publications regarding new species for science were also published supported by the Department of Fisheries.



Marine Biodiversity of Myeik Archipelago and Field Guide to Sharks of Myanmar

Research and Training

In order to implement above responsibilities, DoF has established five fisheries training centers namely.

- Institute of Fisheries Technology (Gyogone, Yangon Region)
- Upper Myanmar Fisheries Training Center (Sagaing, Sagaing Region)
- Lower Myanmar Fisheries Training Center (Pyapone , Ayeyarwady Region) and
- Fisheries Training Center (Thahton, Mon State)
- Fisheries Extension Training Room (Bago, Bago Region)

Human resource development in fishery sector and capacity building are carried out through the fishery training centers. In the year 2018-2019, Seventeen training courses have been successfully conducted associated the fields of Aquaculture, English Speaking, Capacity Building, Energy Saving and Safety at Sea for Small Fishing Vessels , Proper Fish Handling Techniques Applicable to Local Fishing Vessels, Water Quality Control and Fish/ Prawn Disease Control, Fish Processing and Quality Control for Fishery Products, Health and Diagnostic Examination of Fish and Health of Fish and Shellfish, Basic Taxonomy and Identification of Marine Fish, Resources Conservation, Supporting Training on Quality Control and Research, Comprehensive Management, Fishing Gear, Fisheries Management, Safety at Sea, Research Practical Data Analysis, Ecosystem Approach to Fishery Management: totally 1389 trainees have been acquired knowledge of fisheries relevant fields. The various training for fishery taskforce skill development in (2018-2019) fiscal year has been conducted with 45 trainings and 1389 trainees in total.

No	Training Course	2018-2019		Remarks
		No of Course	No of Training	
1.	Training on Aquaculture	17	634	DoF Training Center (Thahton) DoF Training Center (Pyapone) Institute of Fisheries Technology (Gyogone) Hlawgar Fishery Station Bago Fishery Station Yae Nathar Fishery Station
2.	Training on English Speaking	3	68	DoF Training Center (Sagaing) NayPyiTaw
3.	Training on Capacity Building	1	19	NayPyiTaw
4.	On-site Training on Energy Saving and Safety at Sea for Small Fishing Vessels	1	30	Institute of Fisheries Technology (Gyogone)
5.	On-site Training on Proper Fish Handling Techniques Applicable to Local Fishing Vessels	1	30	Institute of Fisheries Technology (Gyogone)
6.	Training on Water Quality Control and Fish/Prawn Disease Control	3	89	DoF Training Center (PyaPone) Fisheries Extension Training Room(Bago) A Mar Township, East Village (PyaPone)
7.	Training on Fish Processing and Quality Control for Fishery Products	6	199	DoF Training Center (PyaPone) DoF Training Center (Thahton) Meiktila Township Yin Mar Pin Township Shan State(Kengtung) Kachin State(Shwe Ku)
8.	Training on Health and Diagnostic Examination of Fish and Health of Fish and Shellfish	1	22	Fisheries Extension Training Room (Bago)
9.	Training on Basic Taxonomy and identification of Marine Fish	3	72	Institute of Fisheries Technology (Gyogone)
10.	Training on Resources Conservation	2	68	DoF Training Center (Thahton)

2018-2019				
No	Training Course	No of Course	No of Training	Remarks
11.	Supporting Training on Quality Control and Research Section,	1	14	DoF Training Center (Sagaing)
12.	Training on Comprehensive Management	1	28	DoF Training Center (Pyapon)
13.	Training on Fishing Gear	1	20	Institute of Fisheries Technology (Gyogone)
14	Training on Fisheries Management	1	20	DoF Training Center (Sagaing)
15.	Training on Safety at Sea	1	15	DoF Training Center (Pyapon)
16.	Training on Research Practical Data Analysis	1	26	Institute of Fisheries Technology (Gyogone)
17.	Training on Ecosystem Approach to Fishery Management	1	35	Institute of Fisheries Technology (Gyogone)
Total		45	1389	



In Order to develop Fisheries Training Center and Fisheries Extension Officer, Development & Training Session is laid down the plan to conduct the following work plans during the fiscal year (2019-2020):

- * Training on Fishing Gear Technology
- * Training on Safety at Sea for Fisherman
- * Training on Fish Processing and Quality Control for Fishery Products
- * Training on Good Aquaculture Practice (GAQP)
- * Training on Water Quality Management and Fish/Shrimp Disease Control Management
- * Training on Basic English Speaking
- * Training on Shrimp and Growth-out Culture
- * Training on Capacity Building for Servants
- * Training on Prevention and Controlling for Fish/Shrimp, Prawn Culture
- * Training on Crab Growth-out Culture
- * Training on Fish Growth-out Culture
- * Training on Prawn Growth-out Culture
- * Training on Eel Culture
- * Training on Basic Seabass(Latescalcarifer) Culture
- * Training on Resource Conservation
- * Training on Fresh Water/Marine Mud Crab Culture and Growth-out Culture
- * Training on Basic Aquaculture and Induces Breeding

International Relations and Projects

By the Invitation of the International, Regional Organizations and Partner Countries, DOF Staffs had participated in the meetings, workshops, seminars and trainings in other countries and the experiences and knowledge gained from those events will contribute the objectives of DOF in her continuing efforts towards achieving sustainable fisheries development for food security. The participated list of events was as follows;

No.	Group	2018-2019					
		Training		Workshop/ Meeting Seminar/Duty		Delegation/ Study Tour/ Trade Fair	
		Freq:	Person	Freq:	Person	Freq:	Person
1	SEAFDEC	2	2	25	43	1	1
2	Gov of Norway	-	-	1	1	-	-
3	Gov of Kenya	-	-	1	2	-	-
4	Gov of Korea	-	-	1	1	-	-
5	Gov of China	3	16	1	1	1	1
6	Gov of Japan	-	-	1	1	-	-
7	MYSAP-GIZ project	1	2	-	-	-	-
8	World Bank	-	-	-	-	1	9
9	FAO	-	-	7	8	1	1
10	ACIAR	-	-	1	4	-	-
11	JICA	3	7	1	4	-	-
12	TICA- JICA	2	14	-	-	-	-
13	NACA	-	-	1	1	-	-
14	TUMSAT	3	3	1	1	-	-
15	USAID	-	-	1	1	-	-
16	MPEA	-	-	1	1	1	2
17	JFAD	-	-	1	1	-	-
18	FFI	-	-	1	2	-	-
19	GIZ	1	1	-	-	-	-
20	GOJ-TF	-	-	1	2	-	-

No	Group	2018-2019					
		Training		Workshop/ Meeting/ Seminar/Duty		Delegation/ Study Tour/ Trade Fair	
		Freq:	Person	Freq:	Person	Freq:	Person
21	DANIDA Project	-	-	2	4	-	-
22	IIED	-	-	1	1	-	-
23	WorldFish	-	-	2	3	-	-
24	Gov of USA	-	-	1	1	-	-
25	Gov of Maldives	-	-	1	2	-	-
26	Kagoshima University	-	-	1	1	-	-
27	Guangxi Zhunng, China	-	-	1	2	-	-
28	Yangtze River fisheries	-	-	1	1	-	-
29	Charles Sturt University	-	-	1	1	-	-
30	Aeridian Int'l Center (USA)	-	-	1	1	-	-
31	Aquadapt Mekong	-	-	1	1	-	-
32	CIRDAP	1	1	-	-	-	-
33	ASEAN-USAID	-	-	1	1	-	-
34	ASEAN Foundation	-	-	1	1	-	-
35	Thai DoF + EU	-	-	1	1	-	-

No	Group	2018-2019					
		Training		Workshop/ Meeting/ Seminar/Duty		Delegation/ Study Tour/ Trade Fair	
		Freq:	Per- son	Freq:	Person	Freq:	Person
36	Lancang–Mekong Project	-	-	2	4	-	-
37	Temasek Polytechnic	-	-	1	1	-	-
38	Norway Marine Research Institute	-	-	1	1	-	-
39	Ocean Research Center	-	-	1	1	-	-
40	Myan–India Maritime Security Committee	-	-	1	1	-	-
41	Sakura Science Program	-	-	1	6	-	-
42	CP Group	-	-	-	-	1	1
	Total	16	46	69	109	6	15

Ph.D, M.Sc, B.Sc and Training Candidates of DOF at abroad

Qualified staffs of DOF have been studying in abroad for their capacity and after that whose will be performed in relative program.

No.	Name/Position	University	Duration	Graduation	Study Field
1.	U Myat Thiha Saw Assistant Fishery Officer	University of Tasmania (Austria)	19-1-2015 to 31.12.2018	B.Sc (Marine Environ- ment)	Sustainable Economic Development (Including Agri- culture and Food Security)
2.	Daw Wah Wah Phoo Deputy Fishery Officer	Pukyong National University (Korea)	18.9.2017 to 18.8.2019	Ph.D (Fishery Biology)	Fishery Biology
3.	U Ar Kar Myo Assistant Fishery Officer	Kasetsart University (Thailand)	4.8.2016 to 31.12.2018	M.Sc (Fishing Technology)	Fishing Technology
4.	U Min Khaing Assistant Fishery Officer	Pukyong National University (Korea)	27.8.2017 to 19.1.2019	M.Sc (Fisheries Science)	Research & Fisheries Management
5.	Daw Cho Mar Oo Assistant Fishery Officer	Pukyong National University (Korea)	27.8.2017 to 19.1.2019	M.Sc (Fisheries Science)	Fisheries Economic
6.	U Aung Ko Oo Assistant Fishery Officer	Auckland University of Technology (New Zea- land)	5.1.2018 to 31.5.2020	M.Sc (Research)	Food Science
7.	Daw Nway Nway Myint Thein Fishery Officer	Pukyong National University (Korea)	1.8.2018 to 20.12.2019	M.Sc (Fisheries Science)	Fisheries Statistics
8.	Daw Nay Chi Cho Linn Deputy Fishery Officer	Kasetsart University (Thailand)	2-8-2018 to 31-12-2020	M.Sc (Fisheries Science and Technology)	Fisheries Science and Tec n hnology

Ph.D Candidates of DOF at abroad

Qualified staffs of DOF have been studying in abroad for their capacity and after that whose will be performed in relative program.

No.	Name/Position	University	Duration	Graduation	Study Field
9.	Daw Soe Myat Thu Assistant Fisheries Officer	Kasetsart University (Thailand)	2-8-2018 to 31-12-2020	M.Sc (Fisheries Science and Technology)	Fisheries Science and Technology
10.	Daw Ei Mon Khine Assistant Fisheries Officer	Kasetsart University (Thailand)	2-8-2018 to 31-12-2020	M.Sc (Fisheries Science and Technology)	Fisheries Science and Technology
11.	U Zaw Tun Aung Deputy Fisheries Officer	Tromso University (Norway)	5.8.2019 to 31.7.2021	M.Sc (Fisheries Science)	Master of Science in Inter- national Fisheries Management
12.	Daw Thet Su Win Deputy Fisheries Officer	Can Tho Uni- versity (Vietnam)	26.9.2019 to 30-10-2021	M.Sc (Fisheries Science)	Fisheries Science
13.	Daw Moe Moe Khine Assistant Fisheries Officer	Can Tho Uni- versity (Vietnam)	26.9.2019 to 30-10-2021	M.Sc (Fisheries Science)	Fisheries Science

Projects cooperation with Development Partners

1. Ayeyarwaddy Dolphin Research and Protected Area Management Plan (WCS) (Technical Assistant) supported by Wildlife Conservation Society (WCS), from 2017 -2022, along the Ayeyarwady River in Mandalay , Saging Regions and KaChin.
2. Collaborative Program to Support the Conservation of Marine and Fresh-water Biodiversity in Myanmar) (Technical Assistant) support by Flora and Fauna International (FFI) from 2019 to 2024 in Kachin ,Tanintharyi Regions, Ayeyarwady Regions and Rakhine State.
3. Expanding and improving marine Conservation in Myanmar (WCS - Marine) (Technical Assistant) supported by Wildlife Conservation Society (WCS), from 2017 -2022, in Rakhine , Sittwe and Tanintharyi .
4. Myanmar Sustainable Aquaculture Programme (MYSAP) (USD 24.960) funded by German International Agency(GIZ) from 2016 to 2022 in Ayeyarwady Delta and Central Dry Zone , Rakhine State and Shan State .
5. Sustainable Coastal Fisheries (SCF) (USD-6.319) funded by Danish International Development Agency from 2016- 2020 in Tanintharyi (Myeik), Rakhine (Maung Taw and Sitt tawe).
6. Development of Sustainable and environmental friendly aquaculture techniques in coastal waters in Myanmar (JIRCAS) (USD 0.136) funded by Japan International Research Center for Agriculture Sciences from 2017 – 2021 in Tanintharyi Division and Myeik Coastal.
7. Strengthening the adaptive capacity and resilience of fisheries and aquaculture-dependent livelihoods in Myanmar (Fish Adapt) (USD 6) funded by Food and Agriculture Organization (FAO) from 2017 to 2021 in Yangon (Kyauk Tan) , Ayeyarwaddy (Amar) and Rakhine (Mye bone) .
8. Improving Fishery Management in Support of Better Governance of Myanmar's Inland and Delta Fisheries (MYFish-2) (USD 2.130) funded by WorldFish Center from 2017-2020 in Ayeyarwady Delta and Central Dry Zone. .
9. The Development of Rice-Fish System (RFS) in the Ayeyarwady Delta Myanmar (Rice-Fish) (USD 2.09) funded by WorldFish Center from 2017-2021 in Ayeyarwady Delta .
10. Supporting the Application of the Ecosystem Approach to Fisheries Management Considering Climate and Pollution Impacts (EAF- Nansen) (Technical Assistant) implemented by the Food and Agriculture Organization

of the United Nations (FAO) in close collaboration with the Norwegian Institute for Marine Research (IMR) from 2018-2021 in Ayeyarwady, Rakhine and Tanintharyi .

11. Quantifying Biophysical and Community Impacts of Improved Passage in Lao and Myanmar (Fish Passage) (USD 0.123) funded by ACIAR from 2018-2020 in Bago Region .
12. Marine Shrimp Aquaculture development in Rakhine State (Ye Chan Pyin) (USD 1) funded by Thailand International Cooperation Agency (TICA) from 2018-2020, in Rakhine State (Ye Chan Pyin) .
13. Improvement of Quality Assurance System for Small and Medium- Sized Traditional Fishery Products Processing (SME) (USD 0.4988), Funded by Mae khong –Lan Chang, from 2019-2021 in Yangon Region, Bago Region, Ayeyarwady Delta and Tanintharyi Region .
14. Cooperation Between Myanmar and Norway in the Fisheries and Aquaculture Sector (MYANOR FISH) (USD 7.800), Funded by Marine Institute of Research (MIR) from 2019-2024 in Tanintharyi (Myeik) & NayPyiTaw Council .

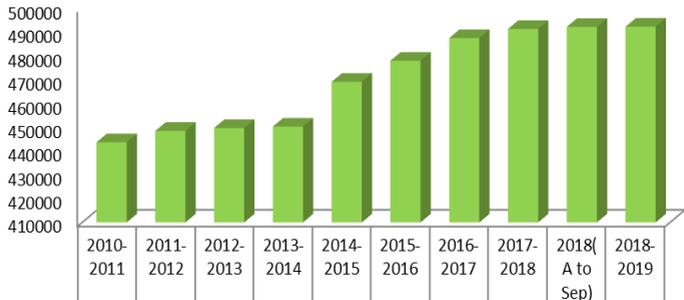
FISHERY STATISTICS

Table.1. FISHERY PRODUCTION (2010-2011 to 2018-2019)

Thousand Metric Ton						
No.	Year	Total	Aquaculture	Leasable Fisheries	Open Fisheries	Marine Fisheries
1.	2010-2011	4163.46	830.48	250.04	913.12	2169.82
2.	2011-2012	4478.35	899.05	282.64	963.82	2332.84
3.	2012-2013	4716.22	929.38	290.00	1012.97	2483.87
4.	2013-2014	5047.40	964.12	304.44	1076.59	2702.25
5.	2014-2015	5316.95	999.63	315.36	1147.76	2854.20
6.	2015-2016	5591.83	1014.42	338.69	1241.98	2996.74
7.	2016-2017	5675.47	1048.69	339.23	1251.13	3036.42
8.	2017-2018	5877.46	1130.35	341.02	1253.95	3152.14
9.	2018(April to Sep)	2581.45	495.49	122.74	513.42	1449.80
10.	2018-2019	5971.10	1121.35	339.36	1260.69	3249.70

Table.2. TOTAL AQUACULTURE PONDS AND PRODUCTION

No.	Year	Area of Aquaculture Ponds (Acre)	Production of Aquaculture Ponds (Thousand Metric Ton)
1.	2010-2011	443695	830.48
2.	2011-2012	448468	899.05
3.	2012-2013	449692	929.38
4.	2013-2014	450324	964.12
5.	2014-2015	469153	999.63
6.	2015-2016	478002	1014.42
7.	2016-2017	487525	1048.69
8.	2017-2018	491345	1130.35
9.	2018(A to Sep)	492206	495.49
10.	2018-2019	492295	1121.35



■ Area of Aquaculture Ponds (Acre)	443695	448468	449692	450324	469153	478002	487525	491345	492206	492295
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Figure.1: Area of Aquaculture Pond (2010-2011 to 2018-2019)

Table. 3.TOTAL AREA OF AQUACULTURE PONDS

Unit - Acre

No.	Year	Area		Total
		Fish Pond	Shrimp Pond	
1.	2010-2011	218746	224949	443695
2.	2011-2012	220171	228297	448468
3.	2012-2013	221395	228297	449692
4.	2013-2014	222028	228296	450324
5.	2014-2015	232515	236638	469153
6.	2015-2016	239671	238331	478002
7.	2016-2017	245807	241718	487525
8.	2017-2018	247007	244338	491345
9.	2018(April to Sep)	247818	244388	492206
10.	2018-2019	247858	244437	492295

Table.4.1. AQUACULTURE FISH POND BY STATES AND REGIONS

Unit-Acre

No.	States/ Regions	2010- 2011	2011-2012	2012-2013	2013-2014	2014-2015
1	Kachin	1938	1910	1990	2168	2313
2	Kayah	638	673	748	760	798
3	Kayin	400	400	464	464	589
4	Chin	108	107	296	296	296
5	Sagaing	5159	5465	5809	6023	6374
6	Taninthayi	351	922	922	923	1065
7	Bago	25748	26003	26009	26014	27158
8	Magway	430	425	425	425	425
9	Mandalay	6898	7154	7416	7624	7609
10	Mon	920	969	969	975	979
11	Rakhine	-	-	20	20	20
12	Yangon	59870	59864	59864	59864	65848
13	Shan	3377	3387	3409	3409	3408
14	Ayeyarwady	112909	112892	112892	112892	115462
15	NayPyi Taw	-	-	162	171	171
	Total	218746	220171	221395	222028	232515

Table.4.2. AQUACULTURE FISH POND BY STATES AND REGIONS

Unit-Acre

No.	States/Regions	2015-2016	2016-2017	2017-2018	2018(April to Sep)	2018-2019
1	KaChin	2312	2312	2344	2346	2355
2	Kayah	819	893	893	893	894
3	Kayin	675	711	731	731	741
4	Chin	296	296	296	304	344
5	Sagaing	7128	7580	7580	7575	7544
6	Taninthayi	1120	1120	1120	1120	1120
7	Bago	28324	31121	31146	31151	31132
8	Magway	425	425	425	424	424
9	Mandalay	7970	7902	7873	7860	7848
10	Mon	995	995	1001	1001	1001
11	Rakhine	20	20	20	20	20
12	Yangon	66015	67038	66444	67284	67328
13	Shan	3408	3408	3408	3383	3383
14	Ayeyarwady	119993	121811	123551	123551	123551
15	NayPyi Taw	171	175	175	175	173
	Total	239671	245807	247007	247818	247858

Table.4.3.AQUACULTURE SHRIMP / PRAWN POND BY STATES AND REGIONS

Unit-Acre

No.	States/Regions	2010- 2011	2011-2012	2012-2013	2013-2014	2014-2015
1.	KaChin					
2	Kayah	-	-	-	-	-
3	Kayin	80	80	80	80	80
4	Chin	-	-	-	-	-
5	Sagaing	-	-	-	-	-
6	Taninthayi	821	4141	4141	4140	4140
7	Bago	12	40	40	40	40
8	Magway	-	-	-	-	-
9	Mandalay	-	-	-	-	-
10	Mon	1125	1125	1125	1125	1125
11	Rakhine	155533	155533	155533	155533	155533
12	Yangon	10229	10229	10229	10229	17829
13	Shan	-	-	-	-	-
14	Ayeyarwady	57149	57149	57149	57149	57892
15	NayPyi Taw	-	-	-	-	-
	Total	224949	228297	228297	228296	236638

Table.4.4.AQUACULTURE SHRIMP / PRAWN POND BY STATES AND REGIONS

Unit-Acre

No.	States/ Regions	2015-2016	2016-2017	2017-2018	2018 (April to Sep)	2018-2019
1	KaChin	-	-	-	-	-
2	Kayah	-	-			
3	Kayin	130	130	130	130	130
4	Chin	-	-			
5	Sagaing	-	-			
6	Taninthayi	4138	4138	4138	4138	4138
7	Bago	40	40	40	40	40
8	Magway	-	-			
9	Mandalay	-	-			
10	Mon	1125	1125	1125	1125	1124
11	Rakhine	156488	156489	156488	156488	156488
12	Yangon	18442	18916	18681	18731	18781
13	Shan	-	-			
14	Ayeyarwady	57968	60880	63736	63736	63736
15	NayPyi Taw	-	-	-		
	Total	238331	241718	244338	244388	244437

Table. 5. THE PRODUCTION OF LEASABLE FISHERIES AND OPEN FISHERIES

No.	Year	Total number of Leasable (Number)	Production of Leasable Fisheries (Thousand Metric Ton)	Production of Open Fisheries (Thousand Metric Ton)	Total Production of Inland Fisheries (Thousand Metric Ton)
1.	2010-2011	3458	250.04	913.12	1163.16
2.	2011-2012	3415	282.64	963.82	1246.46
3.	2012-2013	3409	290.00	1012.97	1302.97
4.	2013-2014	3290	304.44	1076.59	1381.03
5.	2014-2015	3304	315.36	1147.76	1463.12
6.	2015-2016	3312	338.69	1241.98	1580.67
7.	2016-2017	3299	339.23	1251.13	1590.36
8.	2017-2018	3243	341.02	1253.95	1594.97
9.	2018(April to Sep)	3082	122.74	513.42	636.16
10.	2018-2019	3076	339.36	1260.69	1600.05



Figure 2: Number of Leasable Fisheries in Myanmar (2010-2011 to 2018-2019)

Table.6. FISHING VESSELS

Unit - Number

No.	Year	Small Fishing Boat		Off-shore Vessels		Total
		Powered Boat	Non-Powered Boat	National	Foreign	
1.	2010-2011	13823	15548	2196	396	31963
2.	2011-2012	12288	15463	2598	264	30613
3.	2012-2013	12157	12757	2724	150	27788
4.	2013-2014	12490	13732	2736	153	29111
5.	2014-2015	12240	13391	2840	52	28523
6.	2015-2016	13831	12583	3030	11	29455
7.	2016-2017	16012	10704	3168	48	29932
8.	2017-2018	15084	6802	3219	5	25110
9.	2018(April to Sep)	6292	2901	2417	5	11615
10.	2018-2019	14077	5122	3211	-	22410

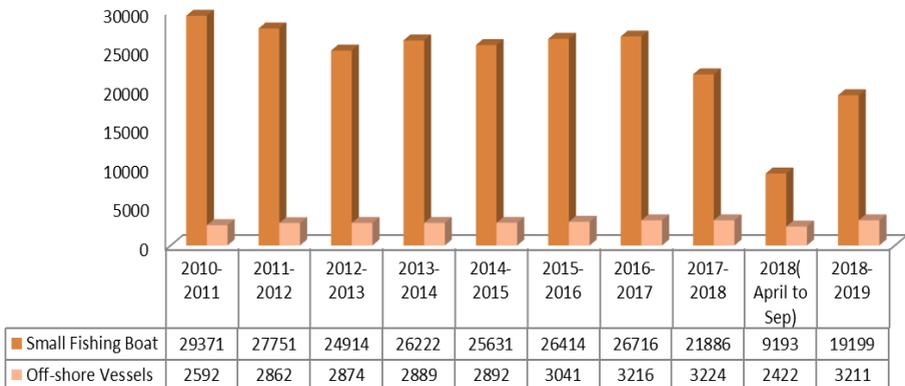


Figure3: Number of Small Fishing Boats and Off –Shore Vessels

Table 7.1. TYPE OF FISHING GEAR IN STATES AND REGIONS

No.	Year	States and Regions	Trawl	Purse Seine	Drift net	Long line	Stick-held falling net	Unit-Number	
								Trap	Total
1.	2010-2011	Head office	487	80	174	6	-	31	778
		Rakhine	5	-	-	-	-	-	5
		Taninthayi	512	88	-	-	29	66	697
		Ayeyarwady	-	-	567	1	-	4	572
		Mon	-	-	144	-	-	-	144
		Yangon	-	-	-	-	-	-	-
		Total	1004	170	885	7	29	101	2196
2.	2011-2012	Head office	549	86	167	6	-	29	837
		Rakhine	9	-	-	-	-	1	10
		Taninthayi	542	187	-	15	302	60	1106
		Ayeyarwady	-	-	503	2	-	3	508
		Mon	-	-	137	-	-	-	137
		Yangon	-	-	-	-	-	-	-
		Total	1100	273	807	23	302	93	2598
3.	2012-2013	Head office	552	74	182	3	-	25	836
		Rakhine	7	3	-	-	-	1	11
		Taninthayi	564	201	-	32	356	64	1217
		Ayeyarwady	1	-	499	2	-	1	503
		Mon	-	-	148	-	-	-	148
		Yangon	1	-	7	1	-	-	9
		Total	1125	278	836	38	356	91	2724
4.	2013-2014	Head office	23	5	5	-	-	2	35
		Rakhine	50	3	-	-	-	1	54
		Taninthayi	565	217	8	27	347	115	1279
		Ayeyarwady	-	-	411	1	-	1	413
		Mon	-	-	166	-	-	-	166
		Yangon	506	62	198	3	-	20	789
		Total	1144	287	788	31	347	139	2736
5.	2014-2015	Head office	587	61	196	2	-	28	874
		Rakhine	2	3	-	-	-	3	8
		Taninthayi	578	219	1	25	327	104	1254
		Ayeyarwady	-	-	494	-	-	1	495
		Mon	-	-	209	-	-	-	209
		Yangon	-	-	-	-	-	-	-
		Total	1167	283	900	27	327	136	2840

Table.7.2. TYPE OF FISHING GEAR IN STATES AND REGIONS

		Unit-Number							
No.	Year	States and Regions	Trawl	Purse Seine	Drift net	Long line	Stick-held falling net	Trap	Total
6.	2015-2016	Head office	612	41	167	1	-	24	845
		Rakhine	-	2	-	-	-	4	6
		Taninthayi	628	241	3	33	351	99	1355
		Ayeyarwady	-	-	498	-	-	-	498
		Mon	-	-	326	-	-	-	326
		Yangon	-	-	-	-	-	-	-
Total			1240	284	994	34	351	127	3030
7.	2016-2017	Head office	706	47	154	1	-	20	928
		Rakhine	-	5	-	-	-	4	9
		Taninthayi	637	270	4	30	395	96	1432
		Ayeyarwady	-	-	477	-	-	1	478
		Mon	-	-	321	-	-	-	321
		Yangon	-	-	-	-	-	-	-
Total			1343	322	956	31	395	121	3168
8.	2017-2018	Head office	730	68	150	1	-	19	968
		Rakhine	-	5	-	-	-	4	9
		Taninthayi	671	257	4	22	391	90	1435
		Ayeyarwady	-	-	485	-	-	1	486
		Mon	-	-	321	-	-	-	321
		Yangon	-	-	-	-	-	-	-
Total			1401	330	960	23	391	114	3219
9.	2018 (April to Sep)	Head office	689	30	119	1	-	17	856
		Rakhine	-	3	-	-	-	2	5
		Taninthayi	669	188	-	15	242	61	1175
		Ayeyarwady	-	-	285	-	-	-	285
		Mon	-	-	96	-	-	-	96
		Yangon	-	-	-	-	-	-	-
Total			1358	221	500	16	242	80	2417
10.	2018-2019	Head office	728	62	150	1	-	18	959
		Rakhine	-	3	-	-	-	3	6
		Taninthayi	698	275	2	19	381	88	1463
		Ayeyarwady	-	-	462	-	-	1	463
		Mon	-	-	320	-	-	-	320
		Yangon	-	-	-	-	-	-	-
Total			1426	340	934	20	381	110	3211

Table.8.FISHERY EXPORTS

Quantity - Metric Ton
Value - US \$ in Million

No.	Year	Fish		Prawns		Others		Total	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1.	2010-2011	273043.74	342.44	19142.91	68.66	81706.06	144.41	373892.71	555.51
2.	2011-2012	283688.76	396.27	17995.03	86.19	85297.53	171.39	386981.32	653.85
3.	2012-2013	266464.97	378.05	17267.93	89.29	93112.79	185.50	376845.69	652.84
4.	2013-2014	237142.31	286.93	16508.97	61.98	91616.08	187.36	345267.36	536.27
5.	2014-2015	225974.93	258.61	17527.33	56.89	94788.33	166.75	338290.59	482.25
6.	2015-2016	246970.93	274.25	13673.49	49.64	108326.47	178.74	368970.89	502.63
7.	2016-2017	290580.04	319.04	13082.46	58.21	135044.01	228.57	438706.51	605.82
8.	2017-2018	394135.80	385.81	15905.44	60.78	158186.09	265.13	568227.33	711.72
9.	2018 (April to Sep)	147802.63	149.12	7206.920	30.38	66064.92	114.03	221074.47	293.53
10.	2018-2019	382135.95	367.44	13979.31	59.98	187561.09	300.84	583676.35	728.26

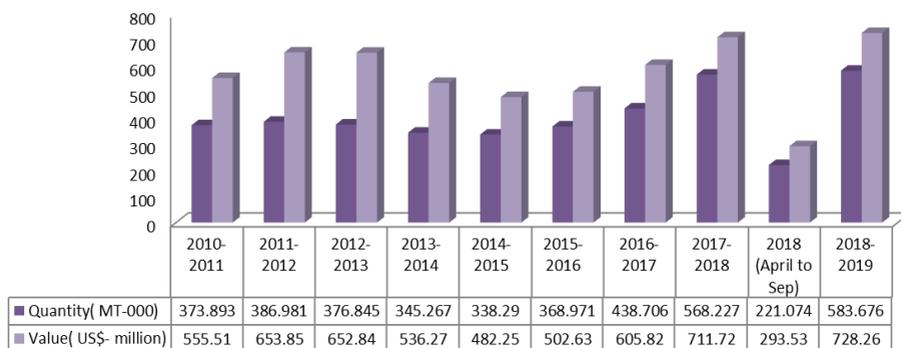


Figure 4: Fish and Fishery Product Exported in Myanmar (2010-2011 to 2018-2019)

Table.9. TOP TEN SPECIES OF EXPORTED FISH AND FISHERIES PRODUCT OF MYANMAR

No.	Species (Common Name)	2018(April to September)	
		MT (Ordinary)	US\$ (Million)
1.	Rohu	34776.934	35.370
2.	Live Mud Crab	7370.921	22.329
3.	Live Eel	5449.283	16.508
4.	Fish Meal	15539.265	14.683
5.	Soft Shell Crab	1414.051	13.522
6.	Ribbon Fish	7634.333	12.507
7.	Tiger	1331.291	10.751
8.	Pink	4240.881	9.527
9.	Trash Fish	22500.846	7.875
10.	Big Eye Croaker	6952.098	7.805

No.	Species (Common Name)	2018-2019	
		MT (Ordinary)	US\$ (Million)
1.	Rohu	57783.525	58.621
2.	Fish Meal	44057.24	43.106
3.	Live Mud Crab	11552.501	36.621
4.	Soft Shell Crab	3042.401	33.390
5.	Ribbon Fish	19056.456	32.809
6.	Live Eel	8661.579	31.022
7.	Hilsa	10076.210	26.945
8.	Squid	14918.917	23.841
9.	Trash Fish	72118.758	23.109
10.	Pink	9100.652	22.075

Table.10.FISHERY PRODUCT EXPORTED BY TRADING COUNTRIES (2018 April to September)

US\$-Million

No	Country	Fish		Prawn		Other		Total	
		MT	US\$	MT	US\$	MT	US\$	MT	US\$
1	Taiwan	16.900	0.090	185.750	0.548	164.849	0.800	367.499	1.438
2	Malaysia	1271.441	2.087	725.443	3.774	2041.286	5.982	4038.170	11.843
3	Oman	2707.872	2.855	6.261	0.010	14.981	0.027	2729.114	2.892
4	Saudi	2260.214	4.360	2.620	0.005	104.625	0.198	2367.459	4.563
5	U.S.A	1857.584	3.142	124.865	1.226	604.686	6.101	2587.135	10.469
6	Singapore	9831.725	11.992	148.612	0.327	556.707	1.495	10537.044	13.814
7	China	9306.647	17.595	1704.035	5.467	36748.288	59.052	47758.970	82.114
8	Hong Kong			699.087	5.460	200.316	2.475	899.403	7.935
9	Bahrain	3228.753	3.497	2.005	0.004	13.497	0.023	3244.255	3.524
10	U.K	2999.808	5.805	6.542	0.014	82.682	0.305	3089.032	6.124
11	Kuwait	3823.537	4.003	1.730	0.005	9.346	0.018	3834.613	4.026
12	U.A E	9029.751	9.720	24.165	0.061	30.775	0.183	9084.691	9.964
13	Japan	38.243	0.052	1639.064	9.105	1525.514	3.860	3202.821	13.017
14	Bangladesh	6315.262	6.515	0.150	0.001	936.380	0.716	7251.792	7.232
15	Iraq	4165.490	4.150					4165.490	4.150
16	Thailand	83707.972	64.068	1817.174	3.511	21206.888	28.326	106732.034	95.905
17	Qatar	3728.649	4.023	11.827	0.028	34.664	0.063	3775.140	4.114
18	Australia	324.803	0.470	0.872	0.003	291.980	1.295	617.655	1.768
19	Italy	1155.380	1.694			4.000	0.006	1159.380	1.700
20	Korea	142.066	0.214			491.570	1.318	633.636	1.532
21	India	448.890	0.835					448.890	0.835
22	France	22.994	0.045			57.424	0.290	80.418	0.335
23	Vietnam	12.007	0.011	48.653	0.523	900.820	1.302	961.480	1.836
24	Cyprus	11.500	0.016			0.500	0.001	12.000	0.017
25	South Africa	230.163	0.284	4.854	0.009	3.350	0.007	238.367	0.300
26	Canada	324.790	0.531			1.600	0.003	326.390	0.534
27	Jordon	189.814	0.210	0.937	0.004	2.000	0.003	192.751	0.217
28	Netherland	145.350	0.185			0.250	0.001	145.600	0.186
29	Sweden	87.920	0.129					87.920	0.129
30	Greece	48.000	0.058					48.000	0.058
31	Brunei	72.574	0.106					72.574	0.106
32	Belgium	142.256	0.213	49.470	0.280	10.250	0.019	201.976	0.512
33	Philippine					7.500	0.064	7.500	0.064
34	Germany	22.272	0.033					22.272	0.033
35	Macao					1.550	0.040	1.550	0.040
36	Newzealand			0.688	0.005	9.253	0.041	9.941	0.046
37	Bulgaria			2.121	0.008	7.387	0.011	9.508	0.019
38	Turkey	53.000	0.054					53.000	0.054
39	Pakistan	79.000	0.081					79.000	0.081
	Total	147802.627	149.123	7206.925	30.378	66064.918	114.025	221074.470	293.526

Table.11.FISHERY PRODUCT EXPORTED BY TRADING COUNTRIES (2018-2019)

US\$-Million

No	Country	Fish		Prawn		Other		Total	
		MT	US\$	MT	US\$	MT	US\$	MT	US\$
1	Thailand	244908.053	170.082	3587.362	9.113	56506.639	78.463	305002.054	257.658
2	China	24039.153	46.641	4211.404	10.933	109009.015	147.244	137259.572	204.818
3	Japan	172.387	1.042	3232.197	20.986	3423.901	10.853	6828.485	32.881
4	Singapore	17865.464	23.317	387.114	1.38	1127.272	3.212	19379.85	27.909
5	U.S.A	3898.617	6.828	182.808	1.537	1583.728	17.241	5665.153	25.606
6	Malaysia	3912.205	6.188	607.938	4.081	5652.201	14.515	10172.344	24.784
7	Saudi	9452.228	18.032	1.162	0.002	452.336	0.796	9905.726	18.83
8	U.AE	15853.243	16.872	20.456	0.063	81.062	0.421	15954.761	17.356
9	Hong Kong	0.495	0.003	1297.303	10.212	413.953	7.12	1711.751	17.335
10	U.K	7519.413	15.389	22.506	0.058	254.791	1.189	7796.71	16.636
11	Bahrain	14309.792	15.86	3.122	0.006	97.417	0.173	14410.331	16.039
12	Bangladesh	9501.048	9.419			3054.093	2.29	12555.141	11.709
13	Iraq	8802.145	8.869					8802.145	8.869
14	Qatar	5800.01	6.175	12.237	0.025	80.651	0.145	5892.898	6.345
15	Australia	651.478	1.495			787.955	4.534	1439.433	6.029
16	Oman	5106.305	5.432	6.772	0.013	120.135	0.228	5233.212	5.673
17	Taiwan	2.421	0.005	297.789	0.832	782.119	4.096	1082.329	4.933
18	Kuwait	4165.67	4.499	1.21	0.003	36.445	0.066	4203.325	4.568
19	Korea	323.815	0.516	0.823	0.003	1551.143	3.671	1875.781	4.19
20	India	1477.873	4			35.5	0.026	1513.373	4.026
21	Vietnam			35.121	0.286	2185.196	2.496	2220.317	2.782
22	Italy	1548.044	2.555	0.8	0.008			1548.844	2.563
23	Canada	772.617	1.352	0.3	0.001	1.451	0.001	774.368	1.354
24	France	18.041	0.029			160.862	0.996	178.903	1.025
25	South Africa	545.211	0.681	10.309	0.012	8.24	0.015	563.76	0.708
26	Belgium	236.541	0.388	39.06	0.298	0.02	0	275.621	0.686
27	Sweden	272.348	0.404	11.232	0.098			283.58	0.502
28	Netherland	285.013	0.409			12.157	0.065	297.17	0.474
29	Macao	0.020	0			14.04	0.386	14.06	0.386
30	Spain					77.28	0.251	77.28	0.251
31	Brunei	153.167	0.248			0.811	0.001	153.978	0.249
32	Germany	75.108	0.125			11.44	0.066	86.548	0.191
33	Jordon	108.5	0.159			1	0.002	109.5	0.161
34	Philipine					14.82	0.149	14.82	0.149
35	Labenon	74.095	0.101			9.075	0.019	83.17	0.12
36	Ireland	49.109	0.089					49.109	0.089
37	Greece	73.032	0.088					73.032	0.088
38	Newzealand					8.288	0.08	8.288	0.08
39	Bulgaria			10.284	0.031	5.375	0.023	15.659	0.054
40	Inycost	79.44	0.053					79.44	0.053
41	Denmark	24	0.028					24	0.028
42	Pakistan	27	0.028					27	0.028
43	Moldives	22.07	0.022			0.168	0.001	22.238	0.023
44	Cyprus	10.785	0.016					10.785	0.016
45	Turkey					0.51	0.003	0.51	0.003
	Total	382135.956	367.439	13979.309	59.981	187561.089	300.837	583676.354	728.257

Table.12.1.TOP TEN COUNTRIES EXPORTED FISHERY PRODUCTS

2010-2011			2011-2012		
Countries	MT	US-Million	Countries	MT	US-Million
China	77914.27	179.704	China	92775.645	258.759
Thailand	134634.31	110.595	Thailand	136278.599	124.457
Singapore	25413.33	59.378	Malaysia	23325.904	53.623
Kuwait	50643.82	56.683	Kuwait	45496.48	51.155
Malaysia	20669.93	39.419	Singapore	15881.889	34.522
Saudi	19474.26	24.673	Japan	6839.415	30.361
Japan	7197.15	21.882	Saudi	20771.696	28.610
UAE	12292.49	17.789	Bangladesh	17296.858	23.124
Bangladesh	11372.95	14.166	UAE	16045.361	21.320
UK	6488.43	13.085	UK	6275.849	13.845
2012-2013			2013-2014		
Countries	MT	US-Million	Countries	MT	US-Million
Chian	90780.734	244.249	China	82665.926	199.290
Thailand	137631.665	133.165	Thailand	126645.544	128.980
Singapore	26584.477	49.748	Malaysia	16459.550	35.285
Kuwait	34515.926	49.153	Kuwait	26196.712	27.051
Malaysia	19288.339	45.678	Singapore	20086.003	25.220
Japan	6895.203	34.971	Saudi	19672.380	24.370
Saudi	21738.835	31.806	Japan	6490.001	23.511
UAE	15142.596	19.424	UAE	16008.274	18.271
UK	6341.289	14.561	UK	7123.743	13.839
Bangladesh	9529.391	11.978	Bangladesh	8190.575	8.500
2014-2015			2015-2016		
Countries	MT	US-Million	Countries	MT	US-Million
Chian	75732.900	169.685	Chian	75732.900	169.685
Thailand	127537.529	127.750	Thailand	127537.529	127.750
Malaysia	16769.467	31.400	Malaysia	16769.467	31.400
Singapore	21453.699	22.959	Singapore	21453.699	22.959
Saudi	20689.382	22.353	Saudi	20689.382	22.353
Kuwait	23428.406	21.935	Kuwait	23428.406	21.935
Japan	6750.174	18.846	Japan	6750.174	18.846
UAE	13838.681	14.588	UAE	13838.681	14.588
UK	5654.002	10.189	UK	5654.002	10.189
Bangladesh	7602.536	9.013	Bangladesh	7602.536	9.013

Table.12.2.TOP TEN COUNTRIES EXPORTED FISHERY PRODUCTS

2016-2017			2017-2018		
Countries	MT	US-Million	Countries	MT	US-Million
Thailand	211097.950	198.709	Thailand	301984.934	258.808
China	100200.229	190.119	China	117797.366	197.963
Malaysia	11629.971	35.349	Singapore	27407.662	36.637
Japan	6049.425	24.583	Malaysia	12603.042	33.325
Saudi	21129.795	23.919	Saudi	25411.982	28.879
Singapore	15076.495	22.710	Japan	7132.693	27.672
Bangladesh	11117.243	15.393	USA	5086.237	18.852
UAE	13884.501	14.897	UAE	13815.933	15.425
UK	6609.502	12.516	UK	7386.898	14.338
USA	3525.811	12.146	Bangladesh	11696.075	14.292

2018(April to September)			2018-2019		
Countries	MT	US-Million	Countries	MT	US-Million
Thailand	106732.034	95.905	Thailand	305002.054	257.658
China	47758.97	82.114	China	137259.572	204.818
Singapore	10537.044	13.814	Japan	6828.485	32.881
Japan	3202.821	13.017	Singapore	19379.85	27.909
Malaysia	4038.170	11.843	USA	5665.153	25.606
U.S.A	2587.135	10.469	Malaysia	10172.344	24.784
U.A.E	9084.691	9.964	Saudi	9905.726	18.830
Hong Kong	899.403	7.935	UAE	15954.761	17.356
Bangladesh	7251.792	7.232	Hong Kong	1711.751	17.335
U.K	3089.032	6.124	UK	7796.710	16.636

Table.13. FISH SUPPLY IN YANGON

Unit - Thousand Metric Ton

No.	Year	Fish Supply		
		Fresh Water	Marine	Total
1.	2010-2011	93.07	138.44	231.51
2.	2011-2012	97.67	152.94	250.61
3.	2012-2013	94.68	167.01	261.69
4.	2013-2014	135.04	166.42	301.46
5.	2014-2015	142.45	152.95	295.40
6.	2015-2016	127.56	159.46	287.02
7.	2016-2017	124.65	170.58	295.23
8.	2017-2018	114.45	153.44	267.89
9.	2018 (A to Sep)	50.67	49.01	99.68
10.	2018-2019	118.40	137.01	255.41

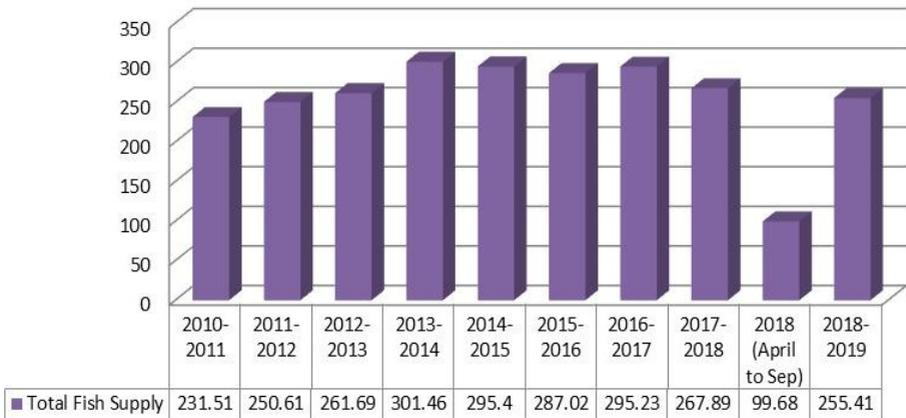


Figure 5: Fish Supply in Yangon (2010-2011 to 2018-2019)

Table. 14.1. SEED PRODUCTION BY FISH HATCHERIES UNDER DOF

Unit: Million

No.	Myanmar Name	Common Name	Scientific Name	2010-11	2011-12	2012-13	2013-14
1.	Nga Myit Chin	Rohu	<i>Labeo rohita</i>	460.179	535.409	549.201	384.861
2.	Shwe Wa Nga Gyin	Common carp	<i>Cyprinus carpio</i>	83.882	49.223	45.579	41.914
3.	Myetsar Nga Gyin	Grass carp	<i>Ctenopharyngodon idellus</i>	8.397	3.833	13.400	5.598
4.	Nga Khaung Pwa	Catla	<i>Catla catla</i>	11.733	6.547	9.637	7.054
5.	Tilapia	Tilapia	<i>Tilapia spp:</i>	18.363	17.883	13.063	13.571
6.	Ngwe Yaung Nga Gyin	Silver carp	<i>Hypophthalmichthys molitrix</i>	5.629	6.894	5.246	5.533
7.	Ghaung Gyi Nga Khu	Big Head	<i>Hypophthalmichthys nobilis</i>	3.8	3.539	2.305	2.785
8.	Nga Khu	Catfish	<i>Clarias batrachus</i>	-	0.050	-	-
9.	Nga Dan	Striped catfish	<i>Pangasianodon hypophthalmus</i>	9.384	5.660	8.976	7.111
10.	Nga Phan Ma	Carplet	<i>Osteobrama alfredianus</i>	-	-	-	-
11.	Nga Gyin Phyu	Mrigal	<i>Cirrhinus mrigala</i>	6.652	4.554	6.087	2.854
12.	Ye Cho Nga Mote	Pacu	<i>Piaractus brachypomum</i>	6.733	3.690	7.633	5.569
13.	Nga Khone Ma	Tarpian	<i>Punctius gonionotus</i>	181.439	112.761	127.863	73.478
14.	Nga Thiyine	Minor carp	<i>Leabo sdolizkae</i>	-	-	-	-
15.	Be Lar	Snakeskin gourami	<i>Trichogaster pectoralis</i>	-	0.020	-	-
16.	Vietnam Nga Dan	Basa catfish	<i>Pangasius bacourti</i>	0.060	-	-	-
17.	Nga Kye	Scorpion catfish	<i>Heteropneustes fossilis</i>	0.002	0.300	0.250	0.100
18.	Nga Phane	Nga phane	<i>Cyprinus intha</i>	-	0.003	0.218	0.353
19.	Sultan	Sultan fish	<i>Leptobarbus hoevenii</i>	-	0.004	-	0.060
20.	Nga Ohn Tone	Nandina	<i>Labeo nandina</i>	-	-	0.065	-
21.	Nga Dane	Kuria labeo	<i>Labeo gonius</i>	-	-	0.100	-
22.	Taung Paw Nga Thar Lauk	Streaked prochilod	<i>Prochilodus lineatus</i>	-	-	-	0.565
Total				796.253	750.370	789.623	551.406

Table. 14.2. SEED PRODUCTION BY FISH HATCHERIES UNDER DOF

No.	Myanmar Name	Common Name	Scientific Name	2014-15	2015-16	2016-17	2017-18
1.	Nga Myit Chin	Rohu	<i>Labeo rohita</i>	397.569	419.600	455.631	434.623
2.	Shwe Wa Nga Gyin	Common carp	<i>Cyprinus carpio</i>	38.751	35.981	46.795	41.818
3.	Myetsar Nga Gyin	Grass carp	<i>Ctenopharyngodon idellus</i>	5.483	5.378	7.074	7.337
4.	Nga Khaung Pwa	Catla	<i>Catla catla</i>	6.976	6.877	9.191	7.987
5.	Tilapia	Tilapia	<i>Tilapia spp:</i>	11.492	11.792	15.446	14.329
6.	Ngwe Yaung Nga Gyin	Silver carp	<i>Hypophthalmichthys molitrix</i>	4.715	4.146	6.432	6.72
7.	Ghaung Gyi Nga Gyin	Big Head	<i>Hypophthalmichthys nobilis</i>	2.203	2.830	2.124	3.153
8.	Nga Khu	Catfish	<i>Clarias batrachus</i>	0.001	-	-	-
9.	Nga Dan	Striped catfish	<i>Pangasianodon hypophthalmus</i>	5.675	7.787	8.301	9.310
10.	Nga Phan Ma	Carplet	<i>Osteobrama alfredianus</i>	0.105	-	0.055	-
11.	Nga Gyin Phyu	Mrigal	<i>Cirrhinus mrigala</i>	2.275	3.190	4.735	6.197
12.	Ye Cho Nga Mote	Pacu	<i>Piaractus brachypomum</i>	7.325	8.265	7.810	8.455
13.	Nga Khone Ma	Tarpian	<i>Puntius gonionotus</i>	89.541	100.879	79.120	89.759
14.	Nga Thyine	Minor carp	<i>Leabo sdolizkae</i>	-	-	0.152	0.015
15.	Be Lar	Snakeskin gourami	<i>Trichogaster pectoralis</i>	-	0.170	0.186	-
16.	Nga Pyayma	Climbing perch	<i>Ananas testudine</i>	-	-	-	-
17.	Nga Kye	Scorpion catfish	<i>Heteropneustes fossilis</i>	0.050	0.100	0.110	0.120
18.	Nga Phane	Nga phane	<i>Cyprinus intha</i>	1.651	1.103	0.610	1.050
19.	Sultan	Sultan fish	<i>Leptobarbus hoevenii</i>	-	-	-	0.075
20.	Nga Ohn Tone	Nandina	<i>Labeo nandina</i>	-	-	-	-
21.	Nga Dane	Kuria labeo	<i>Labeo gonius</i>	-	0.050	0.100	0.10
22.	Taung Paw Nga Thar Lauk	Streaked prochilod	<i>Prochilodus lineatus</i>	1.600	0.550	0.220	0.12
Total				575.412	608.698	644.092	631.168

Table.14.3. SEED PRODUCTION BY FISH HATCHERIES UNDER DOF

No.	Myanmar Name	Common Name	Scientific Name	Unit - Million	
				2018 (A to Sep)	2018-2019
1.	Nga Myit Chin	Rohu	<i>Labeo rohita</i>	341.658	445.531
2.	Shwe Wa Nga Gyin	Common carp	<i>Cyprinus carpio</i>	32.425	49.502
3.	Myetsar Nga Gyin	Grass carp	<i>Ctenopharyngodon idellus</i>	6.389	9.803
4.	Nga Khaung Pwa	Catla	<i>Catla catla</i>	5.415	8.336
5.	Tilapia	Tilapia	<i>Tilapia spp:</i>	9.452	15.709
6.	Ngwe Yaung Nga Gyin	Silver carp	<i>Hypophthalmichthys molitrix</i>	6.019	6.465
7.	Ghaung Gyi Nga Gyin	Big Head	<i>Hypophthalmichthys nobilis</i>	2.575	3.900
8.	Nga Khu	Catfish	<i>Clarias batrachus</i>	-	-
9.	Nga Dan	Striped catfish	<i>Pangasianodon hypophthalmus</i>	6.077	15.238
10.	Nga Phan Ma	Carplet	<i>Osteobrama alfredianus</i>	-	0.250
11.	Nga Gyin Phyu	Mrigal	<i>Cirrhinus mrigala</i>	3.722	7.010
12.	Ye Cho Nga Mote	Pacu	<i>Piaractus brachypomum</i>	5.050	9.012
13.	Nga Khone Ma	Tarpian	<i>Punctius gonionotus</i>	65.372	106.897
14.	Nga Thiyne	Minor carp	<i>Leabo sdolizkae</i>	-	-
15.	Be Lar	Snakeskin gourami	<i>Trichogaster pectoralis</i>	-	-
16.	Nga Pyayma	Climbing perch	<i>Ananas testudine</i>	0.200	0.300
17.	Nga Kye	Scorpion catfish	<i>Heteropneustes fossilis</i>	0.140	0.180
18.	Nga Phane	Nga phane	<i>Cyprinus intha</i>	0.480	0.720
19.	Sultan	Sultan fish	<i>Leptobarbus hoevenii</i>	-	0.050
20.	Nga Ohn Tone	Nandina	<i>Labeo nandina</i>	-	-
21.	Nga Dane	Kuria labeo	<i>Labeo gonius</i>	0.100	0.100
22.	Taung Paw Nga Thar Lauk	Streaked prochilod	<i>Prochilodus lineatus</i>	0.205	1.029
Total				485.279	680.032

Table.15.FISH HATCHERIES UNDER DOF (2010-2011)

			Unit - Million
No.	Fish Hatcheries	Location	Production
	Yangon Region		186.762
1.	Hlaw Kar	Mingalardone Township, Yangon.	101.801
2.	Twante	Twante Township	44.490
3.	Laydaukkan	Dagon(east) Township	40.471
	Bago Region		68.228
4.	Bago (Kali)	Bago Township	40.089
5.	Thanappin	Thanappin Township	15.442
6.	Oakpho	Oakpho Township	12.697
	Mandalay Region		373.521
7.	Pathein Gyi	Pathein Gyi Township	97.871
8.	Myit Thar	Myit Thar Township	110.999
9.	Natyekan	A-ma-ya-pu-ya Township	58.951
10.	Pyinmanar	Pyin-ma-nar Township	78.660
11.	Matayar	Ma-ta-yar Township	27.040
	Ayeyarwady Region		101.779
12.	Pathein	Pathein Township	20.893
13.	Talotehla	Ma-u-bin Township	10.820
14.	Hinthada	Hin-tha-da Township	9.631
15.	Pantanaw	Pan-ta-naw Township	35.232
16.	Aung hate	Ma-u-bin Township	25.203
	Magway Region		8.584
17.	Taungdwingyi	Magway Township	5.519
18.	Pwint Phyu	Pwint Phyu Township	3.065
	Kachin State		19.011
19.	Waing-maw	Waing-maw Township	9.259
20.	Bamaw	Bamaw Township	9.752
	Sagaing Region		26.655
21.	Shwe Bo	Shwe Bo Township	10.617
22.	Yay Oo	Yay Oo Township	10.329
23.	Htee chaint	Kalay Township	5.709
	Mon State		5.129
24.	Thahtone	Thahtone Township	5.129
	Shan State		3.067
25.	Nyaung Shwe	Nyaung Shwe Township	3.067
	Kayin State		3.517
26.	Pha aan	Pha-aan Township	3.517

Table.16.FISH HATCHERIES UNDER DOF (2011-2012)

			Unit - Million
No.	Fish Hatcheries	Location	Production
Yangon Region			180.268
1.	Hlaw Kar	Mingalardone Township	81.844
2.	Twante	Twante Township	47.555
3.	Laydaukkan	Dagon(east) Township	50.869
Bago Region			69.665
4.	Bago (Kali)	Bago Township	39.964
5.	Thanappin	Thanappin Township	15.156
6.	Oakpho	Oakpho Township	14.545
Mandalay Region			314.509
7.	Pathein Gyi	Pathein Gyi Township	82.420
8.	Myit Thar	Myit Thar Township	77.225
9.	Natyekan	A-ma-ya-pu-ya Township	37.111
10.	Pyinmanar	Pyin-ma-nar Township	100.070
11.	Matayar	Ma-ta-yar Township	17.683
Ayeyarwady Region			128.953
12.	Pathein	Pathein Township	25.896
13.	Talotehla	Ma-u-bin Township	15.252
14.	Hinthada	Hin-tha-da Township	13.010
15.	Pantanaw	Pan-ta-naw Township	47.436
16.	Aung hate	Ma-u-bin Township	27.359
Magway Region			7.532
17.	Taungdwingyi	Magway Township	4.582
18.	Pwint Phyu	Pwint Phyu Township	2.950
Kachin State			13.630
19.	Waing-maw	Waing-maw Township	8.089
20.	Bamaw	Bamaw Township	5.521
21.	Putao	Putao Township	0.020
Sagaing Region			23.987
22.	Shwe Bo	Shwe Bo Township	5.353
23.	Yay Oo	Yay Oo Township	11.814
24.	Htee chaint	Kalay Township	6.820
Mon State			6.713
25.	Thahtone	Thahtone Township	6.713
Shan State			2.915
26.	Nyaung Shwe	Nyaung Shwe Township	2.915
Kayin State			2.197
27.	Pha aan	Pha-aan Township	2.197

Table. 17. FISH HATCHERIES UNDER DOF(2012-2013)

			Unit - Million
No.	Fish Hatcheries	Location	Production
	Yangon Region		177.925
1.	Hlaw Kar	Mingalardone Township	80.445
2.	Twante	Twante Township	37.638
3.	Laydaukkan	Dagon(east)Township	59.842
	Bago Region		74.165
4.	Bago (Kali)	Bago Township	40.343
5.	Thanappin	Thanappin Township	17.098
6.	Oakpho	Oakpho Township	16.724
	Mandalay Region		290.901
7.	Pathein Gyi	Pathein Gyi Township	87.519
8.	Myit Thar	Myit Thar Township	99.661
9.	Natyekan	A-ma-ya-pu-ya Township	78.626
10.	Matayar	Ma-ta-yar Township	25.095
	Nay Pyi Taw		56.296
11.	Pyinmanar	Pyin-ma-nar Township	56.296
	Ayeyarwady Region		127.650
12.	Pathein	Pathein Township	20.702
13.	Talotehla	Ma-u-bin Township	15.981
14.	Hinthada	Hin-tha-da Township	11.918
15.	Pantanaw	Pan-ta-naw Township	54.355
16.	Aung hate	Ma-u-bin Township	24.694
	Magway Region		10.657
17.	Taungdwingyi	Magway Township	5.279
18.	Pwint Phyu	Pwint Phyu Township	5.378
	Kachin State		16.736
19.	Waing-maw	Waing-maw Township	9.866
20.	Bamaw	Bamaw Township	6.870
	Sagaing Region		21.375
21.	Shwe Bo	Shwe Bo Township	6.452
22.	Yay Oo	Yay Oo Township	10.293
23.	Htee chaint	Htee chaint Township	4.630
	Mon State		7.101
24.	Thahtone	Thahtone Township	7.101
	Shan State		4.818
25.	Nyaung Shwe	Nyaung Shwe Township	4.818
	Kayin State		1.999
26.	Pha aan	Pha aan Township	1.999

Table.18. FISH HATCHERIES UNDER DOF (2013-2014)

			Unit - Million
No.	Fish Hatcheries	Location	Production
Yangon Region			141.582
1.	Hlaw Kar	Mingalardone Township	59.329
2.	Twante	Twante Township	44.549
3.	Laydaukkan	Dagon(east)Township	37.704
Bago Region			73.114
4.	Bago (Kali)	Bago Township	35.608
5.	Thanappin	Thanappin Township	15.161
6.	Oakpho	Oakpho Township	22.345
Mandalay Region			186.448
7.	Pathein Gyi	Pathein Gyi Township	79.267
8.	Myit Thar	Myit Thar Township	58.215
9.	Natyekan	A-ma-ya-pu-ya Township	36.549
10.	Matayar	Ma-ta-yar Township	12.417
Nay Pyi Taw Council			19.719
11.	Pyinmanar	Pyin-ma-nar Township	19.719
Ayeyarwady Region			79.279
12.	Pathein	Pathein Township	19.095
13.	Talotehla	Ma-u-bin Township	13.046
14.	Hinthada	Hin-tha-da Township	13.400
15.	Pantanaw	Pan-ta-naw Township	19.374
16.	Aung hate	Ma-u-bin Township	14.364
Magway Region			9.404
17.	Taungdwingyi	Magway Township	3.671
18.	Pwint Phyu	Pwint Phyu Township	5.733
Kachin State			11.447
19.	Waing-maw	Waing-maw Township	5.741
20.	Bamaw	Bamaw Township	5.706
Sagaing Region			21.694
21.	Shwe Bo	Shwe Bo Township	6.589
22.	Yay Oo	Yay Oo Township	9.53
23.	Htee chaint	Htee chaint Township	5.575
Mon State			3.142
24.	Thahtone	Thahtone Township	3.142
Shan State			3.125
25.	Nyaung Shwe	Nyaung Shwe Township	3.125
Kayin State			2.452
26.	Pha aan	Pha aan Township	2.452

Table.19. FISH HATCHERIES UNDER DOF (2014-2015)

			Unit - Million
No.	Fish Hatcheries	Location	Production
Yangon Region			152.836
1.	Hlaw Kar	Mingalardone Township	73.744
2.	Twante	Twante Township	40.652
3.	Laydaukkan	Dagon(east) Township	38.440
Bago Region			68.640
4.	Bago (Kali)	Bago Township	35.226
5.	Thanappin	Thanappin Township	17.772
6.	Oakpho	Oakpho Township	15.642
Mandalay Region			157.184
7.	Pathein Gyi	Pathein Gyi Township	73.936
8.	Myit Thar	Myit Thar Township	59.268
9.	Natyekan	A-ma-ya-pu-ya Township	11.494
10.	Matayar	Ma-ta-yar Township	12.486
Nay Pyi Taw			56.156
11.	Pyinmanar	Pyin-ma-nar Township	56.156
Ayeyarwady Region			86.250
12.	Pathein	Pathein Township	19.813
13.	Talotehla	Ma-u-bin Township	14.936
14.	Hinthada	Hin-tha-da Township	14.439
15.	Pantanaw	Pan-ta-naw Township	22.523
16.	Aung hate	Ma-u-bin Township	14.539
Magway Region			8.489
17.	Taungdwingyi	Taungdwingyi Township	4.053
18.	Pwint Phyu	Pwint Phyu Township	4.436
Kachin State			9.893
19.	Waing-maw	Waing-maw Township	3.892
20.	Bamaw	Bamaw Township	6.001
Sagaing Region			25.072
21.	Shwe Bo	Shwe Bo Township	7.481
22.	Yay Oo	Yay Oo Township	11.334
23.	Htee chaint	Htee chaint Township	6.257
Mon State			3.218
24.	Thahtone	Thahtone Township	3.218
Shan State			4.458
25.	Nyaung Shwe	Nyaung Shwe Township	4.458
Kayin State			3.216
26.	Pha aan	Pha aan Township	3.216

Table.20. FISH HATCHERIES UNDER DOF (2015-2016)

			Unit - Million
No.	Fish Hatcheries	Location	Production
Yangon Region			165.363
1.	Hlaw Kar	Mingalardone Township	80.407
2.	Twante	Twante Township	42.011
3.	Laydaukkan	Dagon(east) Township	42.945
Bago Region			69.995
4.	Bago (Kali)	Bago Township	35.570
5.	Thanappin	Thanappin Township	18.214
6.	Oakpho	Oakpho Township	16.211
Mandalay Region			174.461
7.	Pathein Gyi	Pathein Gyi Township	77.043
8.	Myit Thar	Myit Thar Township	71.063
9.	Natyekan	A-ma-ya-pu-ya Township	0.010
10.	Matayar	Ma-ta-yar Township	26.345
Nay Pyi Taw			56.149
11.	Pyinmanar	Pyin-ma-nar Township	56.149
Ayeyarwady Region			83.440
12.	Pathein	Pathein Township	19.367
13.	Talotehla	Ma-u-bin Township	17.366
14.	Hinthada	Hin-tha-da Township	12.460
15.	Pantanaw	Pan-ta-naw Township	20.695
16.	Aung hate	Ma-u-bin Township	13.552
Magway Region			9.546
17.	Taungdwingyi	Taungdwingyi Township	4.296
18.	Pwint Phyu	Pwint Phyu Township	5.250
Kachin State			10.914
19.	Waing-maw	Waing-maw Township	4.479
20.	Bamaw	Bamaw Township	6.435
Sagaing Region			26.263
21.	Shwe Bo	Shwe Bo Township	7.904
22.	Yay Oo	Yay Oo Township	11.389
23.	Htee chaint	Htee chaint Township	6.970
Mon State			3.403
24.	Thahtone	Thahtone Township	3.403
Shan State			5.835
25.	Nyaung Shwe	Nyaung Shwe Township	5.835
Kayin State			3.329
26.	Pha aan	Pha aan Township	3.329

Table.21. FISH HATCHERIES UNDER DOF (2016-2017)

			Unit - Million
No.	Fish Hatcheries	Location	Production
Yangon Region			164.758
1.	Hlaw Kar	Mingalardone Township	80.368
2.	Twante	Twante Township	43.887
3.	Laydaukkan	Dagon(east) Township	40.503
Bago Region			74.613
4.	Bago (Kali)	Bago Township	38.061
5.	Thanappin	Thanappin Township	18.930
6.	Oakpho	Oakpho Township	17.622
Mandalay Region			181.209
7.	Pathein Gyi	Pathein Gyi Township	77.195
8.	Myit Thar	Myit Thar Township	74.754
9.	Natyekan	A-ma-ya-pu-ya Township	-
10.	Matayar	Ma-ta-yar Township	29.260
Nay Pyi Taw			57.287
11.	Pyinmanar	Pyin-ma-nar Township	57.287
Ayeyarwady Region			106.128
12.	Pathein	Pathein Township	19.202
13.	Talotehla	Ma-u-bin Township	20.285
14.	Hinthada	Hin-tha-da Township	16.179
15.	Pantanaw	Pan-ta-naw Township	25.998
16.	Aung hate	Ma-u-bin Township	24.464
Magway Region			9.391
17.	Taungdwingyi	Taungdwingyi Township	4.361
18.	Pwint Phyu	Pwint Phyu Township	5.030
Kachin State			11.706
19.	Waing-maw	Waing-maw Township	5.702
20.	Bamaw	Bamaw Township	6.004
Sagaing Region			27.188
21.	Shwe Bo	Shwe Bo Township	7.914
22.	Yay Oo	Yay Oo Township	10.912
23.	Htee chaint	Htee chaint Township	8.362
Mon State			4.168
24.	Thahtone	Thahtone Township	4.168
Shan State			4.236
25.	Nyaung Shwe	Nyaung Shwe Township	4.236
Kayin State			3.408
26.	Pha aan	Pha aan Township	3.408

Table.22. FISH HATCHERIES UNDER DOF (2017-2018)

			Unit - Million
No.	Fish Hatcheries	Location	Production
Yangon Region			161.884
1.	Hlaw Kar	Mingalardone Township	79.822
2.	Twante	Twante Township	41.080
3.	Laydaukkan	Dagon(east) Township	40.982
Bago Region			74.317
4.	Bago (Kali)	Bago Township	32.360
5.	Thanappin	Thanappin Township	27.191
6.	Oakpho	Oakpho Township	14.766
Mandalay Region			179.668
7.	Pathein Gyi	Pathein Gyi Township	70.454
8.	Myit Thar	Myit Thar Township	71.098
9.	Natyekan	A-ma-ya-pu-ya Township	10.086
10.	Matayar	Ma-ta-yar Township	28.030
Nay Pyi Taw			57.566
11.	Pyinmanar	Pyin-ma-nar Township	57.566
Ayeyarwady Region			90.519
12.	Pathein	Pathein Township	14.805
13.	Talotehla	Ma-u-bin Township	20.500
14.	Hinthada	Hin-tha-da Township	14.220
15.	Pantanaw	Pan-ta-naw Township	29.277
16.	Aung hate	Ma-u-bin Township	11.717
Magway Region			11.433
17.	Taungdwingyi	Taungdwingyi Township	4.660
18.	Pwint Phyu	Pwint Phyu Township	6.773
Kachin State			12.517
19.	Waing-maw	Waing-maw Township	5.656
20.	Bamaw	Bamaw Township	6.756
21.	Putao	Putao Township	0.105
Sagaing Region			30.987
22.	Shwe Bo	Shwe Bo Township	8.241
23.	Yay Oo	Yay Oo Township	10.550
24.	Htee chaint	Htee chaint Township	12.196
Mon State			4.291
25.	Thahtone	Thahtone Township	4.291
Shan State			4.584
26.	Nyaung Shwe	Nyaung Shwe Township	4.584
Kayin State			3.402
27.	Pha aan	Pha aan Township	3.402

Table.23. FISH HATCHERIES UNDER DOF (2018 April to September)

			Unit - Million
No.	Fish Hatcheries	Location	Production
Yangon Region			144.665
1.	Hlaw Kar	Mingalardone Township	79.275
2.	Twante	Twante Township	29.276
3.	Laydaukkan	Dagon(east) Township	36.114
Bago Region			48.444
4.	Bago (Kali)	Bago Township	15.481
5.	Thanappin	Thanappin Township	17.512
6.	Oakpho	Oakpho Township	15.451
Mandalay Region			146.782
7.	Pathein Gyi	Pathein Gyi Township	54.485
8.	Myit Thar	Myit Thar Township	53.986
9.	Natyekan	A-ma-ya-pu-ya Township	19.816
10.	Matayar	Ma-ta-yar Township	18.495
Nay Pyi Taw			40.038
11.	Pyinmanar	Pyin-ma-nar Township	40.038
Ayeyarwady Region			52.549
12.	Pathein	Pathein Township	7.955
13.	Talotehla	Ma-u-bin Township	13.437
14.	Hinthada	Hin-tha-da Township	7.125
15.	Pantanaw	Pan-ta-naw Township	15.375
16.	Aung hate	Ma-u-bin Township	8.657
Magway Region			10.273
17.	Taungdwingyi	Taungdwingyi Township	4.559
18.	Pwint Phyu	Pwint Phyu Township	5.714
Kachin State			7.516
19.	Waing-maw	Waing-maw Township	3.738
20.	Bamaw	Bamaw Township	3.749
21.	Putao	Putao Township	0.029
Sagaing Region			27.125
22.	Shwe Bo	Shwe Bo Township	6.161
23.	Yay Oo	Yay Oo Township	7.713
24.	Htee chaint	Htee chaint Township	13.251
Mon State			2.861
25.	Thahtone	Thahtone Township	2.861
Shan State			2.550
26.	Nyaung Shwe	Nyaung Shwe Township	2.550
Kayin State			2.476
27.	Pha aan	Pha aan Township	2.476

4Table.24. FISH HATCHERIES UNDER DOF (2018-2019)

			Unit - Million
No.	Fish Hatcheries	Location	Production
Yangon Region			184.165
1.	Hlaw Kar	Mingalardone Township	94.971
2.	Twante	Twante Township	41.438
3.	Laydaukkan	Dagon(east) Township	47.756
Bago Region			72.217
4.	Bago (Kali)	Bago Township	24.278
5.	Thanappin	Thanappin Township	30.153
6.	Oakpho	Oakpho Township	17.786
Mandalay Region			187.815
7.	Pathein Gyi(Thayautkone)	Pathein Gyi Township	70.368
8.	Myit Thar	Myit Thar Township	69.463
9.	Natyekan	A-ma-ya-pu-ya Township	22.948
10.	Matayar	Ma-ta-yar Township	25.036
Nay Pyi Taw			58.870
11.	Pyinmanar	Pyin-ma-nar Township	58.870
Ayeyarwady Region			120.066
12.	Pathein	Pathein Township	19.832
13.	Talotehla	Ma-u-bin Township	26.165
14.	Hinthada	Hin-tha-da Township	19.400
15.	Pantanaw	Pan-ta-naw Township	34.081
16.	Aung hate	Ma-u-bin Township	20.588
Magway Region			8.578
17.	Taungdwingyi	Taungdwingyi Township	3.319
18.	Pwint Phyu	Pwint Phyu Township	5.259
Kachin State			6.167
19.	Waing-maw	Waing-maw Township	5.388
20.	Bamaw	Bamaw Township	0.674
21.	Putao	Putao Township	0.105
Sagaing Region			29.895
22.	Shwe Bo	Shwe Bo Township	9.984
23.	Yay Oo	Yay Oo Township	8.260
24.	Htee chaint	Htee chaint Township	11.651
Mon State			4.461
25.	Thahtone	Thahtone Township	4.461
Shan State			4.147
26.	Nyaung Shwe	Nyaung Shwe Township	4.147
Kayin State			3.651
27.	Pha aan	Pha aan Township	3.651

Table.25. SHRIMP/PRAWN HATCHERIES UNDER DOF (2012-2013 to 2017-2018)

								Unit - Million
No.	Shrimp/Prawn Hatcheries	2013-	2014-	2015-	2016-	2017-	2018	2018-
	Shrimp (<i>Penaeus monodon</i>)	2014	2015	2016	2017	2018	(April to Sep)	2019
1.	Wa-maw (Long-lone)	0.50	1.70	-	-	1.530	1.500	2.00
2.	Kyauk-phyu	1.50	2.50	2.00	2.500	3.500	-	4.00
3.	Ye-chan-pyin	1.50	-	2.27	-	1.000	0.100	4.00
4.	A-lae-tan-kyaw	-	-	-	-	-	-	-
5.	Soe-me-kyi	-	-	-	-	0.100	0.400	1.20
6.	Chaung Tha (Sein Ngwe Mya) Prawn (<i>Macrobrachium rosenbergii</i>)	-	-	1.20	0.099	-	-	-
7.	Kyauk-tan	-	0.30	0.60	2.940	1.136	0.200	0.80
Total		3.50	4.50	6.07	5.539	7.266	2.20	12.00

Table.26. ICE PLANTS(BY REGION AND STATE)

NO.	REGION AND STATE	NUMBER OF PLANTS	CAPACITY OF ICE PLANT (METRIC TON PER DAY)
1.	YANGON	106	2364.06
2.	TANINTHAYI	48	2535.60
3.	RAKHINE	39	456.00
4.	AYEYARWADY	70	869.00
5.	MON	29	528.00
6.	MANDALAY	7	30.00
7.	SHAN	2	3.20
TOTAL		301	6785.86