

**Second Regional Consultation on Development of Regional Policy  
Recommendations on Sustainable Management of Eel Resources and  
Aquaculture Production in Southeast Asia  
31 August – 1 September 2014  
Palembang, Indonesia**

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**I. Opening of the Meeting**

1. The Second Regional Consultation on Development of Regional Policy Recommendations on Sustainable Management of Eel Resources and Aquaculture Production in Southeast Asia was convened from 31 August to 1 September 2014 in Palembang, Indonesia. The Meeting was attended by representatives from SEAFDEC Member Countries, namely: Cambodia, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, Philippines, Thailand, and Vietnam. Representatives from SEAFDEC Aquaculture Department (AQD), SEAFDEC Marine Fishery Resources Development and Management Department (MFRDMD), SEAFDEC Training Department (TD), SEAFDEC Secretariat, and FAO; as well as resource persons also attended the Consultation. The list of participants appears in **Annex 1**.

2. While welcoming the participants to the Consultation and to Indonesia, the SEAFDEC Alternate Council Director for Indonesia, *Dr. Achmad Poernomo* referred to the declaration during the “Global Oceans Action Summit for Food Security and Blue Growth” that ocean cooperation among countries should take into consideration the following: coastal resources and resilience, role of oceans, science and technology, and blue economics. In this connection, he stressed that cooperation among the SEAFDEC Member Countries to promote ocean management should be strengthened. He thanked the Member Countries for their presence in the Consultation as this signified their commitment towards sustainable management of fishery resources not only in the oceans but in inland waters as well.

3. In this connection, he pointed out that the conservation and management of eel resources has been gaining attention in view of the declining supply of wild juveniles. He emphasized that this Second Regional Consultation is timely for effective measures on the conservation and management of this legendary fish would be charted. He recalled that during the First Regional Technical Consultation on Eels in February 2014, some basic information on the eel resources in the Member Countries have been exchanged and compiled, such as distribution, common gear used, production, importing and exporting countries of eel, as well as regulations on catching and trading of eels in some SEAFDEC Member Counties. Such valuable information could therefore be used as reference for the development of conservation and management measures for eels. While asking the participants to actively take part in the Consultation and before ending his Welcome Remarks which appears in **Annex 2**, he invited the participants to join the International Conference on Inland Fisheries and Inauguration of Inland Fishery Resources Development and Management Department (IFRDMD) of SEAFDEC, organized back-to-back with this Second Regional Consultation.

4. SEAFDEC Secretary-General, *Dr. Chumnarn Pongsri* expressed his gratitude to the participants for coming to the Second Regional Consultation which is significant as

the freshwater eels in the Southeast Asian region had been diminishing. He gave as an example the European and American eels which have been threatened, and as a result the European eel *Anguilla anguilla* has been listed in CITES Appendix II since 2009. Considering that eel resources in the region such as the Indian mottled eel (*Anguilla bengalensis*), Indonesian shortfin eel (*Anguilla bicolor*), and marbled eel (*Anguilla marmorata*) are economically-important and noting that the Indonesian shortfin eel is known to have been exploratory cultured commercially, he therefore, considered it necessary to ensure that this resource is properly conserved and managed before it is too late to save it from the verge of being critically endangered, and before these important species would be considered for listing in the CITES Appendices. He then urged the participants in the Consultation to map out some policy recommendations that would lead to the best benefits for the Member Countries, and declared the Consultation open. His Opening Remarks appear in **Annex 3**.

## **II. Background, objectives and arrangements**

5. The Policy and Program Coordinator of SEAFDEC, *Dr. Somboon Siriraksophon* provided a brief summary of the background, objectives and arrangements of the Consultation.” While emphasizing that the world demand of freshwater eels is increasing and that majority of world eel production is from aquaculture with the Japanese eel (*Anguilla japonica*) as the most cultured species, he raised the concern on the decreasing catch of eel juveniles from the wild for aquaculture seeds in the whole East Asian region since 2010. As a result, interest in the exploitation of juveniles of other eel species as cheaper alternative has been growing, and all sights are set towards Southeast Asia where some eel species could be found in its waters and some developments are already in progress especially for the Indonesian shortfin eel. For this reason, he encouraged the Southeast Asian countries through this Consultation, to consider developing regional approaches for the conservation and management of the region’s eel resources, which is one of the objectives of the Consultation which appears in **Annex 4**.

## **III. National, Regional and International Concerns on Eel Fisheries and Aquaculture**

### **3.1 Ecology and Diversity of Tropical Freshwater Eels**

6. While presenting the “Ecology and Diversity of Tropical Freshwater Eels” (**Annex 5**), the resource person from the Institute of Oceanography and Environment, Universiti Malaysia Terengganu, *Prof. Dr. Takaomi Arai* focused on the genus *Anguilla* as the most important of the eel families because of its unique catadromous life history and food resources. However, this eel resource is being confronted with a major problem as all young eels used in cultivation are sourced from the wild, *e.g.* glass eels and elvers captured in estuaries, and there are no historical records on the status of tropical eel stocks, fisheries and aquaculture production in Southeast Asia. Nevertheless, non-scientific reports indicated that 70 tons of eels have been exported to Japan from one eel farm in Indonesia in 2013 and this quantity is estimated to double in 2014. The present market price of juvenile eels is 150 times higher than 20 years ago and a number of village people near juvenile eel fishing grounds in Indonesia tend to concentrate on eel fishing only, although the juvenile eel catch is now reported to be

half that of 20 years ago. However, such estimated decline has never been evaluated based on scientific research.

7. He also cited that freshwater eels are mostly not consumed in Southeast Asia but the demand outside the region is gradually increasing to compensate for the Japanese eel. He then provided some future perspectives for sustainable use of tropical eel resources such as continuous monitoring for glass eel recruitment, establishment of no-fishing zones for glass eels, yellow eels and silver eels for conservation and study, escapement of silver eels which in turn enhances glass eel recruitment, law enforcement for illegal eel trading, and captive breeding as this would save the wild eel resources.

8. In responding to the query of the representative from Cambodia on the identification and distribution of eel species, he suggested that morphological structure could be used to identify the species but since some species have similar body color which makes it quite difficult to distinguish one species from another, then DNA analysis could be used. For the distribution of eel resources, this could be based on eel migratory histories, since eel has homing grounds and territories, and lives both in downstream and upstream waters.

### **3.2 Freshwater Eel Research in Indonesia**

9. “Indonesian Eel: Research and Production” (**Annex 6**) was presented by *Dr. Melta Rini Fahmi*, Researcher from the Research and Development of Aquaculture of Indonesia, who explained the various aspects of eel resources including biological, tropical eel species, species diversity of Indonesian eel, regulations on management of Indonesian eel, and eel aquaculture in Indonesia. She added that most of morphological characteristics of the Indo-Pacific anguillid species are overlapping. Although molecular identification technique has been suggested for eel species identification, the relatively high cost of using this technique remains challenging for the identification of tropical eels. In an attempt to address this concern, a new method for eel identification had been developed by her team. The Semi-multiplex PCR which is a variant of Multiplex-PCR enables several targets in one reaction simultaneous amplification by using one forward primer and several reverse primers.

10. In response to the query of the Policy and Program Coordinator of SEAFDEC, *Dr. Somboon Siriraksophon* about shortage of glass eel noting that only about 10 tons of glass eels had been captured from Indonesian waters and supplied as seeds for aquaculture, she clarified that since 2009 the Government of Indonesia banned the export of glass eels. However, many big scale (with high technology) foreign-owned companies are operating in Indonesia using wild seeds so that the shortage of glass eels for aquaculture could only emanate mainly from these companies.

11. While noting that there are seven eel species found in Indonesia, *Prof. Dr. Takaomi Arai* inquired about the reason why only *A. bicolor* is cultured. In response, she explained that this species has good taste and are accepted by Japanese customers. Nevertheless, many farms in Indonesia are now starting to culture *A. mamorata* for export to Taiwan and South Korea.

### **3.3 Conservation and Management of Freshwater Eels in the Philippines**

12. In introducing the Status and Conservation of Elver Fisheries in Luzon, Philippines (**Annex 7**), the representative from the Bureau of Fisheries and Aquatic Resources of the Philippines, *Dr. Milagros C. Morales* provided a list of species of elvers found in Northern Philippines. These elvers are present all year round with peak months from August until February declining during the lean season such as in December, April, May, June, and July. Fishers observed that the extreme cold temperature in December and hot temperature in April-July affect the upstream migration of elvers. She added that the awareness of fisherfolk on the biology and need to conserve and manage the resources still remains relatively low. However, she cited that the Philippine Government has launched a conservation and management plan for river eels including research and development as well as information and education campaigns.

13. In responding to the query of the Fisheries Policy Advisor to the Ministry of Marine Affairs and Fisheries of Indonesia, *Mr. Ichiro Nomura* on why the Philippine Government issued export ban to regulate eel aquaculture and on the compliance rate of such regulation, she explained that export ban of elvers is meant to conserve the resources since the wild seed stocks had been decreasing and could affect the sustainability of the resources.

14. On restocking, she clarified that this is done in open waters using wild seeds. However, since ricefield eel is not true eel, the Consultation suggested that relevant data of the Philippines on eel resources could also include production status of ricefield eels.

### **3.4 Management and Conservation of Eel Fisheries and Aquaculture in Japan**

- **Conservation and Management of Japanese Eel**

15. The representative from the Fisheries Agency of Japan, *Mr. Takato Maki* presented the Conservation and Management of Japanese Eel (**Annex 8**), and explained that the East Asian countries and region share one Japanese eel stock and since 2001, the number of yellow eel catch has been decreasing together with decreasing number of fishers. The possible reasons could be due to oceanographic changes, degradation of habitat, and overharvesting. In this regard, the Government of Japan has started emergency measures on eels in June 2012, which include eel aquaculture management, strengthening of research and study on eel, releasing eels and improving habitat environment, domestic eel stock management, and regional eel stock management.

16. In response to a query on the method for releasing eels in water bodies, he clarified that restocking makes use of seeds from the wild, considering that eel captive breeding technology is still limited. Therefore, wild seeds are still being used for restocking.

17. Considering the advance management of eel resources in Japan, he also explained about the effects of regulations such as input control, closed season to fisher's livelihood. Specifically, each Prefecture designs suitable measures in their respective areas after thorough consultation with fishers as well as monitors the effectiveness and

enforcement of such measures. In addition, during closed seasons, fishers are engaged in alternative livelihoods such as agriculture, to supplement their incomes.

- **Life History of Japanese Eel and Its Possible Management Measures**

18. The Deputy Director of the Research Management Department Incorporated Administrative Agency of Fisheries Research Agency, Japan, *Dr. Kazuo Uchida* introduced the Life History of Japanese Eel and Possible Management Measures. He summarized the life history of the Japanese eel including its distribution, migration loop, and yellow eel habitats. He also cited the present status of the eel resources, possible causes of the stock decline, and management measures of Japanese eel. Based on the study on migration history of Japanese eels collected from spawning areas, he highlighted that estuarine and sea eels that mostly inhabit estuaries of East Asia could make a larger reproductive contribution to the next generation, but the sample sizes were too small (only 13 specimens had been collected) to reach clear conclusions of the overall spawner contributions. However, he added that 85% of most eels inhabit the brackishwater areas during their yellow eel stage at least once while about 50% of these spawning eels had lived in freshwater habitats, suggesting that many eels may enter freshwater areas although not remaining there throughout their whole yellow eel growth phase.

19. Even with a long history of research and advance research carried out by Japan, only 13 adult eels have been collected in its waters. Nonetheless, the samples have shown four (4) life patterns.

20. In response to a query by the Technical Coordinator from SEAFDEC Secretariat, *Mr. Tsuyoshi Iwata* about the effectiveness of restocking, he explained that research on eel resources is being conducted by FRA from 2013-2017 including the development of release methods, stabilization of eel supply. Thus, at this stage, the research on eel restocking is still under evaluation.

- **Sustainable Utilization of Fisheries Resources and Implication of International Organizations**

21. The Fisheries Policy Adviser to Ministry of Marine Affairs and Fisheries of the Republic of Indonesia, *Mr. Ichiro Nomura* presented the International Framework for the Conservation and Management of Catadromous Species such as eels (**Annex 9**). He cited a particular part of the United Nations Convention on the Law of the Sea (UNCLOS) which deals with conservation and management of marine living resources in Exclusive Economic Zones (EEZs). He pointed out that under such perspective, a regional cooperation among interested parties for the Japanese eel (*Anguilla japonica*) has been established. In fact, discussions among interested States have been convened since September 2012 and are in progress. He highlighted on the recent topic of discussion which focused on the establishment of eel management framework under the initiative of private organizations and control of eel aquaculture production. He raised the apprehension that discussions on more aquatic species at CITES CoP in have increased recent years. In order to address the possible listing of eel species in the Appendices of CITES, he encouraged the countries to promote sustainable use and aquaculture of eel in the Southeast Asian region, and that collection of data, management of eel stock, and improvement of techniques for eel aquaculture should be

also be carried out. He also informed the Consultation that international instruments, *i.e.* UNCLOS might not impose much restrictions for catadromous species unlike the CITES.

#### **IV. Issues and Challenges on Conservation and Management of Eel Resources in the Region**

22. The Consultation identified issues and concerns on conservation and management of eel resources in the region which are; sustainability of the resources, habitat management, regulations and management measures, strengthening of information and education campaign, regional cooperation for management framework, and cross-cutting issues.

#### **V. Issues and Challenges on Promotion of Eel Aquaculture in the Region**

23. The Consultation identified the issues and concerns on promotion of eel aquaculture in the region which include: development of sustainable aquaculture technology and practices, management of eel aquaculture, strengthening of regional cooperation on sustainable development of eel aquaculture, and addressing cross-cutting issues.

#### **VI. Policy Recommendations for Regional Cooperation for Eel Resources and Development**

##### **6.1 To promote conservation and management of freshwater eel resources**

24. The Consultation discussed strategic actions as well as policy recommendations for the conservation and management of the freshwater eel. After thorough discussion, the Consultation adopted the Policy Recommendations for the Conservation and Management of Catadromous Eel Resources in Southeast Asia which appears in **Annex 10**.

##### **6.2 To promote sustainable eel aquaculture**

25. The Consultation discussed strategic actions and policy recommendations for sustainable aquaculture development. In this regard, the Consultation adopted the Policy Recommendations for Sustainable Development of Catadromous Eel Aquaculture in Southeast Asia which appears as **Annex 11**.

#### **VII. Strategic Framework to Improve the Status and Distribution of Glass Eels in the Region**

26. The Head of Research Institute for Inland Fisheries, *Mr. Budi Iskandar Prisantoso* introduced the plans for improving the status and distribution of glass eels in the region (**Annex 12**). He explained that the strategic actions discussed and adopted during the Consultation would be reported to the SEAFDEC Program Committee during its 37<sup>th</sup> Meeting in December 2014 for endorsement to the SEAFDEC Council, while the policy recommendations would be submitted to the 17<sup>th</sup> FCG/ASSP also in December 2014 for endorsement to the ASEAN authorities.

## **VIII. Strategic Framework to Promote Freshwater Eels Aquaculture in the Region**

27. The Chief of SEAFDEC/AQD, *Dr. Felix G. Ayson* presented the strategic plans to promote freshwater eel aquaculture (**Annex 13**) and pointed out that the involvement of eel aquaculture industries which have achieved advances in this field would be essential in the process. He also raised the concern on the need to establish a working group among the pilot countries to coordinate the relevant activities.

## **IX. Wrap-up on the Policy Recommendations, Immediate Plans of Action and Ways Forward**

28. Based on the Policy Recommendations that have been adopted at this Consultation, three immediate actions have been identified, namely: (1) establishment of regional cooperation on data collection and sharing, which could be carried out through the working group which will be tasked to standardize data collection procedures; (2) review of existing data/information; and (3) conduct of data collection in three pilot countries (*e.g.*, Indonesia, Philippines and Thailand).

29. The Consultation also agreed on the immediate actions that should be taken by the countries, such as precautionary approach for utilization of eel resources, and massive awareness building activities and educational campaigns on the impacts of illegal fishing on the region's eel resources. Specifically, the Consultation agreed that awareness building programs should be developed to provide better understanding of all stakeholders on the existing management measures and the impacts of illegal fishing.

30. The Consultation was informed that SEAFDEC would submit the first draft of the Policy Recommendations adopted during this Consultation to the SEAFDEC Council by *ad referendum* for comments and endorsement.

31. Meanwhile, IFRDMD will submit a project proposal on the improvement of the status and distribution of glass eels in the region during the 37<sup>th</sup> Meeting of the SEAFDEC Program Committee in December 2014.

32. After thorough discussion, the Consultation agreed on Immediate Plans of Action and Ways Forward which appears in **Annex 14**.

## **X. Other Matters**

### **10.1 Introduction of “Bicolor Eel Meeting”**

33. The Fisheries Policy Adviser to Ministry of Marine Affairs and Fisheries of the Republic of Indonesia, *Mr. Ichiro Nomura* informed the Consultation on the planned organization of the International Symposium in Conservation, Management and Trade of *Anguilla bicolor* in Indonesia on 25-26 November 2014 in Jakarta, Indonesia. Organized jointly by the Ministry of Marine Affairs and Fisheries of the Republic Indonesia and Japan International Cooperation Agency (JICA) Indonesia, the Symposium is aimed at sharing current biological information and management status of *Anguilla bicolor* and learning lessons from experiences on the development of

*Anguilla japonica* fishery. The Symposium is intended to strengthen the efforts of Indonesia in the management, conservation and improvement of the trade capacity of *Anguilla bicolor* species. His presentation appears in **Annex 15**.

34. Moreover, he clarified that the language to be used during the Symposium would be Bahasa and English. The organizers would therefore make arrangements in order that interpretation equipment would be made available.

## **XI. Closing Remarks**

35. The Secretary-General of SEAFDEC, *Dr. Chumnarn Pongsri* thanked all participants for their active participation in the deliberations during the Consultation. He pointed that with little information presently on eel resources as well as technology to breed and nursing these species, it would be a challenge for SEAFDEC to develop the measures for the management and conservation of the region's eel resources. However, he highlighted that through improved data and information on eel species and better understanding of the reproductive cycle of the eel species, the current rate of reduction of eel wild stock could be minimized.

36. In closing, the Deputy Secretary-General of SEAFDEC, *Mr. Hajime Kawamura* commended the participants in the Consultation for coming up with policy recommendations that would promote cooperation for eel research as well as conservation and management of the region's eel resources. He encouraged the Member Countries and the SEAFDEC Departments to continue maintaining this collaborative environment to foster the healthy state of the eel resources in Southeast Asian region. After offering such food for thought, he declared the Second Regional Consultation on Development of Regional Policy Recommendation on Sustainable Management of Eel Resources and Aquaculture Production in Southeast Asia closed.