PROJECT DOCUMENT

ACHIEVEMENTS FOR YEAR 2019

Project ID: 0520150101

Program Category	ASEAN-SEAFDEC ASSP and FCG Mechanism		
Project Title	Enhancement of Sustainability of Catadromous Eel Resources in Southeast Asia		
Program Strategy No.	I	**Total Duration**	2015-2019
Lead Department	Inland Fishery Resources Development and Management Department (IFRDMD)	**Lead Country**	None
Donor/Sponsor	Japanese Trust Fund (JTF)	**Total Donor Budget**	USD 248,020
Project Partner	None	**Budget for 2019**	USD 41,080
Project Leader	Ms. Ni Komang Suryati / IFRDMD	**Project Participating Country(ies)**	All Member Countries

PART I: OVERALL PROJECT DESCRIPTION

1. Brief Project Description:

This project is aimed at enhancing the sustainability of catadromous eel resources in Southeast Asia (hereinafter it is to be called "the region"). There are three main activities on the project. The first one is aims at clear understanding on current situation of resources, fisheries and utilization of catadromous eels in the region. The second one is aims at improving data collection and statistics of catadromous eel catch in ASEAN Member States (hereinafter referred to as "AMS"). The third one is aims at enhancing knowledge and capacity in AMSs for the conservation, management and sustainable utilization of catadromous eel resources.

In particular, lack of data and statistics on tropical eel species may bring negative impact to the fisheries sectors. Various kind of information about the tropical eels should be collected through a variety of sources, including the fishing activities (catch statistics), biological surveys and from the beneficiaries (traders, consumers and so on).

2. Background and Justification:

With the rapid decline of temperate eels, the market value of tropical eels rises in recent years. Glass eel (juvenile of eel) capture fisheries in tropical zone increase dramatically. In order to avoid the over exploitation on glass eel, the Indonesian government issued the regulation to prohibit export of eel seeds less than 150 g from Indonesia's territory. The similar policies to prohibit export of eel seeds are enforced in some other countries. Conservation and management policy issues on tropical eel resources for their sustainability become more important not only in Indonesia but also in the region. Therefore, the region needs a policy to balance between utilization and sustainability of tropical eel resources. At the same time, we should consider that we just have quite limited knowledge on tropical eel species in this region yet.

The main objectives of this project are to find out the current status of eel fisheries, to develop the data collection methods and statistical data on fisheries production, and to promote the management plans for conservation and sustainable use of tropical eel resources. The Goals of the project are construction of guidelines on conservation, management and sustainable utilization of catadromous eel resources in the region.

3. Overall Project Objectives, Outcomes, Outputs, Indicators and Activities:

3.1 Objectives, Outcome and Output of the Project

Objectives	Outcomes	Outputs	Activities
Objective 1: Having clear understanding on the present status of resources, fisheries and utilization of catadromous eels in the region	**Outcome 1:** Understanding the present status on catadromous eel resources in the region. It would be a valuable source for considering of the conservation measures on tropical eel in the latter half of this project.	**Output 1:** • Grasping the present status of fisheries, commercial distribution and the trades of catadromous eel in the region.	**Activity 1.** **Clear understanding on current situation of resources, fisheries and utilization** Sharing and exchanging information on catadromous eels in the region among AMS through a workshop focusing on its fisheries. Collecting the basic information and data by surveying on eel fisheries for clear understanding on the present status and intensity of eel fisheries including glass eel fishery. Finding out the present status of eel trade and market in AMS through interviewing the stakeholders on commercial distribution and trade on tropical eels.
Objective 2: Improving data collection and statistics of catadromous eel catch in AMS	**Outcome 2:** Improving the method of data collection on eel fisheries in the region, with mutual understanding of the differences and similarities on eel fisheries at each AMS.	**Output 2:** • Improving the species identification technique on genus Anguilla in the region. • Gathering continuous data on eel fisheries and trades in AMS	**Activity 2.** **Improvement of data collection and statistics on eel fisheries** Conducting studies on species identification based on DNA technology, including the training of handling genetic information. Developing the basic methodologies of data collection for catch/trade statistics on eel in AMS.

		with accuracy. • Finding out the appropriate methods/measures to collect statistics on eel fishery in the region.	Having a discussion how to develop data collection methodologies for eel statistics among AMS.
Objective 3: Enhancing knowledge and capacity of AMS for conservation, management and sustainable utilization of catadromous eel resources	**Outcome 3:** Promoting the appropriate management of eel fisheries for the sustainable use of tropical eel resources in the region.	**Output 3:** • Finding important causes and factors that wreak the negative impact on tropical eels then seeking the mitigating measures. • Constructing guidelines on eel fishery in the region. • Disseminating the results of this project and also proposing guidelines/policy recommendation on eel fisheries among AMS.	**Activity 3.** **Promotion of conservation, management and sustainable utilization** Conducting research in several waters in the region regarding the negative impact of environmental changes on catadromous eel resources and seeking measures for mitigation from the damages. Compiling all the results of the activities done under the project into the guidelines on conservation, management and sustainable utilization of catadromous eel resources in the region. Having a workshop for dissemination of the outcomes from this project and developing a policy recommendation on the sustainable use of catadromous eel resources in the region. The summarization of the appropriate methods/measures to collect statistics on eel fishery in the region (Activity 2) will also be conducted in this workshop.

3.2 Overall Scope/Description of Project

Activity	Description
Activity 1 Clear understanding on current situation of resources, fisheries and utilization	• Sharing and exchanging information on catadromous eels in the region among AMS through a workshop focusing on its fisheries that participating. Although it was originally scheduled on latter half of 2015, it was postponed to April 2016 considering the conveniences of the participants. (Sub-activity 1.1) • Collecting the basic information and data by surveying on eel fisheries in AMS for clear understanding on present status and intensity of eel fisheries

	including glass eel fishery in the region. The surveys will be carried out during the years of 2015 to 2019. (Sub-activity 1.2. *To keep monitoring the fishing conditions of eels that would not be covered by JAIF project, this sub-activity is extended till 2019, originally planned to complete in 2017 though.*) • Finding out the present status of eel trade and market in AMS through interviewing the stakeholders on commercial distribution and trade on tropical eels. The surveys will also be conducted during the years of 2015 to 2019 in AMS. (Sub-activity 1.3. *To keep monitoring the trend of eel trading that would not be covered by JAIF project, this sub-activity is extended till 2019, originally planned to complete in 2017 though.*)
Activity 2 Improvement of data collection and statistics on eel fisheries	• Conducting studies on species identification among the genus *Anguilla* in AMS based on DNA technology. It includes the training of handling genetic information. This activity will be carried out during the years of 2015 to 2017. (Sub-activity 2.1) • Developing the basic methodologies of data collection for catch/trade statistics on eel in AMS. The study on data collection methodologies will be conducted during the years of 2016 to 2017. (Sub-activity 2.2)
Activity 3 Promotion of conservation, management and sustainable utilization	• Conducting research in several waters in AMS, regarding the negative impact of environmental changes on catadromous eel resources and seeking measures for mitigation from the damages. This activity will be carried out during the years of 2017 to 2019. (Sub-activity 3.1) • Compiling all the results of the activities done under the 4-year project into the guidelines on conservation, management and sustainable utilization of catadromous eel resources in the region. Having a workshop for dissemination of the outcomes from this project and developing a policy recommendation on sustainable use of catadromous eel resources in the region at the end of the project (2019). (Sub-activity 3.3) The summarization of the appropriate methods/measures to collect statistics on eel fishery in the region (originally planned as Sub-activity 2.3) will also be conducted in this workshop.
Activity 4 Coordination by the project leader	• The project leader coordinates and encourage the research, and dissemination.

3.3 Activity, Sub-activity and Proposed Budget for 2015-2019)

(Unit: USD**)**

Activity	Sub-Activity	Y1 2015	Y2 2016	Y3 2017	Y4 2018	Y5 2019
Activity 1: Clear understanding on the current situation of resources, fisheries and utilization	Sub-activity 1.1: Workshop to exchange information on catadromous eels in the region	18,000 (carry forward to 2016)				
	Sub-activity 1.2: Survey on trends of catadromous eel fisheries	8,000	12,000	8,000	10,000	**5,380**
	Sub-activity 1.3: Survey on commercial distribution/trade of catadromous eels	8,000	9,000	8,000	15,000	**2,200**

Activity 2: Improvement of data collection and statistics on eel fisheries	Sub-activity 2.1: Study on catadromous eel species identification by DNA technology	8,000	12,000	8,000	35,000	**5,000**
	Sub-activity 2.2: Study on statistical data collection methodologies		9,000	8,000	10,000	
Activity 3: Promotion of conservation, management and sustainable utilization	Sub-activity 3.1: Study on elements negatively impacting catadromous eel resources and mitigating measures			10,000	10,940	**3,000**
	Sub-activity 3.2: Develop guidelines on conservation, management and sustainable utilization of catadromous eel resources					**8,690**
	Sub-activity 3.3: Workshop to develop policy recommendation on the sustainability of catadromous eel resources in the region (incl. the summarization of the appropriate methods/measures to collect statistics on eel fishery in the region)					**12,702**
Activity 4: Coordination by the project leader	The project leader will coordinate and assist all researches and dissemination, that will be supported by one assistant who hires to carry out the project effectively.					**4,108**
……	**Sub-Total Budget**	**42,000**	**42,000**	**42,000**	**80,940**	**41,080**

PART II: ACHIEVEMENT OF 2019 PROJECT IMPLEMENTATION

1. Achievements of the Project Implementation for the present year 2019:

IFRDMD has conducted six sub-activities under three main activities (Activity 1, 2 and 3) in 2019. Under these sub-activities, the result indicates that very limited member countries provide national statistical data on tropical anguillid eels. However, a series of data were collected from Myanmar, Indonesia, the Philippines and Viet Nam as a baseline to be explored. Description of data includes trend of each country were plotted to indicate their status and trends of harvesting. Eel samples that exist in Southeast Asia (Indonesia, Myanmar and the Philippines) have been identified. There are six species/subspecies identified namely *Anguilla bicolor bicolor, A. bicolor pacifica, A. marmorota, A. bengalensis, A. interioris* and *A. luzonensis*. We continuously got the preliminary information regarding the relationship between upward migration of eels and the artificial constructions from one hydropower dam in Indonesia that already applies fish ladder. It is PLTA Poso II which is located in Poso river and operated by PT. Poso Energy. In 2019, this company restocked 200 kg elvers in Peura village Poso lake. On September 2019, they have plan to restock silver eels at the river mouth of Poso.

2. Information of Present Year Activity including Involved Stakeholders:

List of Actual Sub-activity	Type of activity	Number of Participants			Spent Budget (USD)
		MCs	SEAFDEC	Others	
Activity 1: Clear understanding on current situation of resources, fisheries and utilization					
Sub-activity 1.2**:** Survey on trends of catadromous eel fisheries	I: Research	20(12)	12(7)		**5,380**
Sub-activity 1.3**:** Survey on commercial distribution/trade of catadromous eels	I: Research	20(12)	12(7)		**2,200**
Activity 2: Improvement of data collection and statistics on eel fisheries					
Sub-activity 2.1**:** Study on catadromous eel species identification by DNA technology	I: Research	2(1)	2(2)		**5,000**
Activity 3: Promotion of conservation, management and sustainable utilization					
Sub-activity 3.1**:** Study on elements negatively impacting catadromous eel resources and mitigating measures	I: Research	20(12)	12(7)		**3,000**
Sub-activity 3.2**:** Developing guidelines on conservation, management and sustainable utilization of catadromous eel resources	I: Research	23(4)	19(10)		**8,690**
Sub-activity 3.3**:** Workshop to develop policy recommendation on the sustainability of catadromous eel resources in the region	I: Research	23(4)	19(10)		**12,702**
Activity 4: Coordination by the project leader					
Sub-activity 4.1: The project leader will coordinate and assist all researches and dissemination, that will be supported by one assistant who hires to carry out the project effectively.	VI: Others	2(1)	17(9)		**4,108**
					41,080

Remarks) Regarding the number of participants, please indicate total number of participants (and number of female participants within), such as 20 (10).

3. Achievements and Expected Outcomes/Outputs of the Activity:

Planned activity	Expected outcome/output	Achievements
Activity 1:		
Clear understanding on current situation of resources, fisheries and utilization		
Sub-activity 1.2 Survey on trends of catadromous eel fisheries	Understanding of the present status and recent trend of eel fisheries and eel resources in the region.	IFRDMD gets the present status and recent trend of eel fisheries and eel resources in the region. National landing data reported to FAO global fishery and aquaculture production statistics (2019), indicates that two countries, i.e., Indonesia and the Philippines played a significant role in river eels fisheries landing in this region. The estimate reported landing from 1980 to 2017 showed that Indonesia increased and fluctuated since 1990, while the Philippines steadily increased since 2000 then gradually decreased after 2013 Indonesia: - Scatter plot between catch and number of fishers showed there is no significant trend and uncertain of abundance occurs during the last five years in Palabuhan Ratu. Trend CPUE (kg/fishers) within a period of 2013 – 2017 indicated negative slope with low correlation and excluding data of 2018. - Series of elver and yellow eel were available in Poso lake and its adjacent waters. Fifteen years of harvesting data indicate the volume tends to decrease in the last two years. Special attempt should be carried out in monitoring of monthly harvest volume data. The maximum volume of monthly harvest tends to decrease, while the average relatively stables then decrease since 2017. Estimation of CPUEs was not available due to limited data on effort. Myanmar: - The data structure in Myanmar was available from 2017 to 2018 and 2019 up early of 2019. No of observation varied between those two years, and several monthly data were not available in each year. However, the total estimated catch was relatively at the same volume. Clarification on the different number of observation and

		missing data would be interested in explaining the high uncertainties on data quality. The Philippines: - Plotting estimate CPUE to several fishers showed that there is no clear indication on status and trend of this glass eel fishery, both of fishers and catch in the last three years were lower compared in the previous years. However, there is a general trend of high number of active fishers tend to proportionally in-line with an increasing total catch. - Experimental fishing was carried out as an effort to standardize estimate CPUE in the Philippines. Data in yearly scale indicates that estimate CPUE by fishers (13 – 89 kg) and by an hour (2 – 11 kg) as an indicator of abundance. This approach is very helpful to estimate status and trend based on core sampling of fishing methods. The result could be arranged as a representative standard effort for a longer period of observations and considered as an indicator of glass eel abundance in the area. - Further information on a low number of active fishers occurs in the average last three years (642) compare the average of 2007 to 2011 (around 2500) would be interesting to investigate, whether fishers leave the fisheries due to another source of livelihood or low probability of harvest rate on glass eel fishery. A short study on the socio-ecological system of eels fishers should be investigate to, particularly the dynamic of part-time fishers which probably in and out from fisheries seasonally. Viet Nam: - The data structure in Viet Nam was available from Jan 2018 up early of 2019. No of observation varied between those two years, and several monthly data were not available in each year. Clarification on the different number of observation and missing data would be interested in explaining the high uncertainties on data quality

Sub-activity 1.3 Survey on commercial distribution/trade of catadromous eels	Understanding the amount and route of trading of eel in AMS.	IFRDMD gets clear information regarding the amount and route of trading of eel that exist in Indonesia, Philippines, Viet Nam, Myanmar, and Thailand. Another source of export data is available globally. The general export data of river eels nei and elver live showed that Indonesia (ID), Myanmar (MM) and Philippines (PH) play a significant role in the region. Export tends to decrease in 2013 for Indonesia and 2014 for Myanmar and the Philippines. The major contribution after 2010 were Myanmar and the Philippines
Activity 2:		
Improvement of data collection and statistics on eel fisheries		
Sub-activity 2.1 Study on catadromous eel species identification by DNA technology	The establishment of the method of species identification on genus *Anguilla* by DNA analysis.	Eel samples that exist in Southeast Asia (Indonesia, Myanmar and the Philippines) have been identified. There are five species ; *Anguilla bicolor bicolor, A. bicolor pacifica, A. marmorota, A. bengalensis, A. interioris* identified based the result study conducted in Indonesia (Pelabuhan ratu, Aceh, Tasik Malaya, Bengkulu and Poso). Three species *A. bicolor pacifica, A. marmorota* and *A. luzonensis,* were identified based on the the result study conducted in Philippines. There was only one species, *A. bicolor bicolor*, identified in Myanmar.
Activity 3:		
Promotion of conservation, management and sustainable utilization		
Sub-activity 3.1: Study on elements negatively impacting catadromous eel resources and mitigating measures	Conducting research in several waters in AMS, regarding the negative impact of environmental changes on catadromous eel resources and seeking measures for mitigation from the damages.	IFRDMD continuously got the information regarding the relationship between upward migration of eels and the artificial constructions from one hydropower dam in Indonesia that already applies fish ladder. It is PLTA Poso II which is located in Poso river and operated by PT. Poso Energy. In 2019, this company restocked 200 kg elvers in Peura village Poso lake. On September 2019, they have plan to restock silver eels at the river mouth of Poso.

Sub-activity 3.2: Develop guidelines on conservation, management and sustainable utilization of catadromous eel resources	Constructing guidelines on eel fishery in the region and disseminating through workshop.	IFRDMD will make a guidelines on identification of anguillid eel species in AMS and holding a workshop of five-year achievement of JTF VI by IFRDMD, Jakarta, Indonesia, October 2019. The participants come from all member countries, Japan and SEAFDEC.
Sub-activity 3.3: Workshop to develop policy recommendation on the sustainability of catadromous eel resources in the region	Disseminating the results of this project and proposing guidelines/policy recommendation on eel fisheries among AMS.	Holding a workshop of five-year achievement of JTF VI by IFRDMD, Jakarta, Indonesia, October 2019. The participants come from all member countries, Japan and SEAFDEC.
Activity 4:		
Coordination by the project leader		
Sub-activity 4.1: The project leader will coordinate and assist all researches and dissemination, that will be supported by one assistant who hires to carry out the project effectively.	Project management to lead to success	Progress meetings twice a year. The evaluation at the end of year by experts. Hiring one assistant to carry out the project effectively.

4. List of Completed Publications and Others *(e.g.* technical report, VDO, presentation file, etc.):

List of completed publications for the year 2018	Type of media	Attached e-file
1. Addressing the Issues and Concerns on Anguillid Eel Fisheries in Southeast Asia.	Fish For the People Vol. 17 No.01	http://www.seafdec.org/download/fish-for-the-people-vol-17-no-1/

5. Evaluation from Participants of Member Countries for WS and Training Course:

Planned activity	Evaluation/ Views from Participants
Activity 1 Clear understanding on current situation of resources, fisheries and utilization	
Sub-activity 1.2: Survey on trends of catadromous eel fisheries	There was no evaluation from the participants of AMS.
Sub-activity 1.3: Survey on commercial distribution/trade of catadromous eels	There was no evaluation from the participants of AMS.
Activity 2 Improvement of data collection and statistics on eel fisheries	
Sub-activity 2.1: Study on catadromous eel species identification by DNA technology	There was no evaluation from the participants of AMS.

Activity 3 Promotion of conservation, management and sustainable utilization	
Sub-activity 3.1: Study on elements negatively impacting catadromous eel resources and mitigating measures	There was no evaluation from the participants of AMS.
Sub-activity 3.2: Develop guidelines on conservation, management and sustainable utilization of catadromous eel resources	Not yet conducted.
Sub-activity 3.3: Workshop to develop policy recommendation on the sustainability of catadromous eel resources in the region	Not yet conducted.

6. Major impacts/issues:

IFRDMD establishes and improves the catch statistics on anguillid eels in Indonesia, Philippines Myanmar, and Viet Nam. It needs to find out the critical issues regarding the stock assessment to achieve the sustainable use of anguillid eel resources, before considering the several concrete management measures.

PART III: ACHIEVEMENTS IN OVERALL PROJECT DURATION

1. Abstract of Achievements in the Overall Project Duration *(project duration 5years)*

During 5-year implemented the project, IFRDMD conducted the field surveys to find out the present status of anguillid eel fisheries in AMS. The result indicates that very limited member countries provide national statistical data on tropical anguillid eels. However, a series of data were collected from Myanmar, Indonesia, the Philippines and Viet Nam as a baseline to be explored. Description of data includes trend of each country were plotted to indicate their status and trends of harvesting. Eel samples that exist in Southeast Asia (Indonesia, Myanmar and the Philippines) have been identified. There are six species/subspecies identified namely *Anguilla bicolor bicolor, A. bicolor pacifica, A. marmorota, A. bengalensis, A. interioris* and *A. luzonensis.* To enhance the capacity building, IFRDMD dispatched the researchers to attend the appropriate training, join the relevant meetings, and coordinate the in-house training. The dissemination of the result of researches was done by being the presenter or lecturer in the conferences. The first Workshop on Enhancement of Sustainability of Catadromous Eel Resources in South East Asia in 2016 was held to review the achievements of Catadromous eel research's; to provide the database of Catadromous eel; and to discuss the strategic framework for collecting eel fisheries statistic. At the end of project duration, IFRDMD organized the Workshop on 5-year of IFRDMD's Achievement for reviewing the result of the department and getting the improvement of eel fisheries study from AMSs.

2. Implemented Activities/sub-activities in the Overall Project Duration:

List of Activities	Description of Implemented Activities
Activity 1 Clear understanding on current situation of resources, fisheries and utilization	

Sub-activity 1.1: Workshop to exchange information on catadromous eels in the region	Holding the Workshop to exchange information on catadromous eels in the region
Sub-activity 1.2: Survey on trends of catadromous eel fisheries	Information gathering by referring to the literature, web sites, interviewing and field surveys on the present status of trend catadromous eel fisheries in AMS
Sub-activity 1.3: Survey on commercial distribution/trade of catadromous eels	Information gathering by referring to the literature, web sites, interviewing and field surveys on the present status of commercial distribution/trade of catadromous eels in AMS
Activity 2 Improvement of data collection and statistics on eel fisheries	
Sub-activity 2.1: Study on catadromous eel species identification by DNA technology	Information of genetic study by collecting the sample of catadromous eel in AMS
Activity 3 Promotion of conservation, management and sustainable utilization	
Sub-activity 3.1: Study on elements negatively impacting catadromous eel resources and mitigating measures	Information gathering by referring to the literature, web sites, interviewing and field surveys on the elements negatively impacting catadromous eel resources and mitigating measures in AMS
Sub-activity 3.2: Develop guidelines on conservation, management and sustainable utilization of catadromous eel resources	Organizing a workshop to develop guidelines on conservation, management and sustainable utilization of catadromous eel resources
Sub-activity 3.3: Workshop to develop policy recommendation on the sustainability of catadromous eel resources in the region	Organizing a workshop to develop **to** develop policy recommendation on the sustainability of catadromous eel resources in the region
Activity 4 Coordination by the project leader	
The project leader will coordinate and assist all researches and dissemination, that will be supported by one assistant who hires to carry out the project effectively.	Progress meetings twice a year. The evaluation at the end of year by experts. Hiring one assistant to carry out the project effectively.

3. Achievements and Outcomes/Outputs of Activities in the Overall Project Duration:

List of Activities	Achievements and Outcomes/Outputs of Activities
Activity 1	

Clear understanding on current situation of resources, fisheries and utilization	
Sub-activity 1.1: Workshop to exchange information on catadromous eels in the region	2016: SEAFDEC/IFRDMD was held the 1st Workshop on Enhancement of Sustainability of Catadromous Eel Resources in South East Asia, on 27-29 April 2016, Palembang, Indonesia. The Workshop was attended by the representatives from Malaysia, Myanmar, Philippines, Thailand, Viet Nam and Indonesia; scientists from universities; eel industries in Indonesia; the Japan International Cooperation Agency (JICA), as well as the SEAFDEC/Secretariat, AQD and IFRDMD. The Workshop discussed and then came up with following recommendations: Increase the Survival rate from glass eel to elver in the eel culture; How to measure and regulate the glass eel fishery; Origin laundering of eel seeds; Compilation of existing information/research from Member Countries.
Sub-activity 1.2: Survey on trends of catadromous eel fisheries	2015: IFRDMD got information of the trends and intensity of eel capture including glass eel catch through the surveys conducted in Indonesia and Philippines. 2016: IFRDMD got information regarding the target species and stage of anguillid eels as seeds for eel culture in Indonesia and Myanmar. In Myanmar, the target species for eel fishery and eel culture is *Anguilla marmorata* and its yellow eel has been used for seeds for culture. In Indonesia, main target species of eel fishery and eel culture is *A. bicolor bicolor* and its glass eel, elver and yellow eel are used as seeds for eel culture. Since the rearing from glass eel to elver needs high-level skills and conditions, the eel farms that can start eel farming from glass eel are still limited. 2017: IFRDMD got information regarding the target species and stage of anguillid eels as seeds for eel culture in Viet Nam and Philippines, with technical information. 2018: IFRDMD got information regarding the Anguillid eel fishery for seeds (glass eels and/or yellow eels) are existed in Indonesia, Philippines, Viet Nam, Myanmar, and additionally for Cambodia & Thailand. 2019: IFRDMD gets the present status and recent trend of eel fisheries and eel resources in the region. National landing data reported to FAO global fishery and aquaculture production statistics (2019), indicates that two countries, i.e., Indonesia and the Philippines played a significant role in river eels fisheries landing in this region. The estimate reported landing from 1980 to 2017 showed that Indonesia increased and fluctuated since 1990, while the Philippines steadily increased since 2000 then gradually decreased after 2013.
Sub-activity 1.3: Survey on commercial distribution/trade of catadromous eels	2015: IFRDMD got information of the commercial distribution and trades in Indonesia and Philippines and the status of eel trades and markets in AMS through the surveys. 2016: IFRDMD got information regarding the target species and stage of anguillid eels as seeds for eel culture in Indonesia and Myanmar. In Myanmar, there is virtually only one eel farm and they rear anguillid eel (mainly *A. marmorata*) and Rice-paddy eel. Almost all the products are exported to China, especially just before the Chinese new-year. In Indonesia, there are many eel farms in Java Is. with wide variety of their scale. Some large-scale eel farms funded by foreign company aims export of baked eel "Unagi-kabayaki" to East Asian countries. The other small and middle-

	scale eel farms ship their products to domestic market in Indonesia. 2017: IFRDMD got information regarding the commodity chains and demand-supply relationships of eel seeds in Viet Nam and Philippines. 2019: IFRDMD gets clear information regarding the amount and route of trading of eel that exist in Indonesia, Philippines, Viet Nam, Myanmar, and Thailand. Another source of export data is available globally. The general export data of river eels nei and elver live showed that Indonesia (ID), Myanmar (MM) and Philippines (PH) play a significant role in the region. Export tends to decrease in 2013 for Indonesia and 2014 for Myanmar and the Philippines. The major contribution after 2010 were Myanmar and the Philippines
Activity 2 Improvement of data collection and statistics on eel fisheries	
Sub-activity 2.1: Study on catadromous eel species identification by DNA technology	2016: Many scientists have tackled species identification and species composition of anguillid eels using DNA technique. However, the results of their study have not coincided on the issue yet. We will continue preparation of the samples and materials for future analysis after the scientists in SEA who tackle with this issue would reach the agreeable method and interpretation of their analyses. 2017 & 2018: We got fundamental information regarding the species composition of anguillid eels in Viet Nam and Philippines which dominant species in AMS are *A. bicolor* and *A.marmorata* 2019: IFRDMD identified the eel samples that exist in Southeast Asia (Indonesia, Myanmar and the Philippines). There are five species ; *Anguilla bicolor bicolor, A. bicolor pacifica, A. marmorota, A. bengalensis, A. interioris* identified based the result study conducted in Indonesia (Pelabuhan ratu, Aceh, Tasik Malaya, Bengkulu and Poso). Three species ,*A. bicolor pacifica, A. marmorota and A. luzonensis,* were identified based on the the result study conducted in Philippines. There was only one species, *A. bicolor bicolor*, identified in Myanmar.
Sub-activity 2.2 Study on statistical data collection methodologies	2016: Through our investigation on present status of data/information collection on eel fishery in Indonesia, we noticed that there are some official catch statistics on anguillid eels but many of them are quite fragmented and not accurate therefore unable to use these statistics into stock assessment of eel resources. We have started consultation with government officer how to improve the catch statistics on anguillid eels as soon as possible, in relation with the CITES issue. We have also started independent data collection program on anguillid eels. We have asked some eel collectors in Palabuhan Ratu and Bengkulu, Indonesia, to report daily catch and efforts on anguillid eel fishery. 2017: IFRDMD have summarized the present situation of collecting catch statistics on anguillid eels at each stage in SEAFDEC member countries. 2018: We have summarized the present situation of collecting catch statistics on anguillid eels at each stage in SEAFDEC member countries by improving the data collecting system for catch statistics (with indices of effort for monitoring of the trend and fluctuation of catch of eel seeds in the region.
Activity 3 Promotion of conservation, management and sustainable utilization	

Sub-activity 3.1: Study on elements negatively impacting catadromous eel resources and mitigating measures	2017: We got the preliminary information regarding the relationship between upward migration of eels and the artificial constructions in the rivers in some countries. 2018: We got the preliminary information regarding the relationship between upward migration of eels and the artificial constructions in the rivers in some countries. Until now only one hydropower dam in Indonesia that already apply fish ladder which is PLTA Poso II, located in Poso river operated by PT. Poso Energy. Another precaucionary approach conducted by PT Posos Energy to maintain the sustainability of eel especially in Poso Lake is through the CSR (Corporate Social Responsibility) program, by stocking anguilla eel from lower side to upper side of the dam to increase number of eel that survebility crossing the dam. 2019: We continuously got information regarding the relationship between upward migration of eels and the artificial constructions from one hydropower dam in Indonesia that already applies fish ladder by Poso Energy Company. In 2019, this company restocked 200 kg elvers in Peura village Poso lake. On September 2019, they have plan to restock silver eels at the river mouth of Poso.
Sub-activity 3.2: Develop guidelines on conservation, management and sustainable utilization of catadromous eel resources	2019: IFRDMD will make a leaflet/brochure on the guidelines and will share it on the workshop of five-year achievement of JTF VI by IFRDMD, Jakarta, Indonesia, October 2019. The participants come from all member countries, Japan and SEAFDEC.
Sub-activity 3.3: Workshop to develop policy recommendation on the sustainability of catadromous eel resources in the region	2019: IFRDMD will hold a workshop of five-year achievement of JTF VI by IFRDMD, Jakarta, Indonesia, October 2019. The participants come from all member countries, Japan and SEAFDEC.
Activity 4 Coordination by the project leader	
The project leader will coordinate and assist all researches and dissemination, that will be supported by one assistant who hires to carry out the project effectively.	Progress meetings twice a year. The evaluation at the end of year by experts. Hiring one assistant to carry out the project effectively.

4. Evaluation and Major Impacts/Issues in the Overall Project Duration:

IFRDMD got the information of the present status on catadromous eel resources in the region and summarized the present status and problems on catch statistics and commodity chain of anguillid eel in Indonesia into scientific paper. IFRDMD got the information on the species identification of anguillid eel in AMS by morphological character and DNA analysis. IFRDMD established and improved the method of data collection on eel fisheries in the Indonesia, Myanmar, Philippines and Viet Nam, with mutual understanding of the differences and similarities on eel fisheries at each AMS, due to limited data of anguillid eel fisheries on national statistical data. It needs to find out the critical issues regarding the stock assessment to achieve the sustainable use of anguillid eel resources, before considering the several concrete management measures.

5. Publications and Others (*e.g.* technical report, VDO, presentation file, etc.):

No.	List of completed publications in the Overall Project Duration	Type of media	Attached e-file
1.	Eel fisheries research in Member Countries	SEAFDEC Newsletter Vol. 38 No.1, Jan-March 2015.	*http://www.seafdec.org/download/seafdec-newsletter-vol-42-no-1/*
2.	SEAFDEC participates in Eel Symposium	SEAFDEC Newsletter VOLUME 38 NUMBER 4 October - December 2015 Page 4	*http://www.seafdec.org/download/seafdec-newsletter-vol-38-no-4/*
3.	IFRDMD holds discussion on establishing catch statistics on eels in Indonesia	SEAFDEC Newsletter VOLUME 39 NUMBER 4 October - December 2016 Page 12	*http://www.seafdec.org/download/seafdec-newsletter-vol-39-no-4/*
4.	Exchanging Information on Catadromous Eels in Southeast Asia	SEAFDEC Newsletter VOLUME 39 NUMBER 2 April - June 2016 Page 8-9	*http://www.seafdec.org/download/seafdec-newsletter-vol-39-no-2/*
5.	IFRDMD organizes Workshop on Enhancement of Sustainability of Catadromous Eel Resources	SEAFDEC Newsletter VOLUME 39 NUMBER 2 April - June 2016 Page 12	*http://www.seafdec.org/download/seafdec-newsletter-vol-39-no-2/*
6.	Current status and problems of the catch statistics on anguillid eel fishery in Indonesia (*Mar. Res. Indonesia*. 41(1): 1-13. in printing)	Scientific paper	*http://mrijournal.or.id/index.php/MRI/issue /view/17/showToc*
7.	Way forward for enhancing the sustainability of catadromous eels in Southeast Asia	Report (disclosed on official web site)	*http://www.seafdec.or.id/*
8.	Understanding the Current Status of Anguillid Eel Fisheries in Southeast Asia	Fish For the People Vol. 14 No.03	*http://www.seafdec.org/download/fish-people-vol-14-no-3/*
9.	Addressing the Issues and Concerns on Anguillid Eel Fisheries in Southeast Asia.	Fish For the People Vol. 17 No.01	*http://www.seafdec.org/download/fish-for-the-people-vol-17-no-1/*
10.	IFRDMD supports the Indonesian Ministry Regulation on anguillid eel resources	SEAFDEC Newsletter Vol.42 No.1 January- March 2019 Page 4	*http://repository.seafdec.org/bitstream/handle/20.500.12066/4919/NL42-1.pdf?sequence=1&isAllowed=y*
11.	IFRDMD researchers tag on Training of Trainers for Data Collection and Monitoring of Eels	SEAFDEC Newsletter Vol.42 No.1 January- March 2019 Page 6	*http://repository.seafdec.org/bitstream/handle/20.500.12066/4919/NL42-1.pdf?sequence=1&isAllowed=y*