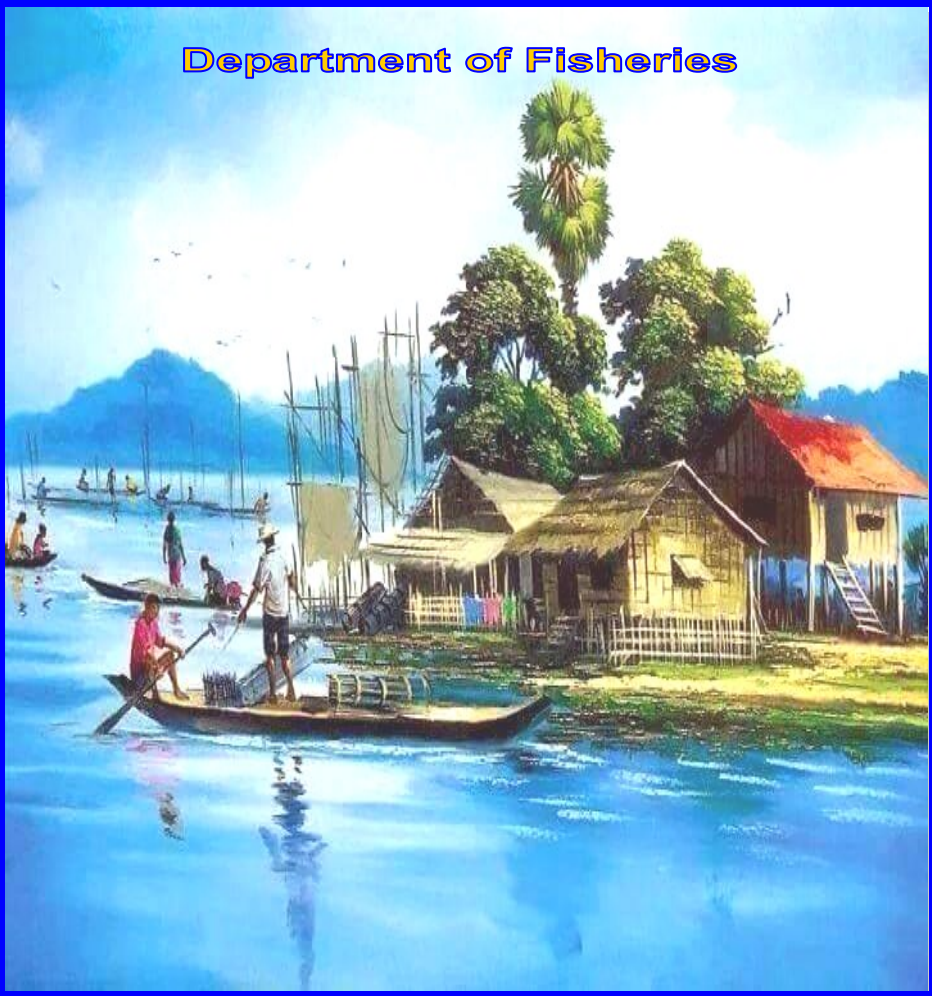
The Republic of The Union of Myanmar

Ministry of Agriculture, Livestock and Irrigation




# Fishery Statistics 2017

THE REPUBLIC OF THE UNION OF MYANMAR

MINISTRY OF AGRICULTURE , LIVESTOCK AND IRRIGATION

# FISHERY STATISTICS

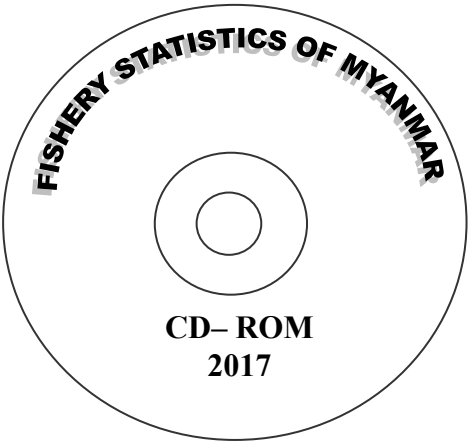
# 2017

## Department of Fisheries

## Myanmar

## *AVAILABLE NOW*

**MYANMAR FISHERY STATISTICS**
**2017**




The CDs are currently available in English only. Hence, for further information please contact the Department of Fisheries, The Republic of the Union of Myanmar, as address given below.

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## FOREWORD

Fishery Statistics of Myanmar for 2016-2017 fiscal year is published by the Department of Fisheries of the Ministry of Agriculture, Livestock and Irrigation. Since the fiscal year 2001-2002, the fishery statistics of Myanmar has been published with the objective of better understanding the situation and information on Myanmar fisheries. Moreover, we have added to some more facts and figures with the fishery information required from the previous 10 year up to this fiscal year, 2016-2017, for the convenience of all users. The annual reporting period used is fiscal year, from first April to the end of March next year.

Nowadays, the fishery statistics has been widely accepted as a tool in providing so as to know the current and past status of the fisheries and to draw up the short term and long term planning for fisheries including for food security and the rural development as well as for the conservation of fisheries resources.

It is clear that the reliable, accurate and timely data and information are needed for the effective fishery management and planning to meet the sustainable fisheries .Furthermore, the capture fisheries and aquaculture can provide many millions of livelihood opportunities of Myanmar people with resulting improved income generation and food-fish availability to the rural communities.

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

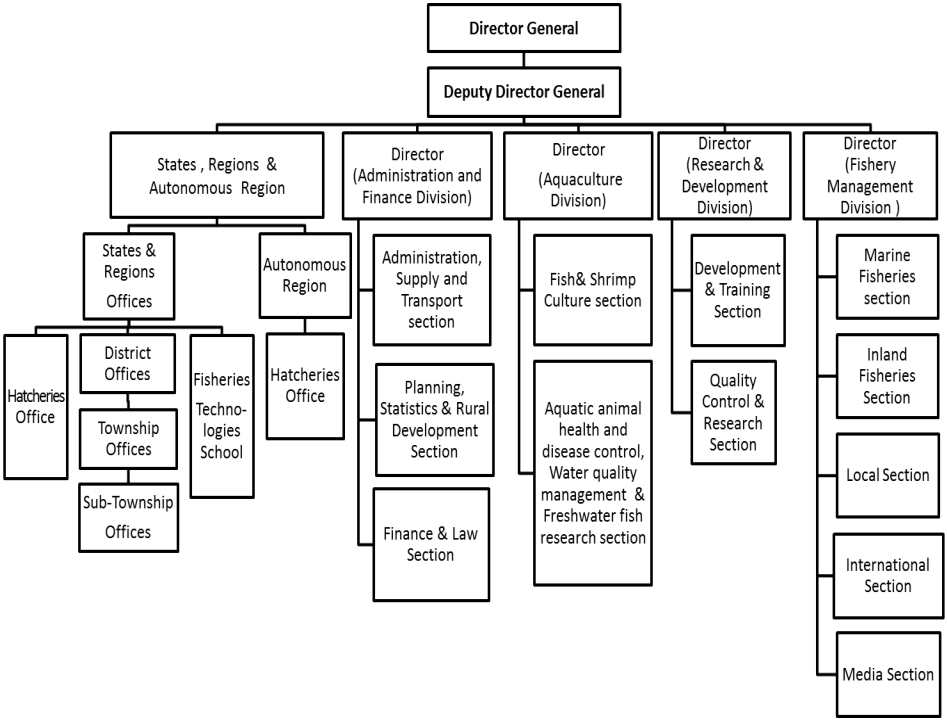
Moreover, Special thanks to U Myint Zin Htoo, Deputy Director-General and all of the Directors of the Department of Fisheries as well as all my staff for their contribution and hard working as completed the success of this publication.

Khin Maung Maw
Director-General
Department of Fisheries

**August 29, 2017**

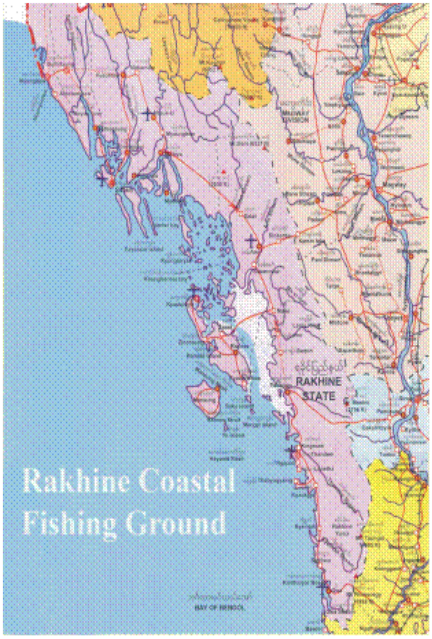
# ORGANIZATIONAL STRUCTURE OF DEPARTMENT OF FISHERIES, MYANMAR

| Officer | Other | Total |
|---|---|---|
| 365 | 2104 | 2469 |



# THE REPUBLIC OF THE UNION OF MYANMAR

# Maps of Fishing Grounds





# FISHERY BRIEF IN MYANMAR

## 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

## Fisheries in Myanmar's Economy

The fishery sector is considered as the most important one after the agriculture sector to fulfill the protein requirement of the people of Myanmar and to provide the food security as well as to get the opportunity for the employment to a large number of fishery communities and rural dwellers. Moreover, fish is second only to rice in the Myanmar diet.

Myanmar is endowed with rich natural resources both in freshwater and marine fisheries. Nowadays, the increasing pressures from industrial and urban development and increased demand for fish and fishery products owing to population growth as well as global climate change can cause for damage to degradation of ecosystems including fisheries resources.

## State of Fisheries

In 2016-2017 fiscal year, the total production of fish was 5.67 million metric tons in Myanmar. In this period, the production of freshwater fish was 2.64million metric tons (47% of the total fish production) and the production of marine fish was 3.03 million metric tons (53% of the total production of fish in Myanmar).

The exported amount of fish and fishery product was (0.439) million metric tons and the value of which was (605.820) million in US$ in 2016-2017. It was exported to ( 40 ) different countries. The exported amount was (8%) of the total production of fish in Myanmar in this period, 2016-2017.

## Type of Fisheries in Myanmar

The type of fisheries in Myanmar is determined by nature of catch. It can be classified into freshwater fisheries and marine fisheries.Freshwater fisheries consists of (a) aquaculture, (b) leasable, (c) open fisheries. Marine fisheries include (a) inshore fisheries and (b) off-shore fisheries.

In the inshore fisheries, the fishing boats operate within from shoreline to (10) nautical miles .In this area, the fishing boat which is build 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 offshore area. In this area, the commercial fishing gears are trawl net, purse seine, and long line.

## Management of Fisheries

Department of Fisheries ( DOF ) is responsible for the development of fishery sector of the Union of Myanmar and the responsibilities of DOF for development and management in fisheries are as follows;-

(1)Conservation and rehabilitation of fishery resources;
(2)Promotion of fisheries researches and surveys;
(3)Collection and compilation of fishery statistics and information;
(4)Extension services;
(5)Supervision of fishery sectors;
(6)Sustainability of fishery resources;

## Fish Price Survey

Department of Fisheries is implementing the fish price survey in Yangon every year.

## Main Factors Affecting in the Production of Fisheries

The conservation of fisheries resources and the maintenances of ecological system are the main factors in the development of fisheries. Ecosystem of the world should be studied on the basis of their principle habitats for a wide variety of flora and fauna. Regarding the maintenances of ecosystem in fisheries, the management of conservation in the freshwater bodies (ponds, lakes, rivers, dams) which provide good habitats for phytoplankton, zooplankton, including aquatic plants and fishes and the conservation of marine ecosystem approach in marine water and its habitats to numerous plants, animals like zoo plankton, fishes, shrimps, oyster and so on., should also be studied as well. Moreover, the conservation of mangrove forest wetland and land-based ecosystem are substantial for development policy with a sustainable basis.

As we all know, mangrove are a source of shelters for fish. Many of coastal species spent the critical early stage of their lives in mangrove waters. So, the mangrove conservation is essential to save fisheries resources. Consequently, it ensures the sustainability of fisheries in the long term. Besides, the maintenance of ecological system is the conservation of reef and coral and declaration the marine protected areas (MPAs). It is the effective approach to improve the marine environment. The understanding of ecosystem function and its maintenance can help the development of fisheries in a sustainable manner.

The weather conditions depend on the environment. Deforestation is one of the factors for destroying the natural environment. So the forest conservation is needed by everybody. In the fishery sector, another important

thing is the prevention of the fish disease which has been a difficult problem for fish-farmers. So, the sufficiency on the supply of good water quality is an essential matter.

Moreover, The public awareness for environment is very important for the sustainable fisheries and the people should be educated about the environment not to do over fishing and degrading the environment which are harming them-selves. It is, because we are being a part of the complex network of its environment.

## The Role of the Private Sector in Fisheries

The role of the private sector of fisheries in Myanmar is operated by private entrepreneurs who can manage their business in their own ways in accordance with the rules and regulations which are laid down for them by the Government.

Regarding on this matter, since 1988 Myanmar made some dramatic and radical changes in social, political, and economic fronts. From that time onward, the market oriented economic system has been adopted in Myanmar. Since then, all fishery business in Myanmar was carried out by the private sector. Consequently, all state owned infrastructure of fishery sector such as, fishing vessels, ice-plants, processing plants, cold stores, fish-meal plants, canning plants etc. were sold out or leased to the private owners by the Government.

## 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 law, 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.

## Taking Action to the Illegal Harvest

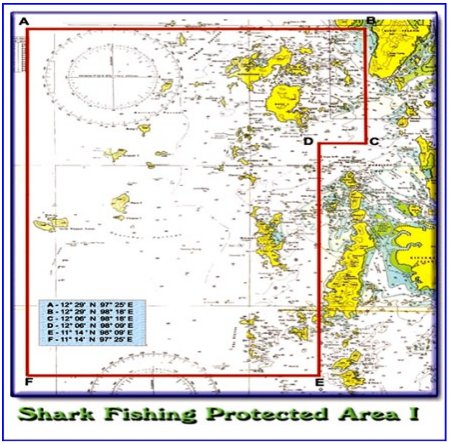
Department of Fisheries manages the conservation of the fishery resources. With regard to the conservation of the fisheries resources and to maintain for the long- term of the fisheries resources, DOF is managing to stop the illegal harvest for exporting such as alive mud crab (not allow to export which is (100) gram down weigh).

## Food Security for Myanmar

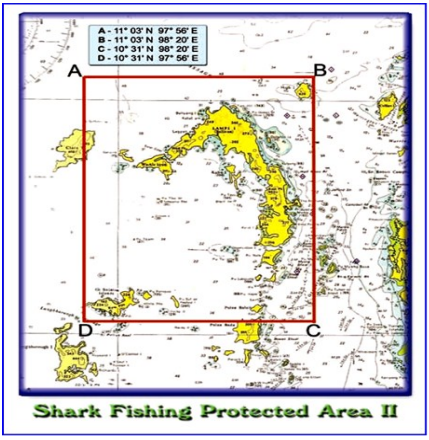
For food sufficiency of Myanmar people including living people in rural area, the plan of implementation for food security were carried out by Department of Fisheries of Myanmar with the releasing fish fingerlings into natural resources such as lakes, dams, reservoirs, and open waters and the genetic improvement in rohu(*Labeo rohita*) to achieve the purpose of getting more and more growth rate of fish and the increase of fish production of per acre in order to get more income by the fishers and fish farmers. Moreover, Department of Fisheries has initiated and encouraged the paddy cum fish farming in Myanmar. Since 2009, the Department of Fisheries under the Ministry of Agriculture, Livestock and Irrigation has been carried out the implementation of genetic improvement in Rohu (*Labeo rohita*) with the short-term and long-term planning.

## Marine Protected Areas (MPAs) and Marine Park and Marine Reserve

Conservation of fisheries resources has always been the primary concern of the Department of Fisheries, so Marine Park and Marine Reserves as well as fisheries protected area have been established under the Fisheries Law of Myanmar. Lampi island of the Thanninthayi coast has been designated as Maine Park and Marine Reserve in 1996. And then, regarding the shark resources conservation, no-body can conduct shark fishing operation in the protected areas stretching from" Rose" island to " Lampi" island; so Mergui Archipelago is famous for their shark, ray, coral reefs and other marine creatures and that is why in this area shark-watching dive tours are very popular with the tourists, who come to Myanmar from around the world.



Shark Fishing Protected Area I



Shark Fishing Protected Area II

## FISHERIES MANAGEMENT DIVISION

### Conservation Measures in Inland Fisheries

The freshwater fisheries waters means waters, pond, course, river, stream and lake which is of a permanent to temporary nature and in which fish live and thrive and which is situated within the inland boundary along the sea coast of Myanmar.Myanmar is endowed with Freshwater resources composed of riverine and estuarine system. Its extensive river system comprise Ayeyawady river which is about 2170km long and its tributaries are the Chindwin about 960 km long and Sittaung (560km), and Thanlwin (1300km). These riverine and estuarine systems provide for the nursery and spawning ground of fish which is main staple food of Myanmar people. Most of Myanmar people who live in rural area can access easily fishing in their place which is near creek or river, lake, flood area for their daily food. The fish provide as source of protein and very cheap or free nutrition for rural people in their whole life time as a gift of nature.

Department of Fisheries has been conducting the fisheries management and conservation measures to be responsible practice for exploitation and effective utilization of resources. In existing freshwater fisheries law(1991) and State and Regional Freshwater fisheries laws, it is prescribed the following objectives;

(a) To further develop the fisheries;
(b) To prevent the extinct of fish;
(c) To safeguard and prevent the destruction of the freshwater fisheries waters;
(d) To obtain duties and fees payable to the State;
(e) To management the fisheries and to take action in accordance with the law

In accordance with the freshwater fisheries law, the freshwater fisheries classify into leasable fisheries, reserved fisheries, tender fisheries and the fisheries waters in which fishing rights are granted under a licence (open fisheries) for the fisheries management measure. The fishers and fisher groups or fisheries communities can obtain the lease or tender licence or Fishing implements licence in the freshwater fisheries waters.

To manage the fishing activities, DoF prescribed the procedures for fresh-water fisheries laws, regulations and licence conditions for determining the prohibited species of fish, size, fishing season, place, fishing gears and methods. DoF issued the notifications and directives for the resources conservations. DoF notified closed seasons during May, June, July to protect the breeders and fish fry.

In leasable fisheries, also known locally as Inn,the fishing rights are granted through a lease agreement with the DoF subject to stipulations relating to the area, species, fishing implements, fishing period and methods used. Open fisheries are also allowed based on the fishing license or floating tenders issued that specify the fishing grounds and any other methods that could be used in all inland water areas except in leasable fisheries.

Leasable fisheries also serve as conservation areas and production promotion sites based on collaborative arrangements among the lease owners and the DoF. However, the short-term lease period of one-year created some concerns as the lessees also had short-term outlooks for the fisheries and did not think of investing more in the fisheries and were not anxious to conserve the resources. As a matter of fact, this led to over-exploitation of resources as the lessees tended to maximize their catch without having thoughts on the sustainability of the fishery resources. Thus in 1909,the long-term lease system was adopted as means of preventing the extinction of indigenous species and depletion of fisheries habitats,sustaining fish production of leasable fisheries,monitoring and controlling illegal fishing in the lease areas, and promoting responsible fisheries practices in the lease areas.

In 1988-1989, the long-term lease permission program was suspended but was restarted in 1992. Under this resumed program, lease owners granted the long-term permission have to undertake various activities such as repairing the water ways where fish migrates, enhancing the fish stocks in the lease areas, and promoting the conservation of fisheries habitats. Considering that such activities could not be completed in one year, DoF grants the lessees long-term permission from 3 to 9 years. Thus, the lessees do not have to bid again for the auction and pay high fees for their lease areas during the lease period.

In order to promote the production and conservation of indigenous species, DoF has initiated culture-based system and capture-based system in

leasable fisheries since 1997. At present, most of the lessees have been conducting these systems since these have provided them beneficial returns. Such practices in leasable fisheries have been promoted by the DoF as ways and means of obtaining sustainable fish production and at the same time promoting conservation measures.

As leasable fisheries progressed, some of the lease areas had been observed to be deteriorating due to siltation, agriculture operations, mining, and road and dam construction. The deteriorated habitats coupled with illegal fishing and overfishing resulted in the depletion of the fishery resources that eventually led to overall decreases in the country's fish production from inland capture fisheries. Thus, the DoF finally established guidelines for preventing further decline of habitats and fish stocks, especially in the lease areas based on long-term lease agreement of three years. Since then, nearly 500 leasable fisheries have been permitted to operate long-term lease arrangements annually. For the sustainability of leasable fisheries, DoF has been permitted the 1686 numbers of long term leases for preparation of water channels and practicing cultures based and capture based system in the leasable fisheries in cooperation with fishers (owners of leasable fisheries) in 2015-2016. Stipulations in the lease agreement include the conditions spelled out in the guidelines. Guidelines detailing the responsibilities of lease holders (lessees) in the lease areas are as follows;

a. Submit to DoF proposal for long-term operation of lease area including work plan.
b. Upon issuance of lease agreement, implement the work plan under the supervision of DoF;
c. Conduct regular repair of waterways where fish migrates, and promote stock enhancement and conservation of fisheries habitats based on culture-based and capture-based systems;
d. Promote conservation of indigenous fishes by adopting capture-based system;
e. Enhance fisheries production using culture-based system by stocking fish seeds during the transition, *i.e.* nursing fish seeds in net enclosures in pens or cages or earthen ponds prior to releasing them to lease areas;
f. Rehabilitate the habitats in order that wild fish would reach the spawning and nursing grounds in the lease areas, *e.g.* deepening of shallow water ways, removing fallen trees and small bushes as well as

other aquatic growth, creating spawning and nursery grounds in some areas along the migration route;

To sustain the leasable fisheries, the capture based system and culture based system has been practiced by lessee in case of beneficial return. The lessee usually carry out according to their annul work plan depending on the different locations. Most usual work plan of lessees is as follows;

a. May –June –July (closed season)
   - Preservation of fisheries habitat and maintenance of waterways
   - Digging shallow water ways, removal of fallen trees, small bushes and other aquatic growth
   - Preparation of fishing gear (fish pen in the lease area)
   - Inspection in the leasable fisheries area
   - Releasing fish fry into the leasable area

b. August –March
   - Finished the construction of Fishing gears
   - Fishing period

Some leasable fisheries were transformed to reserved fisheries which need to protect and preserve the fisheries habitat and resources since 1992. Reserved fisheries means fisheries waters in which fishing operations are prohibited from time to time or in which subject it stipulation by the Department in order to prevent the extinction of fish and to propagate the same. There are 32 reserved fisheries and these are 9 in Yangon region, 5 in Sagaing Region, 3 in Ayeyawady region , 6 in Pago region and 9 in Mandalay region.

Another stock enhancement program is releasing seeds in the natural water bodies. This program was started in 1989-1990. 2113.48 acres for 12 Mud Crab protected areas and 896.96 acres for Lobsters Protected area is identified to protect the nursery grounds and spawning grounds in Rakhine State, Mon State, Tanintharyi Region and Ayeyarwady Region. 527000 Mangrove trees were planted in 1276.4 acres for preservation of biodiversity and mangrove ecosystem.

To maintain the sustainable production, 153.995 million fish fry are trans-planted in the rivers, creeks, dam, reservoirs, lakes and rice fields and 66.621 million fingerlings were released into the leasable fisheries in cooperation between DoF and fishers in 2016-2017.

Department of Fisheries has been conducting the auction for leasable fisheries annually and DoF has collected the revenue 8205.706 million kyat in 2015-2016 fiscal years. Department of Fisheries has collected 2824.204 million kyat for tender fees and 67.952 million kyat for fishing implements fees in 2016-2017 in freshwater fisheries.

The Fisheries Development Meeting was conducted for the consultation on Fisheries Development Work plan in Mandalay on 21-6-2015. The workshop was led by U Khin Maung Aye, Deputy Minister, MLFRD and recommended 16 work plans for fisheries development. It was attended by state and Regional Officer of DoF, district officers, township officer and officers from hatchery office from Upper Myanmar.

The same meeting, led by U Khin Maung Aye, Deputy Minister, MLFRD was conducted in Yangon on 6-7.7.2015. It was attended by state and Regional Officer of DoF, district officers, township officer and officers from hatchery office from lower Myanmar. The meeting agreed to implement the 39 work plans for fisheries development in 2015.

The Regional Forums for inland fisheries was conducted in Mandalay on 26-27.10.2015.The forum was attended by U Khin Maung Aye,Deputy Minister, MLFRD, and experts from India, Bangladesh, Thailand, Lao, Cambodia, Local authorities from Mandalay Region, the professors from Universities, Pyopin, NAG and officials from Department of Fisheries. The forum agreed the 67 recommendations by consultation of 5 groups.

## Fishing Vessel Registration and Licencing System of Myanmar

Department of Fisheries established the fishing vessel licencing system since 1988-1989. In former time, the fishing activities carried out by Myanmar Fisheries Enterprise which was state own business. In accordance with the existing fisheries laws, no one shall without a licence, engage in inshore fisheries and offshore fisheries.

Existing laws and policies on fishing vessel registration and licensing are as follows;

- Myanma Marine Fisheries Law (1990)
- The law relating to the fishing rights of foreign fishing vessels (1989)
- Law amending the Myanma Marine Fisheries Law(1993)
- Law amending the law relating to the fishing rights of foreign fishing vessels(1993)

The existing laws are complied with international plan of Action and cover implementation of vessel registration and vessel licencing. According to political and administration reforms in Myanmar, DoF is preparing the new comprehensive fisheries law. In new fisheries law, it will include rules and regulations for vessel monitoring system and port state measures.

Department of Marine Administration is responsible for registration of fishing vessels and fish carrier vessels under the flag of Myanmar. Department of Fisheries carry out the granting to, suspending and withdrawing fishing licences from fishing vessel or carrier vessels of Myanmar . Department of Fisheries is the authorities for implementing, controlling and enforcing laws, regulations and conservation and management measures which must be complied with by fishing vessels of Myanmar.

To apply the fishing licence to DoF, the fishing vessel must have vessel registration issued by Department of Marine Administration. It must have prior permission of DoF for importing of fishing vessel from other countries and building of fishing vessels. Application for prior permission must be attached legal documents for importing and duties of tax. For application of the fishing vessel registration, the recommendation of Department of Fisheries shall be submitted to Department of Marine Administration.

The fishing licences for fishing vessels are issued by regional or state office of DoF. The following documents requires to be submitted to DoF;

- Vessel registration issued by Department of Fisheries
- Live saving appliance (LSA)
- The previous fishing licence issued by DoF
- The vessel's photos (Front, back, left side, right side)
- The undertaking for truth of vessel's owner

The term of fishing licence is from 1$^{st}$ September to 31$^{st}$ August.The licence should be renewable annually and DoF record the issuance of licence. The changes of measurement, engine, owner, vessel's name and their infraction are recorded in DoF. Also vessel inventory has already prepared for some fishing vessels.

In accordance with the existing fisheries laws, the Master of fishing vessels :

a. Shall abide by the terms and conditions contained in the licence;
b. Shall hang the licence and registration certificate prominently at the wheel house of the vessel;
c. Shall maintain ship's log-book and fishing data book as prescribed by the Department;
d. Shall be responsible for the safety of the inspector, researchers, observers and trainees who are on board the vessel;
e. Shall comply with orders and directives prescribed by the Department from time to time.

Vessel marking system for fishing vessel and carrier vessels also have established in Myanmar. Department of Fisheries issued the directives for vessel marking system for all foreign and local fishing vessel and fish carrier vessels. The four fishing grounds namely Tanintharyi, Ayeyawady, Mon and Rakhine, has divided for administration measure in fisheries. The vessel marking system for each region and state is identified as follows;

For offshore fishing vessel in Tanintharyi region , the hull colour is red and word colour is white. For Ayeyawady and Mon, hull colour is grey and word colour is white. For Rakhine Coastal region, hull colour is Yellow and word colour is white. For all carrier vessels, hull colour is white and word colour is red. The diameter of word is 8 inches and width of word is 1.5 inches.

The hull colour of foreign fishing vessel (Joint venture and Tuna Long line Fishing Vessel) is white and word colour is red.The diameter of word is 8 inches and width of word is 1.5 inches.

Inshore fishing licence issue by DoF in township level and offshore fishing licence issue by DoF in Regional and State level and Head Office. All inshore and offshore fishing vessels must have fishing vessel registration issued by Department of marine administration. The registration of fishing vessel in inshore fisheries is carried out by Department of General Administration which was authorized by Department of Marine Administration. For registration of off-shore fishing vessels is conducted by Department of Marine Administration.

In 2015, DoF had issued the licence for 10619 non- mechanized boats and 16015 mechanized boats and totally 26634 boats in inshore fisheries. DoF issued the fishing licence for 3089 local fishing vessels which are owned by national in offshore fisheries. Department of Fisheries has collected licence fees 1340.494 million kyat from the inshore fishing vessels and offshore fishing vessels.

The fishing gear registration is included in the fishing licence. One fishing vessel is permitted one fishing gear only. If the fishing vessel owner wants to change the fishing gear, he shall apply to DoF for permission. The specification and limitation of fishing gears and other license conditions is stated in the fishing licence card. Currently, DoF is trying to improve the licensing system in electronic format under the e. government system.

Regarding with fishing vessel records, SEAFDEC has been assisting the South East Asian Countries in their efforts to combat IUU fishing through the implementation of the project on the Promotion of Sustainable Fisheries and Counter Measures to Reduce IUU Fishing in South East Asia funded by Japanese Trust Fund. One of the activities under the this project is the Development of a Regional Fishing Vessel Record (RFVR) starting with vessel measuring 24 meters in length and over which refined fishing licencing systems could be used as tools to combat IUU fishing in the region. In order to sustain the establishment of the RFVR for vessels 24 meters and over, SEAFDEF deemed it necessary to develop and manage the relevant Database. Myanmar also participates in sharing information for RFVR in this project and continues submitting of the record of 24 meters and over.

The basic information requirements for RFVR for 24 meters in length and over had updated as shown in following table ;

| No. | **Information of fishing vessel** |
|---|---|
| 1 | Name of Fishing vessel |
| 2 | Vessel registration Number |
| 3 | Owner Name |
| 4 | Licence Number |
| 5 | Expiry date of Licence |
| 6 | Type of fishing method/gears |
| 7 | Port of registry |
| 8 | Gross tonnage (GRT/GT) |
| 9 | Length (L) |
| 10 | Breadth (B) |
| 11 | Depth (D) |
| 12 | Engine Power |
| 13 | Shipyard/Ship builder |
| 14 | Date of launching |
| 15 | International radio Call Sign |
| 16 | Engine Brand |
| 17 | Serial Number of Engine |
| 18 | Hull material |
| 19 | Date of Registration |
| 20 | Area( country) of fishing operation |
| 21 | Nationality of Vessel (flag) |
| 22 | Previous name (if any) |
| 23 | Previous flag (if any) |
| 24 | Name of Captain/Master |
| 25 | Nationality of Captain/Master |
| 26 | Number of Crew (Maximum/Minimum) |
| 27 | Nationality of Crew |
| 28 | IMO number (if available ) |

## Aquaculture Division

The structure of Aquaculture Division comprises with Fish and Shrimp Culture Section, Aquatic Animal Health and Disease Control Section, Freshwater Fish Research Section and Water Quality Management . 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 to align with ASEAN Guidelines of Good Aquaculture Practices and EU market requirement.

### 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 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.

In Myanmar, aquaculture areas have been increased from 12255 ha in 1990-1991 to 64438.8 ha in 2000-2001 and then to 180112 ha in 2010-2011 and 193523 ha in 2016-2017. Aquaculture production has also increased steady annually from 6397 MT in 1990-1991 to 128225 MT in 2000-2001 and 1014420 MT in 2015-2016. The production from aquaculture subsector increased to 1048690 MT in 2016-2017, which was an increase about 3.4 % compared to 2015-2016 production.

## Freshwater Aquaculture

Currently over 20 species of freshwater fishes including common carp, Indian major carps, Chinese carps, tilapia, Pangasius and walking catfishes 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 of 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 finger-lings prior to permission of DoF. As a result, rohu aquacul-ture 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* (Stripped catfish), *Prochilodus luneatus (Taung paw nga tha lott)*, *Leptobarbus hoevenii* (Sultan fish), were successfully induced breeding by experimental scale.

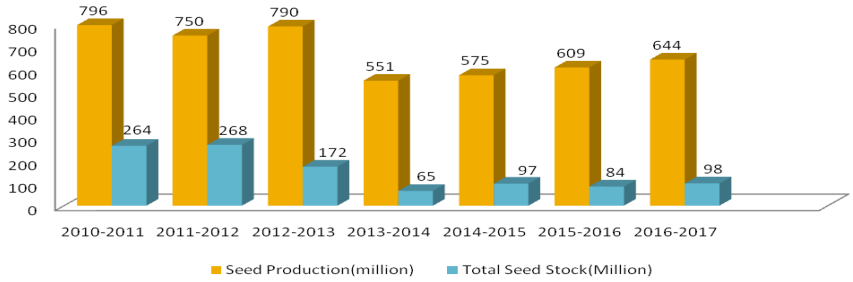
## Workforce

In the field of aquaculture, a total of 33185 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 56798 number of permanent men labours working in 2016-2017 fiscal year.

## Fish Fry and Fingerling Production

In 2016-2017, 26 hatcheries owned by the Department of Fisheries had managed to produce a total of 644.092 million freshwater fish fry and fingerling whereas 39 private hatcheries around Myanmar had produced an impressive amount of 1875 million fry and fingerling.

Accordingly the Department replenishes the natural resources by stocking the hatchery bred quality fish seeds into open waters like rivers, dams, reservoirs, lakes and impoundments. Data on production and stocking of seeds from 2010-2011 to 2016-2017 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 14678 acres of paddy field in States and Divisions were stocked with fish seed in 2016-2017.

## 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. 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 7517.25 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 farmer were invited and disseminated the comprehensive technology. But they were not so much interested in 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 2016-2017 Myanmar have three types of shrimp farming: Semi-intensive shrimp ponds 2181.72 hectares, Extensive plus shrimp ponds 37157.36 hectares and Extensive or traditional shrimp ponds 57151.36 hectares totaling 96490.44 hectares. The total production of fresh water prawn and marine shrimp in 2016-2017 were 67723.87 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 broodstocks 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 neighbouring countries such as Thailand and Bangladesh. Import numbers of

shrimp larva from Bangladesh was not yet available. In 2016-2017, tiger shrimp larva was imported in the amount of 10 million from Thailand.

### 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 documen-tation. 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 2016-2017, the total numbers of 16.4 million *P. vannamei* larva were imported.

### Marine Finfish 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.

### Others Mariculture

Others aquatic species such as oyster, clam, seaweed culture are initial stage in Myanmar. The farming of *Eucheuma* sea weed 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 2016-2017 was 51.187 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 1.45 million pieces in 2015-2016 compared to 1.60 million pieces in 2016-2017. However, the value of ornamental fish production also increases to US$ 0.23 million from US$ 0.03 million in the previous year.

**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 plan-ning 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 remote 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 is now continued projects from 2014 March in Dry Zone Myanmar. Moreover, ACIAR, KOICA 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 375 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 peo-ple. In addition, Department of Fisheries constructed 122 numbers of fish backyard hatcheries at 15 different Regions and States in this 2015-16 fiscal year for conducting self breeding practice of fish to fulfill the needs of fish fry from rural fish farmers, for stock enhancement of fish seeds to creeks between paddy fields and for improvement of the production of fish seeds to conduct the cultured based capture fisheries at leasable fisheries.

**Application of Good Aquaculture Practices (GAqP)**

The Department of Fisheries of Myanmar already initiated Good Aquaculture Practices as national standard in fish and shrimp farming since 2011.

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 313.06 hectares for 4 farmers during last year. For the trade promotion of the aquaculture products, EU gave the awareness training of GAqP, (11) times for capacity building of DoF staff and stakeholders.

**Aquaculture support services**

In 2016-2017, the coordinating plan of Aquaculture Division, Regional and State of DOF and the fish hatcheries stations will support to fish farmers for providing breeders and technical advices to small-scale farmers for poverty reduction and rural development at the township level. Under supervision of aquaculture division, aquatic animal health and disease control section and Freshwater fish research section are (3)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 2016-2017, Freshwater fish research section gave services of water quality analysis on 1680 cases and soil analyses on 15 cases including Tontay Lab and Mandalay Regional Lab. Aquatic animal health and disease control section provided support services of on-site field analyses on 29 cases, lab disease analysis on 75 cases and PCR check for disease on 91 cases. In 2016 July, natural disaster of flooding due to heavy rain affected the commercial aquaculture ponds and small scale fish farmers and DoF therefore, supported 26.256 million fish seeds to local farmers.

## RESEARCH AND DEVELOPMENT DIVISION

### Quality Control and Research Section
### Inspection and Certification Unit

Department of Fisheries responsible Government Organization for exported seafood safety activities to ensure the quality and safety of fish and fisheries products. According to the responsibility for the quality of exported fishery products to meet international standard requirements including importing countries' requirement, Inspection and Certification Unit has been implementing the monitoring, control and surveillance (MCS) activities to be ensure the quality and safety of fish and fishery products. At the present Inspection and Certification Unit has been formed with (5) officers and (24) staffs to confirm processing establishments which complied or not food safety management systems.

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 in fishery establishments to operate in exported fishery products according to ASEAN Regional Guideline, Importing Country's Requirement, Code of Practices in the Regulation.

Inspection and Certification Unit has carried out to improve quality wholesomeness and safety of fishery products for human consumption and minimized post-harvest loss to develop and apply quality and safety management systems that ensure food safety through the implementation, validation and verification of Hazard Analysis Critical Points (HACCP) based system, to improve inspection practices and harmonies with international inspection systems adopt quality and safety management systems as appropriate to the fishery industries to develop and implement GMP guidelines and compliance standards.

And then, Inspection and Certification unit, DOF issued the factory license for (117) processing establishments in 2016-2017 fiscal year to monitor and control for the procedure of processing establishments as the requirements of international standard for food safety and quality assurance. Besides, Inspection and Certification Unit has already formed four inspection teams and regularly examined the implementation of food safety management system such as GMP, SSOP and HACCP due to official control manual. Currently,(20) establishments

have been approved exported to EU, (30) establishments have been approved exported to Vietnam, (6) fish meal establishments and (99) establishments including dried product warehouse and chilled product site have been registered exported to China.

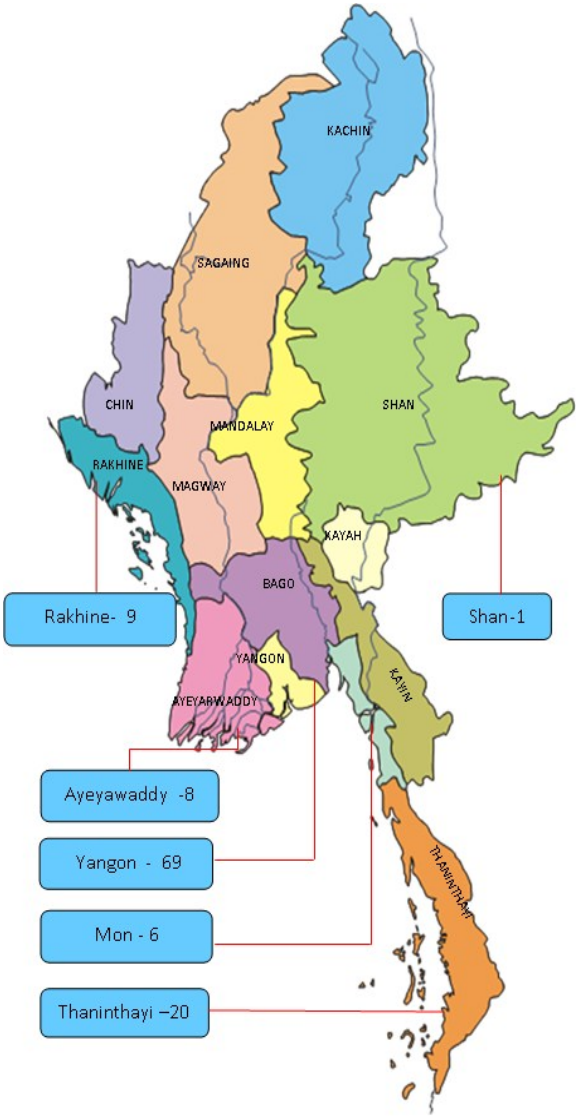



Figure.1.Map of Cold Storages & Processing Plants

Myanmar has been exporting only frozen wild caught fishery products from (20) approved establishments, Inspection and Certification Unit has been performing to export aquaculture products to EU member countries assistant by EU. National residue plan are prepared and guided by international expert from EU Commission. National residue monitoring plan (2017-2018) and progress report for (2016-2017) was sent to DG SANTE. Good Aquaculture Practices has been performed in these NRMP implemented aquaculture farms by the been performed in these NRMP implemented aquaculture farms by the assistance of EU also. EU-GIZ conducted a training course on Good Aquaculture Practices-Compliance and Traceability has already trained 120 participants including DOF staffs and Aqua farms workers and stakeholders.

Currently, Inspection and Certification Unit, DOF issued the " Technical Regulation for Export Import Fishery Products" based on WTO-SPS agreement assistance by FAO TCP/MYA/3401(D) project", during August 2012 to December 2014 to operate in food safety activities due to the international market requirements especially ASEAN, China and importing countries requirement. Similarly, Inspection and Certification Unit, DOF proclaimed Directive - 2/2015 dated on 14.7.2015 to comply in fishery activities.

DOF arranged the some important training program like that HACCP Principles and its Implementation, Good Hygiene Practices in Fish Handling and Traceability,Internal Audit, Risk Analysis for Fishery Products to DOF inspectors and employees from processing establishments, landing sites and ice plants due to the FAO –TCP/MYA/3401(D) .

EU has provided technical assistance for DOF to become in-line with EU Requirements. Currently, EU-GIZ has been supporting the technical assistant, equal 10.5 million euro within three years(2015-2017) under the Trade Development Program through the supply chain such as fishing vessels, landing sites, ice plants due to comply with food safety management system due to the Trade Development Program. EU-GIZ has also supports for Inspection and Certification Unit to building capacity on food safety management systems such as Good Manufacturing Practices (GMP), Good Hygiene Practices (GHP) and Hazard Analysis Critical Control Point System (HACCP). Then, EU-GIZ has been providing support for the implementation of the National Residue Monitoring Plan, to improve the control on veterinary drugs used in aquaculture, supporting

the ICU inspectors to strengthen all aspects of food control systems including aquaculture.

An ASEAN Rapid Alert System on food and feed (RASFF) is ongoing network for notification of direct or indirect risks to human health deriving from food or feed between competent authorities. DOF has participated in pilot Rapid Alert System for food and feed since 2007 and contact with regional activities. Inspection and Certification Unit has conducted the training for ASEAN Rapid Alert System for Food and Feed in 19th January 2015 to 21st January 2015 by Experts from Thailand. Otherwise, Inspection and Certification Unit, DOF has performed Trade Control and Expert System (TRACES) by the assistance of EU-GIZ according to the Trade Development Program.

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 Principe and Requirements for the labeling for pre-package food and Implementation of the ASEAN Common Principle for food Systems in establishments before ASEAN Free Trade Area.

Otherwise, according to ASEAN Economic Blue Print, Inspection and Certification Unit has been implementing food safety issues related priority 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.

**Analytical Laboratory Section**

**Continuously Maintain the Accredited Laboratory Comply with ISO/IEC 17025:2005**

The laboratory, Analytical Laboratory Section of Fish and Quality Control Division of Department of Fisheries (Yangon Region, Myanmar). Accreditation No.1225/55 has been assessed for reassessment of accreditation Code HP 255/54 in accordance with ISO/IEC17025:2005 by the assessor team of the Bureau of Laboratory Quality Standards (BLQS), Department of Medical Sciences (DMSc) Dated on since 2012.

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Our accredited parameters for Microbiological Test were TPC, Coliform, *Ecoli, Salmonella, Staph.aureus, Vibrio cholera* and *Listeria monocytogen*. Chemical Test was Nitrofuran(AOZ, AHD, SEM, AMOZ), ELISA (Chloramphenicol, Tetracycline), Heavy Metal(Cadmium, Lead and Mercury). Now, Laboratory was already finished reassessment and the certification valid has been 29 September 2016 to 28 September 2018.

## Participation the Proficiency Test (PT) Programme

Laboratory had participated the Proficiency Test once a year for all accredited parameter.Currently,PT providers were QMAS(Thailand),Central Lab (Thailand) and FAPAS ( UK).

## Calibration Certificate for Measuring Equipment & Devices

For 2016 program of calibration by ISO/IEC17025:2005 accredited laboratory's maintenance was finished and calibrated at 26, September 2016 with Central Laboratory from Thailand (Songkhla Branch). All measuring Equipment and instruments are 62 items.

## Preventive Maintenance

The laboratory had contracted every year for Regular Preventive Maintenance (RPM) between DoF and Sciex ( Thailand) Co., Ltd from Thailand, AMTT Co., Ltd from Myanmar for LC/MS/MS of 2016. Some of the Microbiological Lab's equipment and remaining chemical equipments as HPLC and AAS also finished preventive maintenance by AMTT Co., Ltd and Okkar Thiri Co., Ltd from Myanmar.

## Action Plan for Future

DoF Laboratory had participated the Japanese Trust Fund VI project for Biotoxin Monitoring in ASEAN conducted by Marine Research Department (MFRD), project period from 2013-2019 as a technical assistance. National Residue Monitoring Plan (NRMP) progress report (2016-2017) and Annual plan (2017-2018) submit to EU, DG- SANTE.

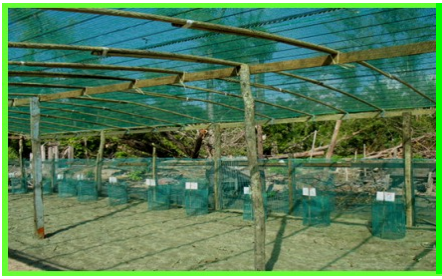
## Environment and Endangered Species Conservation Section

### Sea Turtle Conservation and Management

Nesting of turtles is observed around Andaman Sea, Gulf of Mottama (Gulf of Mattaban), and Bay of Bengal. Since 1963, the Department of Fisheries(DoF) has taken up a project to propagate and conserve sea turtles on Thameehla Island (Diamond Island) in Ngaputaw Township, Ayeyarwady Division. Then in 1986, the project was fully revived and hatchery was established.

Generally sea turtle conservation activities are conducted in collaboration and with the assistance of Southeast Asian Fisheries Development Center (SEAFDEC). Since 2001 the turtle conservation activities have been enhanced as the collaboration with International agencies and organizations are extended. The Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia (IOSEA-MoU) was signed between DOF Myanmar and IOSEA. At present, Myanmar is being cooperated and collaborated with institution namely ASEAN -SEAFDEC, IOSEA (MoU), and Indian Ocean Turtle Newsletter (IOTN).

The sea turtle species recorded in Myanmar are loggerheads(*Carettacaretta*), green turtles (*Cheloniamydas*), hawksbills (*Eretmochelysimbricata*), olive ridleys (*Lepidochelysolivacea*),and leatherbacks(*Dermochelyscoriacea*).DoF had conducted turtle hatching based on conditions of rookeries in nesting areas. Hatching methods used as (a) Hatching in their original natural nests (In-situ) and Hatching in man-made nest after transferring the eggs from natural nests. (Transplanting ) Some nest were excavated and transferred to incubate in selected sites (Hatcheries). Data collection on hatching of Turtles at original nest site was also carrying out. Currently, Department of Fisheries is carrying out tagging and using temperature data loggers in the turtle nests to understand sex differentiation of the turtles.




The public needs to be widely educated and informed for the conservation and protection of sea turtles The DOF educated the fishermen and public living in the coastal areas on the conservation and protection of marine turtles. As preservation of sea turtles in Myanmar waters and their prosperity depend on the interest and the participation of the people, education program have been initiated targeting the fishery communities and the local people along the coastline.

## Ayeyarwady Dolphin Conservation Conducted by Department of Fisheries in Ayeyarwady River

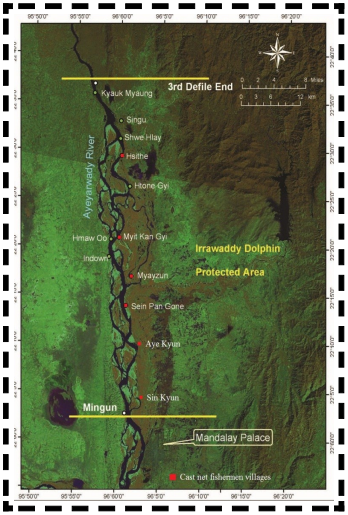
Ayeyarwady (Irrawaddy) River is one of the biggest rivers in Southeast Asia, and it's the most dominant feature in Myanmar (Burma). This arises from Northern hill streams and through steep gorges upstream of Bhamo, and then flow the entire length of country, for approximately 2,200 km, before the reaches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

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

The Department of Fisheries (DoF) established and defined as protected area for Ayeyarwady dolphin (72 km) river segment between Min Gun 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.




**Ayeyawady Dolphin Protected Area**

The Ayeyarwady dolphin conservation team supported Rohu (*Labeo rohita*) species fish fingerlings and also provided fish pellet to culture the fish for 3 months. After 3 months, some fishes were released into the protected area in Ayeyarwady river segment, and purposes for enhancing freshwater fishery resources.

Wildlife Conservation Society (WCS) staff in collaboration with the Department of Fisheries staffs conducted the Ayeyarwady dolphin monitoring, surveillance and visual boat-base survey, and the team always identified and estimated the population and group size and threats to the dolphins between the Mandalay in Mandalay Region to Bahmo in Kachin State every year.

WCS in collaboration with DOF for observing the Ayeyarwady dolphin and conducted workshops regarding village-based eco-tourism.

In Myanmar, interesting 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

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

The Letter of Agreement - LoA was signed on the 23rd September, 2016, between the Department of Fisheries and Wild Life Conservation Society (WCS) USA, for the purpose of marine conservation program, WCS will extent her conservation activities in collaboration with DOF.

## Marine & Fresh Research and Conservation Section

## The Marine Fishery Resources of Myanmar

Myanmar currently reports the largest marine fishery catch in the Bay of Bengal region and the importance of fisheries to both the economy and national food security are undisputable. The capture fishery sector contributes around 10 % to the Myanmar GDP and large part of the human population finds its livelihood in this sector.

Although the total marine catches are uncertain, estimates range as high as 1.3 –1.8 million tonnes per year.

The vision of the Fisheries Department of Myanmar is to "*Ensure a sufficiency of fish supplies not only for the present entire national people but also for future generations by conserving the fishery resources with sustainable fisheries…"*

As part of this commitment, the Department of Fisheries has been cooperating with the Institute of Marine Research of Bergen (IMR), FAO NORAD, the Bay of Bengal Large Marine Ecosystem Project (BOBLME) and the Nansen Survey Programme, to assess the status of marine capture fishery resources in the Myanmar EEZ.

This policy brief summarises the results of two marine fishery/ecosystem surveys conducted in Myanmar during 2013 and 2015 and the main findings and recommendations that emerged from the analysis of the data and the post-survey results workshops.

## Background to the Nansen Surveys

The first assessment of the state of the fishery resources of Myanmar was conducted through two surveys during 1979-1980, using the RV *Dr. Fridtjof Nansen1*. The results from those two surveys were used as the basis to estimate a Maximum Sustainable Yield (MSY) for the marine fisheries of the Myanmar EEZ.

The MSY is the maximum level of catch that can be sustained by the fishery. If this catch level is exceeded, the fishery will decline and so will the sustainable yield. After more than 30 years, the RV *Dr. Fridtjof Nansen* returned to Myanmar and conducted two more surveys (in 2013 and 2015) to update those earlier assessments.

Research Vessels of Dr. *Fridtjof Nansen*

Two workshops were held to present the results of these last two surveys to Myanmar authorities and stakeholders. Both surveys have been planned and executed in close collaboration with the DoF, Myanmar, the BOBLME (for the 2013 survey), the Marine Science Department (Mawlamyine and Myeik universities)

## Objectives of the Nansen Surveys

The 1979-80 surveys aimed at obtaining an estimate of the marine standing stock biomass within Myanmar EEZ, as the basis to estimate sustainable yields.

Environmental work included recording type of bottom and hydrographic conditions. Both the 1979-1980 and 2013-2015 surveys covered the pre-monsoon and post-monsoon seasons. This was intended to account for major seasonal variations in fish abundance. For the 2015 and 2015 surveys, the objectives were expanded to include more comprehensive ecosystem-related data. This included:

- Distribution, abundance and biodiversity 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, oxygen, chlorophyll, nutrients and sediments)
- Bathymetric mapping

- Sampling of benthic communities, infauna and macrofauna
- Determination of sediment composition and chemical analysis (heavy metals and hydrocarbons)

**Main Findings of the 2013-2015 surveys**

Both survey periods showed important seasonal variations in hydrographic conditions over the whole survey area. This affects fish distribution patterns and these changes are well known to the fishery. This does result in differences in the biomass estimates between the pre and post-monsoon seasons.

The seasonal differences 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.

A considerable increase in abundance of jellyfish was observed in 2015 and this was not recorded in any of the previous surveys.

**Pelagic Fish abundance**

The average pelagic biomass estimated in the 1979-1980 surveys was about 1 million tonnes. The average pelagic standing stock biomass estimated from the 2013 and 2015 in Myanmar waters was estimated at only 190 000 tonnes. The updated pelagic biomass estimates represent an 80% decrease from the 1970-1980 estimated biomass.

**Demersal Fish Abundance**

The average demersal biomass estimated in the 1979-1980 surveys was about 750,000 tonnes. The average demersal standing stock biomass in the 2013-2015 survey was estimated at 320 000 tonnes. The updated demersal biomass estimates represent a 50% decrease from the 1970-1980 estimated biomass.

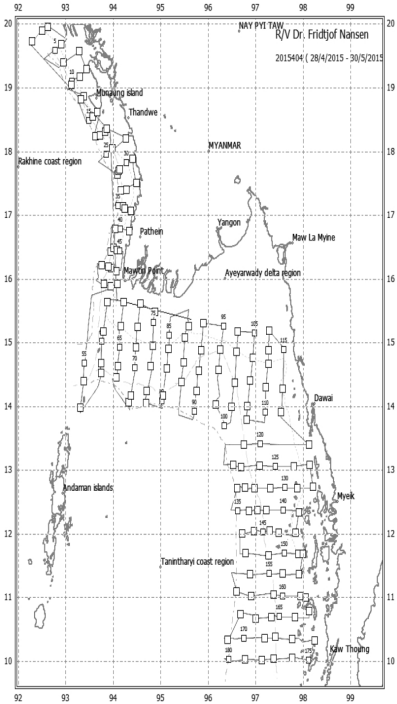



Figure.2.Course track with bottom (□) and pelagic (Δ) trawl stations. The 50 m, 100 m and 500 m depth contour is indicated. The red lines indicate the separation between the three main regions.

## Changes in Species Composition

The species composition of the demersal(trawl)catch was compared. The results show that there has been a significant reduction in the most valuable commercial species(threadfin bream, croakers, sea catfish, snappers). There has also been a significant increase in smaller fast recruiting, less valuable species. This is a typical indication of over-fishing.

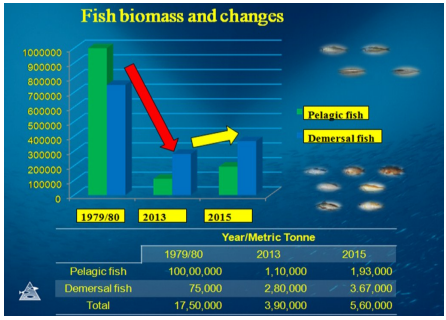



Figure .3.Change in fish abundance

## Collaborate with Fauna and Flora International-FFI

Department of Fisheries (DOF) and FFI-Myanmar Programme have been agreed and signed Letter of Agreement (LoA) on "Collaborative Programme to support the Marine and Freshwater Biodiversity in Kachin and Rakhine States, Ayeyawaddy and Tanintharyi Regions " on 17 December 2014.

## Activities of Fish biodiversity surveys and establishment of Locally Managed Marine Areas-LMMAs

Fauna and Flora International (FFI) is undertaking fish biodiversity surveys in the projects in collaboration with the Department of Fisheries. Because of these surveys, 25 new fish species for the science have been identified. In Indawgyi basin, 95 fish species were recorded and 6 species such as *Lepidocephalichthys* sp. Indawgyi, *Acanthocobitis*sp. Indawgyi, *Physoschistura* sp. Indawgyi, *Schistura* sp. affinis. *malaisei*, *Schistura* sp. Indawgyi, *Amblyceps* sp. Indawgyi were recorded as new species for the science. Along the watershed tributaries of Malihka River in Putao District, 46 fish species were recorded and 5 species such as *Devario* sp., *Aborichthys*aff. *kempi*, *Acanthocobitis*affinis. *botia*, *Schistura* sp. 1, *Schistura* sp. 2 were recorded as new species for the science. In the Taninthary River, 113 fish species were identified and 9 species such as *Hypsibarbus* sp.,*Macrognathus*sp., *Dermogenys*sp., *Crossocheilus*affinis. *burmanicus*, *Brachydanio*affinis. *kerri*, *Pangio*affinis. *pangia*, *Garra*sp., *Acantopsis*sp., *Balitoropsis*affinis.*leonardi*were recorded as new species for science. In Lenyar River, 54 fish species were recorded and 5 species such as *Poropuntius* sp., *Dermogenys*affinis. *collettei*, *Brachydanio*affinis. *kerri*, *Pangio*affinis. *Pangia*, *Garra*sp. were recorded as new species for science.

FFI is also implementing conservation projects in collaboration with the Department of Fisheries and supported by the Tanintharyi Regional Government to establish Locally Managed Marine Areas (LMMAs) in Done Pale Aw village and Lin Lon-Parawah village on the Thayawthadangyi Island and Langann village on Langann Island for the sustainability of the livelihood of the local communities in the MyeikAchipelago. Regarding to implement as the pilot project, Department of Fisheries and FFI created a taskforce for LMMAs which involves local Universities, Line Ministries Government staff and other concerned organizations. And marine mapping are being produced to use of the resources with communities, identified the zoning systems within LMMA and developed rules and regulations for LMMA.

## RECOMMENDATIONS

- Consistent with the Myanmar Vision, management actions and policies should be directed to rebuilding stocks.
- Current yields, based on standing biomass of demersal and pelagic stocks are well below the fishable yield of the 1970's.
- The target would be to rebuild pelagic and demersal stocks to at least the level of the early 1970s.
- In order to achieve this target, the total allowable catches should be in the order of about 100 000 t. (pelagic + demersal).
- A combination of management measures to reduce fishing effort are *required achieve this target.*

*These measures must also be:*

- *Possible to implement*
- *Cost effective*
- *Acceptable by stakeholders*
- *Balanced with respect to short term social and economic impacts and longer term benefits to economy, environment and employment*

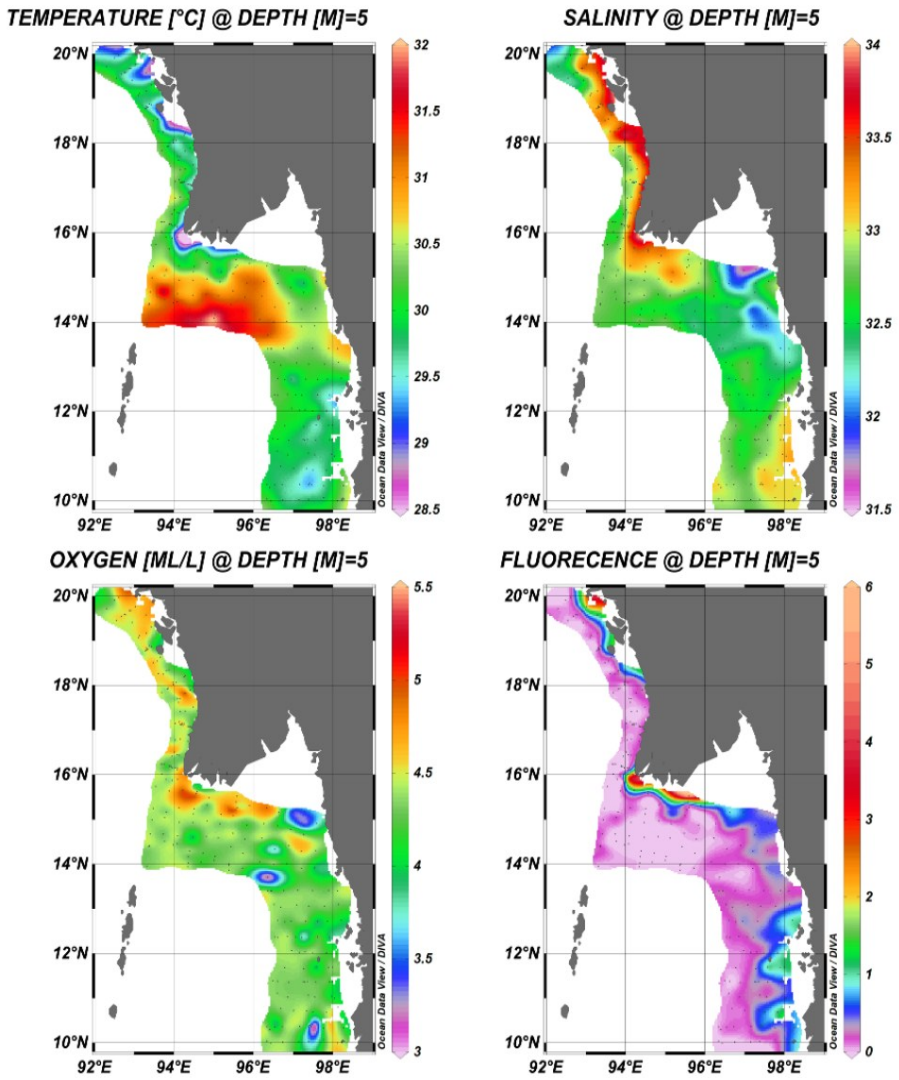



Figure .4. Horizontal near-surface (5 m depth) distributions of temperature, salinity, oxygen and fluorescence for the whole Myanmar coastal area. Station positions are indicated as black dots. Produced with the software Ocean Data View (v 4.7.2), interpolating by DIVA gridding (Ocean Data View, Schlitzer, R., http://odv.awi.de, 2015).

## Research and Training (Fisheries Training Supervision Section)

Department of Fisheries (DoF) is responsible for the development of fisheries sector of the Union of Myanmar and the responsibilities of DoF for development and management in fisheries are as follow:

- Conservation and rehabilitation of fisheries resources
- Promotion of fisheries research and surveys
- Collection and compilation of fisheries statistic and information
- Extension services
- Supervision services
- Sustainability of fishery resources

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

- Institute of Fisheries Technology, (Gyogon, Yangon Region )
- Pyapon Fisheries Training Center, (Ayeyarwady Region ) and
- Upper Myanmar Fisheries Training Center (Sagaing Region)

Human resource development in fishery sector and capacity building are carried out through the training centers. In the year 2016-2017, nine training courses have been successfully conducted associated the fields of Aquaculture, Statistics for Fisheries SPSS for Research and Data Management, On-site Training Leadership and Management, Best Management Practices for Sustainable Fishery Training, Training on Research Data Analysis of Dr. Fridjof Nansen, Taxonomy and Identification of Fish Training, On-site Training Implementation of GMP, SSOP and HACCP for Fish Processing Plant Training, English Specking and Computer: totally 1722 trainees have been acquired knowledge of fisheries relevant fields. The various training for fishery taskforce skill development in (2016-2017) fiscal year has been conducted with 58 trainings and 1722 trainees in total.

| No | Training Course | 2016-2017 | | Remarks |
|---|---|---|---|---|
| | | No of Course | No of Training | |
| 1. | Aquaculture | 29 | 939 | Institute of Fisheries Technology (IFT-Gyogon), DoF Training Center (Sagaing, Pyapon); Fresh Water Hatchery, (Thayetkone, Yenantthar, Hlawgar, Shwe Bo, YaeOo,) Twantae (MFF), Mon State(DoF), Ayeyarwaddy Region (Laputta, Ma U Bin), Shan State, |
| 2. | English Speaking & Computer | 2 | 43 | DoF Training Center (Sagaing) |
| 3. | On-site Training Leadership and Management | 8 | 186 | DoF Nay Pyi Taw, Department of Fisheries Training Center (Sagaing), (Pyapon), |
| 4. | Statistics for Fisheries SPSS for Research and Data Management | 1 | 26 | Institute of Fisheries Technology (IFT-Gyogon), |
| 5. | Best Management Practices for Sustainable Fishery Training | 1 | 15 | Institute of Fisheries Technology (IFT-Gyogon), |
| 6. | Research Data Analysis of Dr. Fridjof Nansen Training | 1 | 24 | Institute of Fisheries Technology (IFT-Gyogon), |
| 7. | Fisheries Statistics and Data Collections | 1 | 16 | Institute of Fisheries Technology (IFT-Gyogon), |
| 8. | Taxonomy and Identification of Fish Training | 2 | 47 | Institute of Fisheries Technology (IFT-Gyogon), |
| 9. | On-site Training Implementation of GMP, SSOP and HACCP for Fish Processing Plant Training | 13 | 426 | Fish processing Plants in Yangon Region |
| | Total | 58 | 1722 | |

Currently, Development of Fisheries, Research & Training is being conducting the project namely: “Small-scale Fisheries and Aquaculture in Myanmar; Institutional Support for the Dissemination of the European Regulation and the Mediterranean Best Practices"(MyanMed) in Institute of Fisheries Technology (IFT, Yangon)by the support of Italian Development Cooperation with the Technical Support of CIHEAM Bari Institute, Italy, with Euro 680000 for one year project in order to upgrade IFT and support fisheries institution in Myanmar. The expected project outcome is that IFT become “Technical Hub”.

## International Relations and Projects Section

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 | 2016-2017 | | | | | |
|---|---|---|---|---|---|---|---|
| | | Training | | Workshop/ Meeting/ Semi-nar/Duty | | Delegation/ Study Tour/ Trade Fair | |
| | | Freq: | Person | Freq: | Person | Freq: | Person |
| 1. | SEAFDEC | 1 | 2 | 15 | 30 | - | - |
| 2. | FAO | - | - | 5 | 5 | | |
| 3. | BOBLME | - | - | 1 | 1 | - | - |
| 4. | MPEA | - | - | 2 | 4 | 1 | 2 |
| 5. | USDA | - | - | 1 | 4 | - | - |
| 6. | Darwin Hilsa Project | | | 1 | 1 | - | - |
| 7. | Gov of Thailand | - | - | 5 | 12 | - | - |
| 8. | Gov of America | - | - | 2 | 3 | - | - |
| 9 | Gov of Japan | 1 | 1 | 1 | 1 | - | - |
| 10 | Gov of Myanmar | - | - | 3 | 6 | - | - |
| 11 | MOFCOM | 4 | 12 | 1 | 1 | - | - |
| 12 | JICA | 6 | 21 | 1 | 1 | 1 | 2 |
| 13 | MFDS | | | 1 | 1 | - | - |
| 14 | AKECF | - | - | 1 | 1 | - | - |
| 15 | PTB | - | - | 1 | 1 | - | - |
| 16 | Gov of Korea | 3 | 6 | - | - | - | - |
| 17 | NGAIUCN | - | - | - | - | 1 | 2 |
| 18 | GEF | - | - | 1 | 2 | - | - |
| 19 | WCS | - | - | 2 | 3 | - | - |

| No | Group | 2016-2017 | | | | | |
|---|---|---|---|---|---|---|---|
| | | Training | | Workshop/ Meeting/ Seminar/Duty | | Delegation/ Study Tour/ Trade Fair | |
| | | Freq: | Person | Freq: | Person | Freq: | Person |
| 20 | ACSF | - | - | 2 | 3 | - | - |
| 21 | Mekong Institute | 1 | 1 | - | - | - | - |
| 22 | NACA | - | - | 3 | 3 | - | - |
| 23 | TICA | 1 | 1 | - | - | - | - |
| 24 | USAID | - | - | 2 | 5 | - | - |
| 25 | Gov of Indonesia | - | - | 1 | 2 | - | - |
| 26 | Austalian Aid | - | - | 1 | 1 | - | - |
| 27 | ICFO | - | - | - | - | 1 | 1 |
| 28 | REYBC | - | - | 1 | 2 | - | - |
| 29 | TUMSAT JST | 1 | 1 | - | - | - | - |
| 30 | ASEAN ROK Cooperation Fund | - | - | 1 | 1 | - | - |
| 31 | AADCP II | - | - | 2 | 2 | - | - |
| 32 | CBI | - | - | 1 | 2 | - | - |
| 33 | ITEC | 2 | 2 | - | - | - | - |
| 34 | Gov of British | - | - | 1 | 1 | - | - |
| 35 | UNCTAD | - | - | 1 | 5 | - | - |
| 36 | TDP Trade Development Program | - | - | 1 | 1 | - | - |
| 37 | NOAA | - | - | 1 | 2 | - | - |
| 38 | CMS | - | - | 1 | 1 | - | - |
| 39 | NORAD | - | - | 1 | 4 | - | - |
| 40 | CBD | 1 | 1 | - | - | - | - |
| | Total | 21 | 48 | 64 | 112 | 4 | 7 |

**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 |
|---|---|---|---|---|---|
| 1. | Daw Htet Moe Win | PKNU International University | 2013 March to 2017 March | Ph. D Candidates Fisheries Science | Health Evaluation on Oyster |
| 2. | U Myat Thiha Saw | University of Tasmania (Austria) | 14-1-2015 To 31-12-2017 | B.Sc Marine Environment | Sustainable Economic Development (Including Agriculture and Food Security) |
| 3. | Daw Khine Htet Htet Win | National Taiwan Ocean University | 1-9-2014 to 31-7-2016 | M. Sc Candidates | International Master's Program in Aquaculture Technology and Management |
| 4. | U Htin Lin Aung | National Taiwan Ocean University | 1-9-2014 to 31-7-2016 | M. Sc Candidates | International Master's Program in Aquaculture Technology and Management |
| 5. | Daw Wah Wah Phu | ICFO | 27-8-2015 to 27-8-2017 | M.Sc Candidates | Graduate course in fisheries |
| 6. | Daw Su Su Mon | National Taiwan Ocean University | 1-9-2015 to 31-7-2017 | M.Sc Candidates | International Master's Program in Aquaculture Technology and Management |

**Department of Fisheries Cooperation with International Organizations**

1. "Small-scale aquaculture Extension for Promotion of Livelihood of Rural Community in CDZ Project" (SAEP II ) (US$- 4 millions) funded by Japan International Cooperation Agency (JICA) in **Central Dry Zone** from March , 2014 to March , 2019 , is focusing on small scale aquaculture in central dry area including Mandalay, Sagaing and Magway Region.**(Project Manager:USaw Lah Paw Wah , Director )**
2. Ayeyarwaddy Dolphin Research and Protected Area Management Plan (WCS)(Technical Assistant) supported by Wildlife Conservation Society (WCS), from 2007 to 2017**, along the Ayeyarwady River**

**in Mandalay and Saging Regions** is to protect and conserve the Ayeyarwady Dolphin. **(Project Manager : Daw Thida Moe , Fishery Officer )**

3. Project for Development of Inland Fish Farming Technology: (US$ 4.41 Million) funded by Korea International Cooperation Agency (KOICA) and to be implemented at **Thayetkone Fisheries Station in Mandalay** from 2014 to 2016. **(Project Manager: Dr Aung Naing Oo, Deputy Director)**
4. Collaborative Program to Support the Conservation of Marine and Freshwater Biodiversity in Myanmar) (Technical Assistant) support by Flora and Fauna International (FFI) from December 2014 to December 2019, Conserving endangered freshwater species and ecosystems, and environmental services in **Kachin and Tanintharyi Regions**. Conserving marine species and ecosystems and environmental services in **Tanintharyi and Ayeyarwady Regions and Rakhine State.** **(Project Manager: Dr Thet YuYu Swe. Fishery Officer)**
5. JTF Chemical & Drug Residues in Fish & Fish Products in SEA-Biotoxins Monitoring in ASEAN (ASP, AZA and BTX) (Technical Assistant) support by SEAFDEC Japanese Trust Fund VI from 2013 to 2017 in **Thaninthayi Region, Rakhine State** . **(Project Manager : Dr. Su Myo Thwe, Deputy Director)**
6. Small- Scale Fisheries and Aquaculture in Myanmar: Institutional Support for Dissemination of European Regulations and Best Mediterranean Practices (MyanMed) (Euro- 0.68 millions) funded by Italy from 2015 Nov-2017 July in **West Gyo Gone, Insein Township, Yangon.** **( Project Manager : Dr Yin Yin Moe, Deputy Director)**
7. Promoting sustainable growth of aquaculture in Myanmar to improve food security and income for communities in the **Ayeyarwady Delta and Central Dry Zone** (MyCulture) (US$- 3.29 millions) funded by WorldFish Center from 2015 -2018 in Ayeyarwady Delta and Central Dry Zone. (**Project Manager: U Nyunt Win, Deputy Director)**
8. Securing a sustainable blue economy for Myanmar (WCS-LoA) funded by Wildlife Conservation Society (WCS), from 2016 to 2017 , **Rakhine Coastal and Tanintharyi Coastal** -
    (A) Securing marine fisheries , Livelihoods and biodiversity in Myanmar through co-management(2016 Sep–2017 Aug ) (US$ -0.0615 millions)
    (B) Spearheading Marine Conservation in Myanmar : A national program for marine spatial planning and fisheries reform (2016 Sep–2017 Aug)(US$-0.210 millions)

(C) Building Thriving Fisheries in Myanmar(2016 Sep–2017 May) (US$-0.1430 millions) **(Project Manager : Daw Thida Moe , Fishery Officer)**

**9.** Myanmar Sustainable Aquaculture Programme (MYSAP) (Euro-22.5 millions) funded by German International Agency(GIZ) from 2016 to 2022 , **Ayeyarwady Delta and Central Dry Zone, Rakhine State and Shan State (Project Manager: U Saw Lah Paw Wah, Director )**

**10.** Sustainable Coastal Fisheries (DANIDA ) ( US$-6 millions) funded by Danish International Development Agency from 2017- 2020**, Tanintharyi (Myeik), Rakhine (Maung Taw and Sitt tawe) (Project Manager: Dr. Htun Thein , Deputy Director )**

**11.** Improvement of Data Collection on fisheries and Aquaculture Production : Pilot system for the Yangon Region (FAO-3601) (US$-0.250 millions) funded by Food and Agriculture Organization-FAO from 2017-2018 Dec, **Yangon Division (Project Manager: U Thant Zin, Assistant Director)**

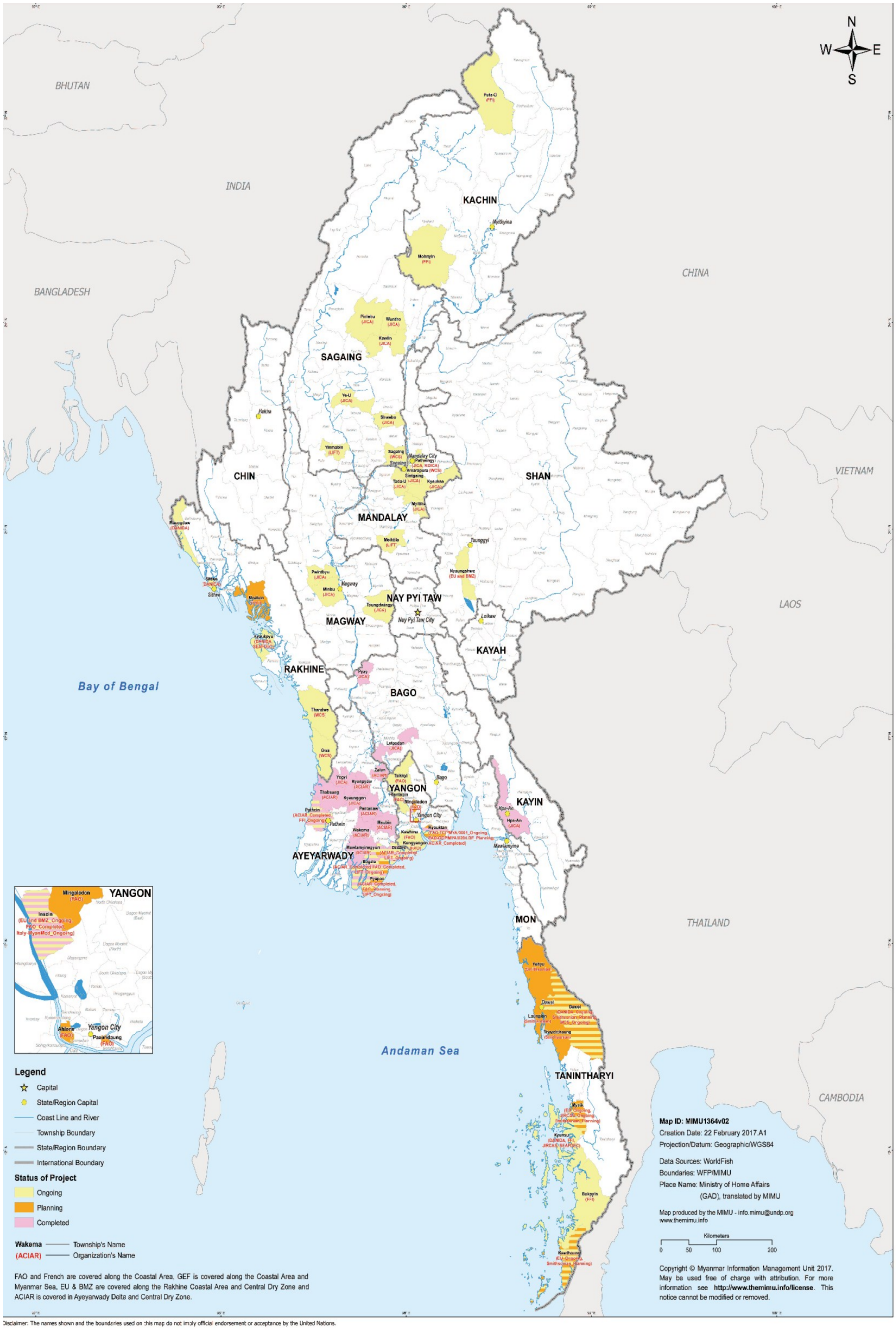
**12.** Development of Sustainable and environmental friendly aquaculture techniques in coastal waters in Myanmar (JIRCAS) ( JP Yan 15 millions) funded by Japan International Research Center for Agriculture Sciences from 2016 Nov – 2021 Aug , **Tanintharyi Division and Myeik Coastal. ( Project Manager: Dr. Aung Naing Oo, Deputy Director)**

**13.** Strengthening the adaptive capacity and resilience of fisheries and aquaculture-dependent livelihoods in Myanmar (Fish Adapt) (US$-6 millions) funded by Food and Agriculture Organization –FAO from 2017 March to 2021, **Yangon (Kyauk Tan) , Ayeyarwaddy (Amar) and Rakhine (Mye bone) ( Project Manager: Dr. Kyaw Kyaw, Deputy Director)**

**14.** Improving Fishery Management in Support of Better Governance of Myanmar's Inland and Delta Fisheries (MYFish-2) (AUD-2.64 millions)funded by WorldFish Center from 2017-2020 , **Ayeyarwady Delta and Central Dry Zone. ( Project Manager: U Nyunt Win, Deputy Director)**

**15.** Smithsonian Conservation Biology Institute (Smithsonian) (Technical Assistant) support by Smithsonian Conservation Biology Institute (USA) from 2017 May to 2017 Nov , **Tanintharyi Division, Dawei and Myeik , kawthaung ( Project Manager: U Tin Htut. Assistant Director)**

# Department of Fisheries' Project Area



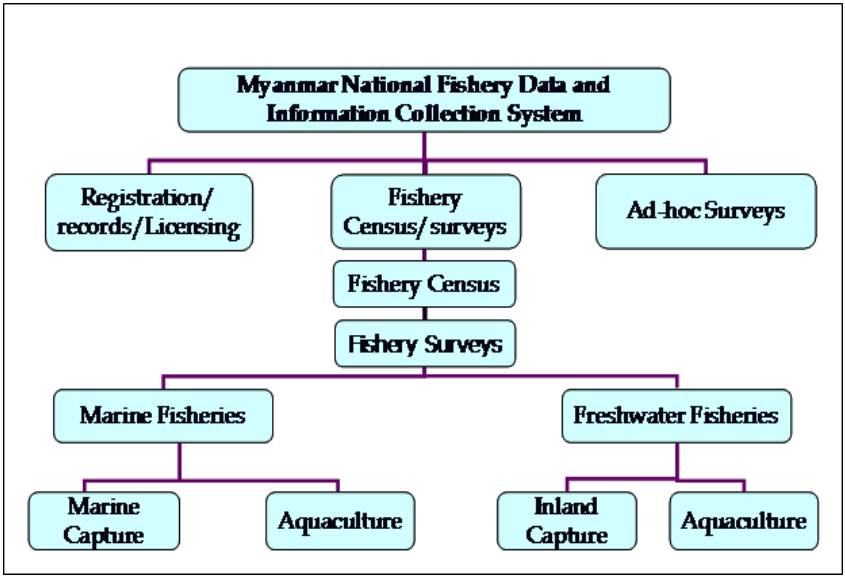
## Planning , Statistics and Rural Development Section

Fisheries statistics are not only a key component of a fisheries information system required for policy, planning, monitoring and management of fisheries but also a vital tool for knowing about the current and past status of fisheries and its trends on the development of the sector.

In major data collection fisheries statistics in Myanmar are three main sources of statistics, such as censuses, surveys and registration and licensing. The Ministry of Agriculture, Livestock and Irrigation is conducting the data collection, compilation, analysis and dissemination for fisheries and Livestock sector. The data collection in fisheries is implemented by the Department of Fisheries (DoF).

### The objectives of fishery data collection

1. To fulfill the requirements of information for the users in relation to fishery sector;
2. To access and focus fisheries resources potential and productivity;
3. Prediction and planning to meet the sustainable fisheries;
4. Making policy and decision on fishery sector;
5. Formulating and developing essential processes for long-term monitoring and management.



# FISHERY STATISTICS

**Table.1. FISHERY PRODUCTION (2007-2008 t0 2016-2017)**

**Thousand Metric Ton**

| No. | Year | Total | Aquaculture | Leasable Fisheries | Open Fisheries | Marine Fisheries |
|---|---|---|---|---|---|---|
| 1. | 2007-2008 | 3193.92 | 687.67 | 191.05 | 625.44 | 1689.76 |
| 2. | 2008-2009 | 3542.19 | 775.25 | 209.72 | 689.71 | 1867.51 |
| 3. | 2009-2010 | 3921.97 | 858.76 | 237.46 | 764.97 | 2060.78 |
| 4. | 2010-2011 | 4163.46 | 830.48 | 250.04 | 913.12 | 2169.82 |
| 5. | 2011-2012 | 4478.35 | 899.05 | 282.64 | 963.82 | 2332.84 |
| 6. | 2012-2013 | 4716.22 | 929.38 | 290.00 | 1012.97 | 2483.87 |
| 7. | 2013-2014 | 5047.40 | 964.12 | 304.44 | 1076.59 | 2702.25 |
| 8. | 2014-2015 | 5316.95 | 999.63 | 315.36 | 1147.76 | 2854.20 |
| 9. | 2015-2016 | 5591.83 | 1014.42 | 338.69 | 1241.98 | 2996.74 |
| 10. | 2016-2017 | 5675.47 | 1048.69 | 339.23 | 1251.13 | 3036.42 |

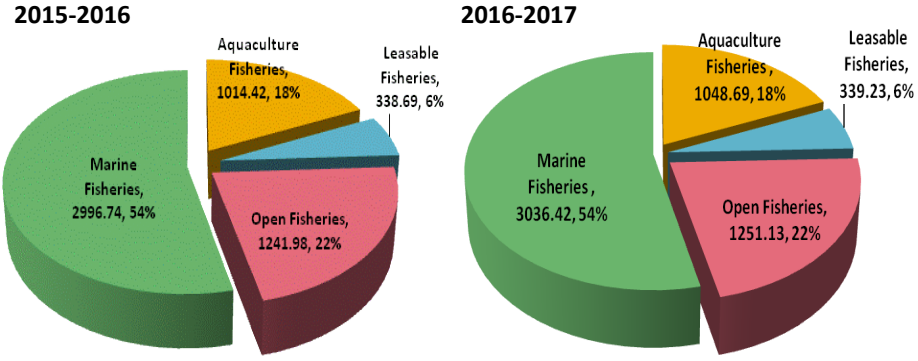



**Figure.5. Fishery Production (2015-2016) & (2016-2017)**

**Table.2.NUMBER OF FISHERS AND FISH FARMARS(2010-2011 to 2014-2015)**

**Unit: Number**

| No. | Working domain | Working status | 2010-2011 | 2011-2012 | 2012-2013 | 2013-2014 | 2014-2015 |
|---|---|---|---|---|---|---|---|
| 1. | Aquaculture | Full Time | 123088 | 124751 | 125978 | 126219 | 126293 |
| | | Part Time | 88739 | 89694 | 90306 | 90481 | 90507 |
| | | Status Unspecified | - | - | - | - | - |
| | | Occasional | - | - | - | - | - |
| 2. | Inland Water | Full Time | 486300 | 486700 | 487000 | 488000 | 450000 |
| | | Part Time | 299500 | 300500 | 300000 | 301000 | 330000 |
| | | Status Unspecified | 785800 | 794000 | 796000 | 796500 | 796500 |
| | | Occasional | - | - | - | - | - |
| 3. | Marine Coastal | Full Time | 220000 | 223000 | 230000 | 230550 | 254000 |
| | | Part Time | 251000 | 254000 | 251000 | 252000 | 252000 |
| | | Status Unspecified | - | - | - | - | - |
| | | Occasional | 916000 | 921000 | 916000 | 917000 | 917000 |
| | | Full Time | 829388 | 834451 | 842978 | 844769 | 830293 |
| | | Part Time | 639239 | 644194 | 641306 | 643481 | 672507 |
| | | Status Unspecified | 785800 | 794000 | 796000 | 765000 | 796500 |
| | | Occasional | 916000 | 921000 | 916000 | 917000 | 917000 |
| | | Total | 3170427 | 3193645 | 3196284 | 3201750 | 3216300 |

**Table.3. TOTAL AQUACULTURE PONDS AND PRODUCTION**

| No. | Year | Area of Aquaculture Ponds (Acre) | Production of Aquaculture Ponds (Thousand Metric Ton) |
|---|---|---|---|
| 1. | 2007-2008 | 441098 | 687.67 |
| 2. | 2008-2009 | 440585 | 775.25 |
| 3. | 2009-2010 | 442702 | 858.76 |
| 4. | 2010-2011 | 443695 | 830.48 |
| 5. | 2011-2012 | 448468 | 899.05 |
| 6. | 2012-2013 | 449692 | 929.38 |
| 7. | 2013-2014 | 450324 | 964.12 |
| 8. | 2014-2015 | 469153 | 999.63 |
| 9. | 2015-2016 | 478002 | 1014.42 |
| 10. | 2016-2017 | 487525 | 1048.69 |

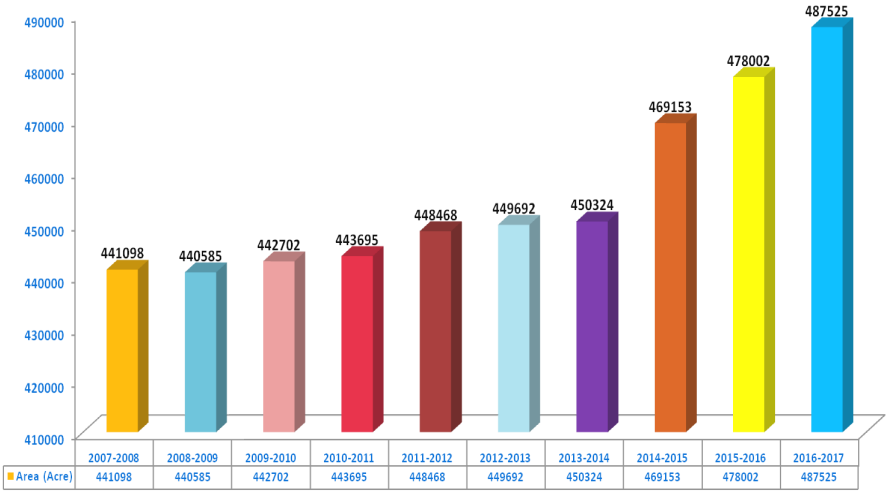



**Figure 6: Area of Aquaculture Pond (2007-2008 to 2016-2017)**

## Table. 4.TOTAL AREA OF AQUACULTURE PONDS

**Unit - Acre**

| No. | Year | Area | | |
|---|---|---|---|---|
| | | Fish Pond | Shrimp Pond | Total |
| 1. | 2007-2008 | 215373 | 225725 | 441098 |
| 2. | 2008-2009 | 215930 | 224655 | 440585 |
| 3. | 2009-2010 | 217835 | 224867 | 442702 |
| 4. | 2010-2011 | 218746 | 224949 | 443695 |
| 5. | 2011-2012 | 220171 | 228297 | 448468 |
| 6. | 2012-2013 | 221395 | 228297 | 449692 |
| 7. | 2013-2014 | 222028 | 228296 | 450324 |
| 8. | 2014-2015 | 232515 | 236638 | 469153 |
| 9. | 2015-2016 | 239671 | 238331 | 478002 |
| 10. | 2016-2017 | 245807 | 241718 | 487525 |

## Table.5.1. AQUACULTURE POND BY STATES AND REGIONS

**Unit-Acre**

| No. | States/ Regions | 2007-2008 | | | 2008-2009 | | | 2009-2010 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Fish Pond | Shrimp Pond | Total | Fish Pond | Shrimp Pond | Total | Fish Pond | Shrimp Pond | Total |
| 1. | Kachin | 1222 | - | 1222 | 1408 | - | 1408 | 1492 | - | 1492 |
| 2. | Kayah | 400 | - | 400 | 510 | - | 510 | 400 | - | 480 |
| 3. | Kayin | 396 | 80 | 476 | 399 | 80 | 479 | 629 | 80 | 629 |
| 4. | Chin | 101 | - | 101 | 101 | - | 101 | 101 | - | 101 |
| 5. | Sagaing | 4569 | - | 4569 | 4569 | - | 4569 | 4794 | - | 4794 |
| 6. | Taninthayi | 329 | 791 | 1120 | 341 | 821 | 1162 | 351 | 821 | 1172 |
| 7. | Bago | 26354 | 12 | 26366 | 26276 | 12 | 26288 | 25888 | 12 | 25900 |
| 8. | Magway | 419 | - | 419 | 419 | - | 419 | 426 | - | 426 |
| 9. | Mandalay | 6205 | - | 6205 | 6411 | - | 6411 | 6783 | - | 6783 |
| 10. | Mon | 848 | 1125 | 1973 | 884 | 1125 | 2009 | 894 | 1125 | 2019 |
| 11. | Rakhine | - | 155533 | 155533 | - | 155533 | 155533 | - | 155533 | 155533 |
| 12. | Yangon | 59870 | 11329 | 71199 | 59835 | 10229 | 70064 | 59870 | 10229 | 70099 |
| 13. | Shan | 3107 | - | 3107 | 3268 | - | 3268 | 3298 | - | 3298 |
| 14. | Ayeyarwady | 111553 | 56855 | 168408 | 111509 | 56855 | 168364 | 112909 | 57067 | 169976 |
| 15. | NayPyi Taw | - | - | - | - | - | - | - | - | - |
| | **Total** | **215373** | **225725** | **441098** | **215930** | **224655** | **440585** | **217835** | **224867** | **442702** |

## Table.5.2.AQUACULTURE POND BY STATES AND REGIONS

**Unit-Acre**

| No. | States/ Regions | 2010-2011 | | | 2011-2012 | | | 2012-2013 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Fish Pond | Shrimp Pond | Total | Fish Pond | Shrimp Pond | Total | Fish Pond | Shrimp Pond | Total |
| 1. | Kachin | 1938 | - | 1938 | 1910 | - | 1910 | 1990 | - | 1990 |
| 2. | Kayah | 638 | - | 638 | 673 | - | 673 | 748 | - | 748 |
| 3. | Kayin | 400 | 80 | 480 | 400 | 80 | 480 | 464 | 80 | 544 |
| 4. | Chin | 108 | - | 108 | 107 | - | 107 | 296 | - | 296 |
| 5. | Sagaing | 5159 | - | 5159 | 5465 | - | 5465 | 5809 | - | 5809 |
| 6. | Taninthayi | 351 | 821 | 1172 | 922 | 4141 | 5063 | 922 | 4141 | 5063 |
| 7. | Bago | 25748 | 12 | 25760 | 26003 | 40 | 26043 | 26009 | 40 | 26049 |
| 8. | Magway | 430 | - | 430 | 425 | - | 425 | 425 | - | 425 |
| 9. | Mandalay | 6898 | - | 6898 | 7154 | - | 7154 | 7416 | - | 7416 |
| 10. | Mon | 920 | 1125 | 2045 | 969 | 1125 | 2094 | 969 | 1125 | 2094 |
| 11. | Rakhine | - | 155533 | 155533 | - | 155533 | 155533 | 20 | 155533 | 155553 |
| 12. | Yangon | 59870 | 10229 | 70099 | 59864 | 10229 | 70093 | 59864 | 10229 | 70093 |
| 13. | Shan | 3377 | - | 3377 | 3387 | - | 3387 | 3409 | - | 3409 |
| 14. | Ayeyarwady | 112909 | 57149 | 170058 | 112892 | 57149 | 170041 | 112892 | 57149 | 170041 |
| 15. | Nay Pyi Taw | - | - | - | - | - | - | 162 | - | 162 |
| | Total | 218746 | 224949 | 443695 | 220171 | 228297 | 448468 | 221395 | 228297 | 449692 |

## Table.5.3. AQUACULTURE POND BY STATES AND REGIONS

**Unit-Acre**

| No. | States/ Regions | 2013-2014 | | | 2014-2015 | | | 2015-2016 | | | 2016-2017 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Fish Pond | Shrimp Pond | Total | Fish Pond | Shrimp Pond | Total | Fish Pond | Shrimp Pond | Total | Fish Pond | Shrimp Pond | Total |
| 1. | Kachin | 2168 | - | 2168 | 2313 | - | 2313 | 2312 | - | 2312 | 2312 | - | 2312 |
| 2. | Kayah | 760 | - | 760 | 798 | - | 798 | 819 | - | 819 | 893 | - | 893 |
| 3. | Kayin | 464 | 80 | 544 | 589 | 80 | 669 | 675 | 130 | 805 | 711 | 130 | 841 |
| 4. | Chin | 296 | - | 296 | 296 | - | 296 | 296 | - | 296 | 296 | - | 296 |
| 5. | Sagaing | 6023 | - | 6023 | 6374 | - | 6374 | 7128 | - | 7128 | 7580 | - | 7580 |
| 6. | Taninthayi | 923 | 4140 | 5063 | 1065 | 4140 | 5205 | 1120 | 4138 | 5258 | 1120 | 4138 | 5258 |
| 7. | Bago | 26014 | 40 | 26054 | 27158 | 40 | 27198 | 28324 | 40 | 28364 | 31121 | 40 | 31161 |
| 8. | Magway | 425 | - | 425 | 425 | - | 425 | 425 | - | 425 | 425 | - | 425 |
| 9. | Mandalay | 7624 | - | 7624 | 7609 | - | 7609 | 7970 | - | 7970 | 7902 | - | 7902 |
| 10. | Mon | 975 | 1125 | 2100 | 979 | 1125 | 2104 | 995 | 1125 | 2120 | 995 | 1125 | 2120 |
| 11. | Rakhine | 20 | 155533 | 155553 | 20 | 155533 | 155553 | 20 | 156488 | 156508 | 20 | 156489 | 156509 |
| 12. | Yangon | 59864 | 10229 | 70093 | 65848 | 17829 | 83677 | 66015 | 18442 | 84457 | 67038 | 18916 | 85954 |
| 13. | Shan | 3409 | - | 3409 | 3408 | - | 3408 | 3408 | - | 3408 | 3408 | - | 3408 |
| 14. | Ayeyarwady | 112892 | 57149 | 170041 | 115462 | 57892 | 173353 | 119993 | 57968 | 177961 | 121811 | 60880 | 182691 |
| 15. | Nay Pyi Taw | 171 | - | 171 | 171 | - | 171 | 171 | - | 171 | 175 | - | 175 |
| | **Total** | **222028** | **228296** | **450324** | **232515** | **236638** | **469153** | **239671** | **238331** | **478002** | **245807** | **241718** | **487525** |

**Table. 6. THE PRODUCTION OF LEASABLE FISHERIES AND OPEN FISHERIES**

| No. | Year | Total number of Leasable (Number) | Production of Leasable Fisheries (MT-000) | Production of Open Fisheries (MT-000) | Total Production of Inland Fisheries (MT-000) |
|---|---|---|---|---|---|
| 1. | 2007-2008 | 3460 | 191.05 | 625.44 | 816.49 |
| 2. | 2008-2009 | 3453 | 209.72 | 689.71 | 899.43 |
| 3. | 2009-2010 | 3451 | 237.46 | 764.97 | 1002.43 |
| 4. | 2010-2011 | 3458 | 250.04 | 913.12 | 1163.16 |
| 5. | 2011-2012 | 3415 | 282.64 | 963.82 | 1246.46 |
| 6. | 2012-2013 | 3409 | 290.00 | 1012.97 | 1302.97 |
| 7. | 2013-2014 | 3290 | 304.44 | 1076.59 | 1381.03 |
| 8. | 2014-2015 | 3304 | 315.36 | 1147.76 | 1463.12 |
| 9. | 2015-2016 | 3312 | 338.69 | 1241.98 | 1580.67 |
| 10. | 2016-2017 | 3299 | 339.23 | 1251.13 | 1590.36 |

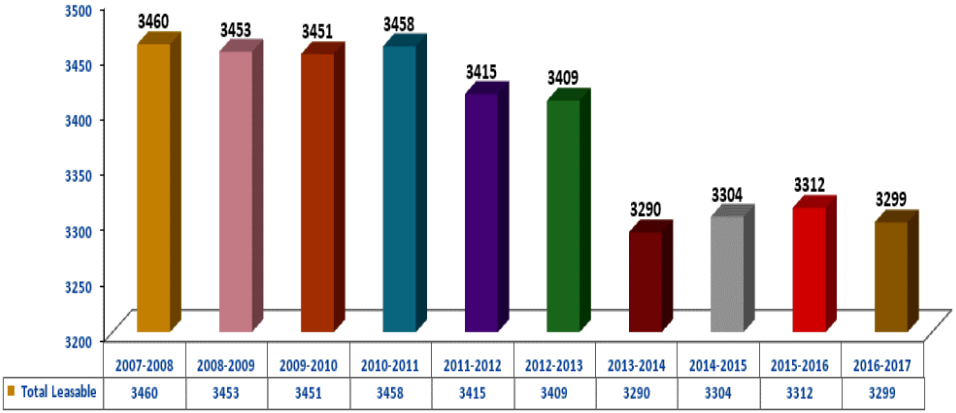



**Figure 7: Number of Leasable Fisheries in Myanmar (2007-2008 to 2016-2017)**

**Table.7. FISHING VESSELS**

**Unit - Number**

| No. | Year | Small Fishing Boat | | Off-shore Vessels | | Total |
|---|---|---|---|---|---|---|
| | | Powered Boat | Non-Powered Boat | National | Foreign | |
| 1. | 2007-2008 | 14289 | 15219 | 1863 | 248 | 31619 |
| 2. | 2008-2009 | 14025 | 14645 | 1758 | 356 | 30784 |
| 3. | 2009-2010 | 13788 | 17054 | 1814 | 391 | 33047 |
| 4. | 2010-2011 | 13823 | 15548 | 2196 | 396 | 31963 |
| 5. | 2011-2012 | 12288 | 15463 | 2598 | 264 | 30613 |
| 6. | 2012-2013 | 12157 | 12757 | 2724 | 150 | 27788 |
| 7. | 2013-2014 | 12490 | 13732 | 2736 | 153 | 29111 |
| 8. | 2014-2015 | 12240 | 13391 | 2840 | 52 | 28523 |
| 9. | 2015-2016 | 13831 | 12583 | 3030 | 11 | 29455 |
| 10. | 2016-2017 | 16012 | 10704 | 3105 | 48 | 29869 |

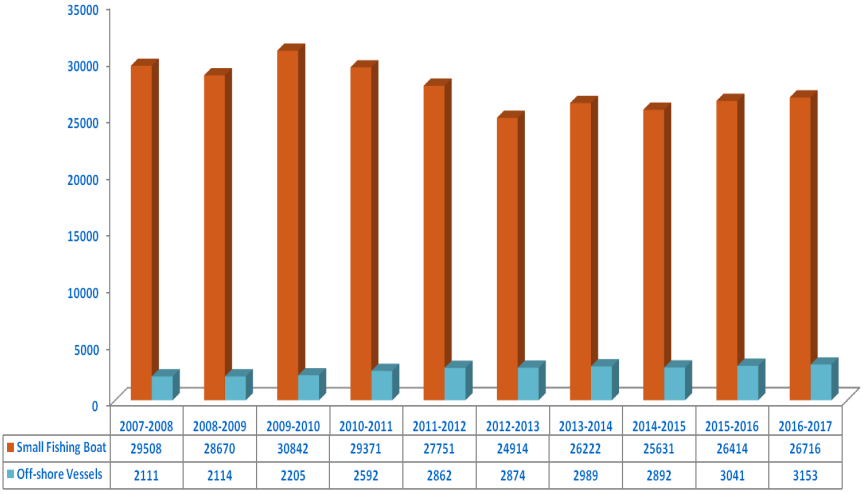



**Figure 8: Number of Fishing Boats and Off –Shore Vessels**

## Table. 8.1. 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 |
|---|---|---|---|---|---|---|---|---|---|
| 1. | 2007-2008 | Head office | 389 | 81 | 145 | - | - | 46 | 661 |
| | | Rakhine | 5 | - | - | - | - | 4 | 9 |
| | | Taninthayi | 376 | 71 | 1 | 1 | 19 | 101 | 569 |
| | | Ayeyarwady | - | - | 464 | - | - | - | 464 |
| | | Mon | - | - | 160 | - | - | - | 160 |
| | | Yangon | - | - | - | - | - | - | - |
| | **Total** | | **770** | **152** | **770** | **1** | **19** | **151** | **1863** |
| 2. | 2008-2009 | Head office | 387 | 72 | 142 | - | - | 39 | 640 |
| | | Rakhine | - | - | - | - | - | - | - |
| | | Taninthayi | 416 | 87 | 2 | 2 | 21 | 62 | 590 |
| | | Ayeyarwady | - | - | 373 | - | - | - | 373 |
| | | Mon | - | - | 155 | - | - | - | 155 |
| | | Yangon | - | - | - | - | - | - | - |
| | **Total** | | **803** | **159** | **672** | **2** | **21** | **101** | **1758** |
| 3. | 2009-2010 | Head office | 426 | 65 | 162 | 3 | - | 37 | 693 |
| | | Rakhine | 6 | - | - | - | - | - | 6 |
| | | Taninthayi | 482 | 100 | 2 | - | 35 | 67 | 686 |
| | | Ayeyarwady | - | - | 544 | - | - | - | 544 |
| | | Mon | - | - | 148 | - | - | - | 148 |
| | | Yangon | - | - | - | - | - | - | - |
| | **Total** | | **914** | **165** | **856** | **3** | **35** | **104** | **2077** |
| 4. | 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** |
| 5. | 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** |

## Table.8.2. 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. | 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** |
| 7. | 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** |
| 8. | 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** |
| 9. | 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** |
| 10. | 2016-2017 | Head office | 676 | 45 | 152 | 1 | - | 20 | 894 |
| | | Rakhine | - | 3 | - | - | - | 4 | 7 |
| | | Taninthayi | 623 | 262 | 4 | 27 | 382 | 94 | 1392 |
| | | Ayeyarwady | - | - | 474 | - | - | 1 | 475 |
| | | Mon | - | - | 321 | - | - | - | 321 |
| | | Yangon | - | - | - | - | - | - | - |
| | **Total** | | **1299** | **310** | **951** | **28** | **382** | **119** | **3089** |

## Table.9.FISHERY EXPORTS

**Quantity - Metric Ton**
**Value - US $ in Million**

| No. | Year | Fish | | Prawns | | Others | | Total | |
|---|---|---|---|---|---|---|---|---|---|
| | | Quantity | Value | Quantity | Value | Quantity | Value | Quantity | Value |
| 1. | 2007-2008 | 245473.15 | 315.46 | 21061.30 | 109.74 | 85117.60 | 135.82 | 351652.05 | 561.02 |
| 2. | 2008-2009 | 234060.74 | 273.27 | 18382.10 | 88.85 | 72267.70 | 121.11 | 324710.54 | 483.23 |
| 3. | 2009-2010 | 277823.74 | 309.86 | 17439.31 | 56.33 | 79829.38 | 130.40 | 375092.43 | 496.59 |
| 4. | 2010-2011 | 273043.74 | 342.44 | 19142.91 | 68.66 | 81706.06 | 144.41 | 373892.71 | 555.51 |
| 5. | 2011-2012 | 283688.76 | 396.27 | 17995.03 | 86.19 | 85297.53 | 171.39 | 386981.32 | 653.85 |
| 6. | 2012-2013 | 266464.97 | 378.05 | 17267.93 | 89.29 | 93112.79 | 185.50 | 376845.69 | 652.84 |
| 7. | 2013-2014 | 237142.31 | 286.93 | 16508.97 | 61.98 | 91616.08 | 187.36 | 345267.36 | 536.27 |
| 8. | 2014-2015 | 225974.93 | 258.61 | 17527.33 | 56.89 | 94788.33 | 166.75 | 338290.59 | 482.25 |
| 9. | 2015-2016 | 246970.93 | 274.25 | 13673.49 | 49.64 | 108326.47 | 178.74 | 368970.89 | 502.63 |
| 10. | 2016-2017 | 290580.04 | 319.04 | 13082.46 | 58.21 | 135044.01 | 228.57 | 438706.51 | 605.82 |

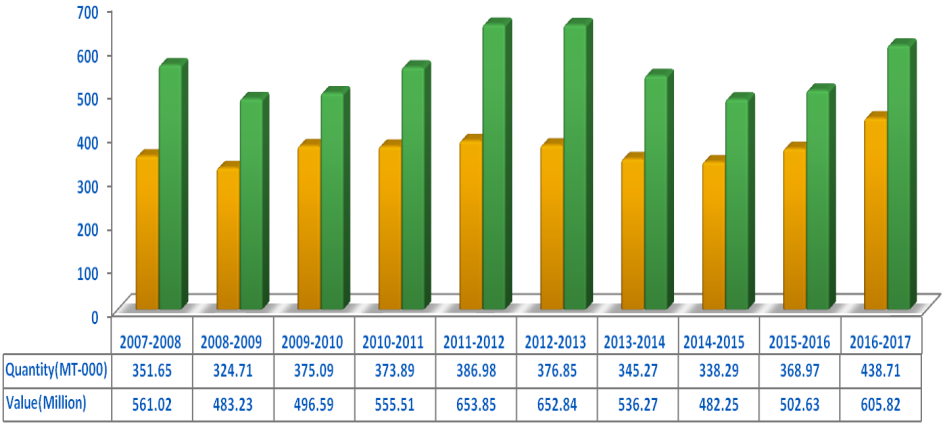



**Figure 9: Fish and Fishery Product Exported in Myanmar (2007-2008 to 2016-2017)**

**Table.10. TOP TEN SPECIES OF EXPORTED FISH AND FISHERIES PRODUCT OF MYANMAR (2016-2017)**

| No. | Species (Common Name) | | MT ( Ordinary) | US$ ( Million) |
|---|---|---|---|---|
| 1. | Rohu |  | 53092.447 | 54.672 |
| 2. | Live Mud Crab |  | 15649.758 | 45.595 |
| 3. | Live Eel |  | 7434.286 | 25.350 |
| 4. | Soft Shell Crab |  | 3037.631 | 25.073 |
| 5. | Fish Meal |  | 37444.871 | 33.730 |
| 6. | Ribbon Fish |  | 20447.705 | 35.116 |
| 7. | Pink |  | 7233.451 | 19.822 |
| 8. | Tiger |  | 2892.161 | 20.965 |
| 9. | Hilsa |  | 12003.643 | 28.044 |
| 10. | Big Eye Croaker |  | 16561.238 | 18.978 |

**Table.11.FISHERY PRODUCT EXPORTED BY TRADING COUNTRIES (2016-2017)**

| No | Country | Fish | | Prawn | | Other | | Total | |
|---|---|---|---|---|---|---|---|---|---|
| | | MT | US$-Million | MT | US$-Million | MT | US$-Million | MT | US$-Million |
| 1 | Singapore | 9767.186 | 15.925 | 363.455 | 1.362 | 4945.854 | 5.423 | 15076.495 | 22.710 |
| 2 | Kuwait | 8331.781 | 8.645 | 3.108 | 0.008 | 51.877 | 0.094 | 8386.766 | 8.747 |
| 3 | Saudi | 20756.158 | 23.262 | 11.284 | 0.016 | 362.353 | 0.641 | 21129.795 | 23.919 |
| 4 | Malaysia | 2518.637 | 3.845 | 1150.565 | 7.428 | 7960.769 | 24.076 | 11629.971 | 35.349 |
| 5 | Japan | 84.797 | 0.216 | 4397.089 | 18.916 | 1567.539 | 5.451 | 6049.425 | 24.583 |
| 6 | Thailand | 168426.109 | 144.173 | 1771.084 | 7.352 | 40900.757 | 47.184 | 211097.950 | 198.709 |
| 7 | China | 31409.967 | 58.060 | 3222.377 | 11.970 | 65567.885 | 120.089 | 100200.229 | 190.119 |
| 8 | UAE | 13657.961 | 14.422 | 151.016 | 0.343 | 75.524 | 0.132 | 13884.501 | 14.897 |
| 9 | UK | 6390.791 | 11.805 | 30.609 | 0.130 | 188.102 | 0.581 | 6609.502 | 12.516 |
| 10 | Hong Kong | 126.241 | 0.350 | 759.893 | 4.560 | 279.852 | 3.402 | 1165.986 | 8.312 |
| 11 | Qatar | 3210.600 | 3.404 | 7.746 | 0.011 | 58.165 | 0.101 | 3276.511 | 3.516 |
| 12 | Korea | 287.619 | 0.407 | 6.561 | 0.030 | 1076.741 | 1.819 | 1370.921 | 2.256 |
| 13 | Bahrain | 2084.381 | 2.187 | 0.662 | 0.001 | 14.388 | 0.054 | 2099.431 | 2.242 |
| 14 | Italy | 1669.388 | 2.393 | 0.005 | - | 48.005 | 0.078 | 1717.398 | 2.471 |
| 15 | Australia | 434.424 | 0.956 | 0.004 | - | 494.230 | 2.572 | 928.658 | 3.528 |
| 16 | USA | 2547.406 | 3.904 | 134.102 | 0.912 | 844.303 | 7.330 | 3525.811 | 12.146 |
| 17 | Oman | 3933.291 | 4.015 | 4.340 | 0.007 | 23.383 | 0.040 | 3961.014 | 4.062 |
| 18 | Iraq | 5116.660 | 5.138 | - | - | 0.200 | 0.001 | 5116.860 | 5.139 |
| 19 | Vietnam | 224.164 | 0.488 | 358.170 | 1.865 | 6290.503 | 4.690 | 6872.837 | 7.043 |
| 20 | Bangladesh | 7111.144 | 11.240 | 225.235 | 1.234 | 3780.864 | 2.919 | 11117.243 | 15.393 |
| 21 | Canada | 437.960 | 0.682 | - | - | 0.450 | 0.001 | 438.410 | 0.683 |
| 22 | India | 897.752 | 2.035 | - | - | 10.000 | 0.008 | 907.752 | 2.043 |
| 23 | Ireland | 121.030 | 0.179 | 7.300 | 0.028 | - | - | 128.330 | 0.207 |
| 24 | Jordon | 113.363 | 0.181 | 1.500 | 0.003 | 3.327 | 0.006 | 118.190 | 0.190 |
| 25 | South Affrica | 106.564 | 0.132 | 6.802 | 0.010 | 27.122 | 0.067 | 140.488 | 0.209 |
| 26 | Philippines | - | - | 5.940 | 0.016 | 16.740 | 0.134 | 22.680 | 0.150 |
| 27 | France | - | - | 0.160 | 0.002 | 62.843 | 0.231 | 63.003 | 0.233 |
| 28 | Indonesia | - | - | 111.240 | 0.559 | 8.428 | 0.019 | 119.668 | 0.578 |
| 29 | Greece | 63.517 | 0.083 | - | - | - | - | 63.517 | 0.083 |
| 30 | Macau | 1.080 | 0.004 | - | - | 0.798 | 0.016 | 1.878 | 0.020 |
| 31 | Pakistan | 135.200 | 0.139 | - | - | - | - | 135.200 | 0.139 |
| 32 | Germany | 42.375 | 0.055 | - | - | - | - | 42.375 | 0.055 |
| 33 | Sweden | 252.208 | 0.315 | - | - | - | - | 252.208 | 0.315 |
| 34 | Netherland | 125.633 | 0.174 | - | - | - | - | 125.633 | 0.174 |
| 35 | Belgium | 23.930 | 0.044 | 80.239 | 0.516 | - | - | 104.169 | 0.560 |
| 36 | Newzealand | - | - | - | - | 5.424 | 0.020 | 5.424 | 0.020 |
| 37 | Taiwan | 2.172 | 0.009 | 271.875 | 0.927 | 366.989 | 1.343 | 641.036 | 2.279 |
| 38 | Turkey | 147.000 | 0.150 | - | - | - | - | 147.000 | 0.150 |
| 39 | Lebanon | 9.360 | 0.015 | 0.100 | 0.001 | 3.000 | 0.005 | 12.460 | 0.021 |
| 40 | Brunei | 12.190 | 0.013 | - | - | 7.590 | 0.040 | 19.780 | 0.053 |
| | **Total** | **290580.039** | **319.045** | **13082.461** | **58.207** | **135044.005** | **228.567** | **438706.505** | **605.819** |

**Table.12.1.TOP TEN COUNTRIES EXPORTED FISHERY PRODUCTS**

| No. | 2007-2008 | | | 2008-2009 | | |
|---|---|---|---|---|---|---|
| | Countries | MT | US-Million | Countries | MT | US-Million |
| 1. | China | 84980.51 | 148.724 | Singapore | 56753.61 | 119.044 |
| 2. | Malaysia | 80835.93 | 86.960 | China | 58921.26 | 106.153 |
| 3. | Singapore | 32095.00 | 70.363 | Thailand | 89489.51 | 76.978 |
| 4. | Thailand | 48820.83 | 55.985 | Malaysia | 23004.36 | 41.260 |
| 5. | Japan | 10523.96 | 42.085 | Kuwait | 34423.65 | 31.844 |
| 6. | Saudi | 18798.08 | 35.146 | Japan | 6514.06 | 23.400 |
| 7. | Kuwait | 27895.32 | 30.026 | Saudi | 17702.43 | 21.344 |
| 8. | Bangladesh | 20229.72 | 27.003 | Bangladesh | 14694.98 | 18.686 |
| 9. | UAE | 9467.70 | 13.902 | UAE | 10610.28 | 13.782 |
| 10. | HongKong | 3141.41 | 12.664 | UK | 5192.63 | 10.674 |
| | | 2009-2010 | | | 2010-2011 | |
| 1. | China | 55991.33 | 105.076 | China | 77914.27 | 179.704 |
| 2. | Thailand | 122817.59 | 99.229 | Thailand | 134634.31 | 110.595 |
| 3. | Singapore | 46424.56 | 96.257 | Singapore | 25413.33 | 59.378 |
| 4. | Kuwait | 58747.92 | 52.964 | Kuwait | 50643.82 | 56.683 |
| 5. | Malaysia | 21351.10 | 36.127 | Malaysia | 20669.93 | 39.419 |
| 6. | Saudi | 20426.63 | 23.272 | Saudi | 19474.26 | 24.673 |
| 7. | Japan | 6215.54 | 16.908 | Japan | 7197.15 | 21.882 |
| 8. | UAE | 13517.21 | 16.784 | UAE | 12292.49 | 17.789 |
| 9. | Bangladesh | 13993.34 | 16.257 | Bangladesh | 11372.95 | 14.166 |
| 10. | UK | 6285.68 | 12.427 | UK | 6488.43 | 13.085 |
| | | 2011-2012 | | | 2012-2013 | |
| 1. | China | 92775.645 | 258.759 | Chian | 90780.734 | 244.249 |
| 2. | Thailand | 136278.599 | 124.457 | Thailand | 137631.665 | 133.165 |
| 3. | Malaysia | 23325.904 | 53.623 | Singapore | 26584.477 | 49.748 |
| 4. | Kuwait | 45496.48 | 51.155 | Kuwait | 34515.926 | 49.153 |
| 5. | Singapore | 15881.889 | 34.522 | Malaysia | 19288.339 | 45.678 |
| 6. | Japan | 6839.415 | 30.361 | Japan | 6895.203 | 34.971 |
| 7. | Saudi | 20771.696 | 28.610 | Saudi | 21738.835 | 31.806 |
| 8. | Bangladesh | 17296.858 | 23.124 | UAE | 15142.596 | 19.424 |
| 9. | UAE | 16045.361 | 21.320 | UK | 6341.289 | 14.561 |
| 10. | UK | 6275.849 | 13.845 | Bangladeah | 9529.391 | 11.978 |

**Table.12.2.TOP TEN COUNTRIES EXPORTED FISHERY PRODUCTS**

| No. | 2013-2014 | | | 2014-2015 | | |
|---|---|---|---|---|---|---|
| | Countries | MT | US-Million | Countries | MT | US-Million |
| 1. | China | 82665.926 | 199.290 | Chian | 75732.900 | 169.685 |
| 2. | Thailand | 126645.544 | 128.980 | Thailand | 127537.529 | 127.750 |
| 3. | Malaysia | 16459.550 | 35.285 | Malaysia | 16769.467 | 31.400 |
| 4. | Kuwait | 26196.712 | 27.051 | Singapore | 21453.699 | 22.959 |
| 5. | Singapore | 20086.003 | 25.220 | Saudi | 20689.382 | 22.353 |
| 6. | Saudi | 19672.380 | 24.370 | Kuwait | 23428.406 | 21.935 |
| 7. | Japan | 6490.001 | 23.511 | Japan | 6750.174 | 18.846 |
| 8. | UAE | 16008.274 | 18.271 | UAE | 13838.681 | 14.588 |
| 9. | UK | 7123.743 | 13.839 | UK | 5654.002 | 10.189 |
| 10. | Bangladesh | 8190.575 | 8.500 | Bangladesh | 7602.536 | 9.013 |
| | | 2015-2016 | | | 2016-2017 | |
| 1. | China | 78217.835 | 161.491 | Thailand | 211097.950 | 198.709 |
| 2. | Thailand | 149567.763 | 143.170 | China | 100200.229 | 190.119 |
| 3. | Malaysia | 13682.229 | 34.233 | Malaysia | 11629.971 | 35.349 |
| 4. | Singapore | 27049.903 | 29.655 | Japan | 6049.425 | 24.583 |
| 5. | Saudi | 20862.038 | 22.223 | Saudi | 21129.795 | 23.919 |
| 6. | Kuwait | 20986.639 | 19.793 | Singapore | 15076.495 | 22.710 |
| 7. | Japan | 5371.332 | 17.325 | Bangladesh | 11117.243 | 15.393 |
| 8. | UAE | 14189.191 | 13.787 | UAE | 13884.501 | 14.897 |
| 9. | UK | 7008.604 | 11.897 | UK | 6609.502 | 12.516 |
| 10. | USA | 3340.950 | 10.031 | USA | 3525.811 | 12.146 |

**Table.13. FISH SUPPLY IN YANGON**

**Unit - Thousand Metric Ton**

| No. | Year | Production | | |
|---|---|---|---|---|
| | | Fresh Water | Marine | Total |
| 1. | 2007-2008 | 91.28 | 143.83 | 235.11 |
| 2. | 2008-2009 | 78.83 | 103.69 | 182.52 |
| 3. | 2009-2010 | 91.39 | 132.47 | 223.86 |
| 4. | 2010-2011 | 93.07 | 138.44 | 231.51 |
| 5. | 2011-2012 | 97.67 | 152.94 | 250.61 |
| 6. | 2012-2013 | 94.68 | 167.01 | 261.69 |
| 7. | 2013-2014 | 135.04 | 166.42 | 301.46 |
| 8. | 2014-2015 | 142.45 | 152.95 | 295.40 |
| 9. | 2015-2016 | 127.56 | 159.46 | 287.02 |
| 10. | 2016-2017 | 124.65 | 170.58 | 295.23 |

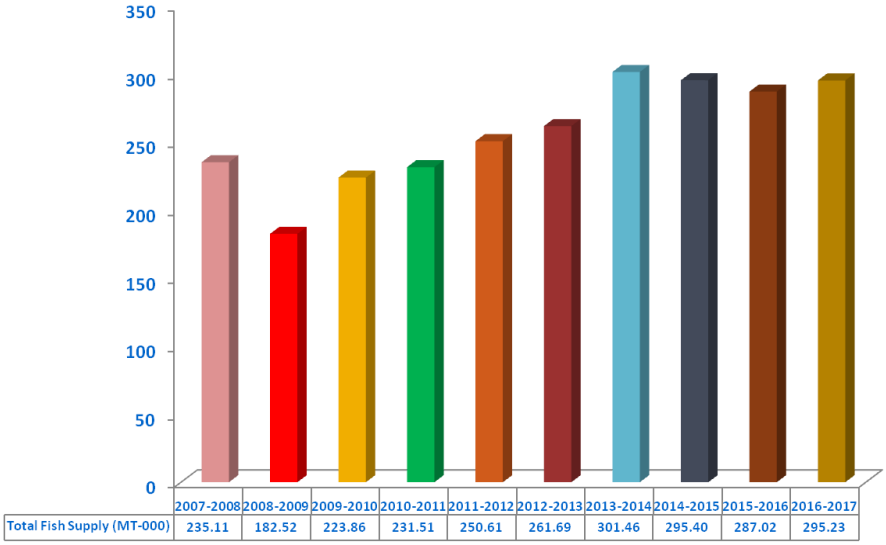



**Figure 10: Fish Supply in Yangon (2007-2008 to 2016-2017)**

**Table.14. PER CAPITA FISH SUPPLY BY YEAR**

| No. | Year | Population (Million) | Production (Metric Ton) | Non-food use (Metric Ton) | Export (Metric Ton) | Per Capita Fish Supply (Kg) |
|---|---|---|---|---|---|---|
| 1. | 2016-2017 | 52.92 | 5675469 | 1986414 | 438706 | 61 |

*In the above figure, the quantities of fish of non-food use is estimated in which it is included for using amount of animal feeds, processing waste from raw material to finished products, and for fish meal etc.,.

## Table. 15.1. SEED PRODUCTION BY FISH HATCHERIES UNDER DOF

**Unit: Million**

| No. | Myanmar Name | Common Name | Scientific Name | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 |
|---|---|---|---|---|---|---|---|---|
| 1. | Nga Myit Chin | Rohu | *Labeo rohita* | 541.823 | 530.733 | 527.260 | 460.179 | 535.409 |
| 2. | Shwe Wa Nga Gyin | Common Carp | *Cyprinus carpio* | 70.870 | 56.783 | 77.370 | 83.882 | 49.223 |
| 3. | Myetsar Nga Gyin | Grass Carp | *Ctenopharyngo-don idella* | 6.336 | 5.881 | 4.170 | 8.397 | 3.833 |
| 4. | Nga Khaung Pwa | Catla | *Catla catla* | 6.089 | 4.950 | 5.190 | 11.733 | 6.547 |
| 5. | Tilapia | Tilapia | *Tilapia spp:* | 13.375 | 12.999 | 20.060 | 18.363 | 17.883 |
| 6. | Ngwe Yaung Nga Gyin | Silver Carp | *Hypophthal-michtys molitrix* | 3.032 | 3.244 | 3.380 | 5.629 | 6.894 |
| 7. | Khaung Gyi Nga Gyin | Big Head | *Aristichthys nobilis* | 2.110 | 2.300 | 2.190 | 3.8 | 3.539 |
| 8. | Nga Khu | Cat Fish | *Clarias batrachus* | - | - | - | - | 0.050 |
| 9. | Nga Dan | Stripped Catfish | *Pangasius sutchi* | 11.724 | 10.076 | 4.660 | 9.384 | 5.660 |
| 10. | Nga Phan Ma | Rohtee | *Rohtee alfrediana* | - | - | - | - | - |
| 11. | Nga Gyin Phyu | Mrigal | *Cirrhina mrigala* | 3.389 | 1.825 | 2.850 | 6.652 | 4.554 |
| 12. | Pa Cu (Ye Cho Nga Mote) | Fresh water pomfret | *Pirictus spp:* | 9.339 | 10.809 | 3.290 | 6.733 | 3.690 |
| 13 | Nga Khone Ma | Tarpian | *Barbodes gonionotus* | 75.293 | 68.712 | 86.230 | 181.439 | 112.761 |
| 14. | Nga Thyine | Minor Carp | *Leabo Fdolizkae* | - | - | 0.050 | - | - |
| 15. | Be Lar | Snakeskin gourami | *Trichogester pectoralis* | - | - | 0.060 | - | 0.020 |
| 16. | Vietnam Nga Dan | Stripped Catfish | *Pangasius bacourti* | - | - | - | 0.060 | - |
| 17. | Nga Kye | Sconpion catfish | *Heteropneustcs fossilis* | - | - | - | 0.002 | 0.300 |
| 18. | Nga Phane | Nga Phane | *Cyprinus intha* | - | - | - | - | 0.003 |
| 19. | Sultan | Sultan Fish | *Leptobanbus hoevenii* | - | - | - | - | 0.004 |
| 20. | Nga Ohn Tone | Nandina | *Labeo nandina* | - | - | - | - | - |
| 21. | Nga Dane | Kuria Labeo | *Labeo gonius* | - | - | - | - | - |
| 22. | Taung Paw Nga Thar Lauk | Streaked prochilod | *Prochilodus line-atus* | - | - | - | - | - |
| | **Total** | | | **743.380** | **708.312** | **736.760** | **796.253** | **750.370** |

## Table.15.2. SEED PRODUCTION BY FISH HATCHERIES UNDER DOF

**Unit - Million**

| No. | Myanmar Name | Common Name | Scientific Name | 2012-13 | 2013-14 | 2014-15 | 2015-16 | 2016-17 |
|---|---|---|---|---|---|---|---|---|
| 1. | Nga Myit Chin | Rohu | *Labeo rohita* | 549.201 | 384.861 | 397.569 | 419.600 | 455.631 |
| 2. | Shwe Wa Nga Gyin | Common Carp | *Cyprinus carpio* | 45.579 | 41.914 | 38.751 | 35.981 | 46.795 |
| 3. | Myetsar Nga Gyin | Grass Carp | *Ctenopharyngo-don idella* | 13.400 | 5.598 | 5.483 | 5.378 | 7.074 |
| 4. | Nga Khaung Pwa | Catla | *Catla catla* | 9.637 | 7.054 | 6.976 | 6.877 | 9.191 |
| 5. | Tilapia | Tilapia | *Tilapia spp:* | 13.063 | 13.571 | 11.492 | 11.792 | 15.446 |
| 6. | Ngwe Yaung Nga Gyin | Silver Carp | *Hypophthal-michtys molitrix* | 5.246 | 5.533 | 4.715 | 4.146 | 6.432 |
| 7. | Khaung Gyi Nga Gyin | Big Head | *Aristichthys nobilis* | 2.305 | 2.785 | 2.203 | 2.830 | 2.124 |
| 8. | Nga Khu | Cat Fish | *Clarias batrachus* | - | - | 0.001 | - | - |
| 9. | Nga Dan | Stripped Catfish | *Pangasius sutchi* | 8.976 | 7.111 | 5.675 | 7.787 | 8.301 |
| 10. | Nga Phan Ma | Rohtee | *Rohtee alfrediana* | - | - | 0.105 | - | 0.055 |
| 11. | Nga Gyin Phyu | Mrigal | *Cirrhina mrigala* | 6.087 | 2.854 | 2.275 | 3.190 | 4.735 |
| 12. | Pa Cu (Ye Cho Nga Mote) | Fresh water pomfret | *Pirictus spp:* | 7.633 | 5.569 | 7.325 | 8.265 | 7.810 |
| 13 | Nga Khone Ma | Tarpian | *Barbodes gonionotus* | 127.863 | 73.478 | 89.541 | 100.879 | 79.120 |
| 14. | Nga Thyine | Minor Carp | *Leabo Fdolizkae* | - | - | - | - | - |
| 15. | Be Lar | Snakeskin gourami | *Trichogester pectoralis* | - | - | - | 0.170 | 0.186 |
| 16. | Vietnam Nga Dan | Stripped Catfish | *Pangasius bacourti* | - | - | - | - | - |
| 17. | Nga Kye | Sconpion catfish | *Heteropneustcs fossilis* | 0.250 | 0.100 | 0.050 | 0.100 | 0.110 |
| 18. | Nga Phane | Nga Phane | *Cyprinus intha* | 0.218 | 0.353 | 1.651 | 1.103 | 0.610 |
| 19. | Sultan | Sultan Fish | *Leptobanbus hoevenii* | - | 0.060 | - | - | - |
| 20. | Nga Ohn Tone | Nandina | *Labeo nandina* | 0.065 | - | - | - | - |
| 21. | Nga Dane | Kuria Labeo | *Labeo gonius* | 0.100 | - | - | 0.050 | 0.100 |
| 22. | Taung Paw Nga Thar Lauk | Streaked prochilod | *Prochilodus lineatus* | - | 0.565 | 1.600 | 0.550 | 0.220 |
| 23. | Nga Thyine | | | - | - | - | - | 0.152 |
| | **Total** | | | **789.623** | **551.406** | **575.412** | **608.698** | **644.092** |

## Table.16.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.17.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. 18. 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.19. 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.20. 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.21. 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.22. 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.23. SHRIMP/PRAWN HATCHERIES UNDER DOF (2011-2012 to 2016-2017)**

Unit - Million

| No. | Shrimp/Prawn Hatcheries / Shrimp (Penaeus monodon) | 2011-2012 | 2012-2013 | 2013-2014 | 2014-2015 | 2015-2016 | 2016-2017 |
|---|---|---|---|---|---|---|---|
| 1. | Wa-maw (Long-lone) | 1.20 | 1.50 | 0.50 | 1.70 | - | - |
| 2. | Kyauk-phyu | 0.80 | 1.00 | 1.50 | 2.50 | 2.00 | 2.500 |
| 3. | Ye-chan-pyin | 0.60 | 3.00 | 1.50 | - | 2.27 | - |
| 4. | A-lae-tan-kyaw | 0.20 | - | - | - | - | - |
| 5. | Chaung Tha (Sein Ngwe Mya) Prawn (Macrobrachium rosenbergii) | - | 2.00 | - | - | 1.20 | 0.099 |
| 6. | Kyauk-tan | 0.60 | - | - | 0.30 | 0.60 | 2.940 |
| | **Total** | **3.40** | **7.50** | **3.50** | **4.50** | **6.07** | **5.539** |

**Table.24. 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** |