Pre-assessment of the Hsin-Kang mahi mahi fishery

Overseas Fisheries Development Council

of the Republic of China (Taiwan)

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Executive Summary

The Hsin-Kang Fishermen Association launched Mahi Mahi Fishery Improvement Project in June 2015. In order to evaluate the gap between the current fishery and well-recognized sustainable fisheries standard, the Overseas Fisheries Development Council is commissioned to conduct pre-assessment for the Hsin-Kang mahi mahi fishery, so as to identify the weakness of the fishery against principles of sustainable fishery, and to further draw up the Action Plan for Hsin-Kang Mahi Mahi Fishery Improvement Project.

In conformity with the international requirements for sustainable fisheries, the pre-assessment use the certification standards (MSC General Certification Requirement 2.0) set forth by the Marine Stewardship Council (MSC). The unit of certification is mahi mahi fisheries operating with pelagic longline in the sea area nearby Hsin-Kang Fishing Harbor in the Eastern Taiwan. For the preparation of this pre-assessment, this assessment group has interviewed a number of stakeholders in different locations, such Hsing-Kang Fishing Harbor in Taitung County, Suao in Yilan countries, and Taipei City, directly or via telephone, as well as collected relevant data and information about the fishery.

1. Introduction of the assessed fishery

Mahi mahi is highly migratory species, which distribute in tropical and subtropical waters around the world. It usually stays in the pelagic sea area and feed on almost all forms of fish and zooplankton, as well as crustaceans and squid. Mahi mahi grows very fast and its sexual maturity is reached less than half year. Mahi mahi spawns several times a year with life span about four years, which is a marine living resource suitable for reasonably utilized. It can be found in surrounding waters of Taiwan, but the population appears more in the Taiwan Eastern sea area. Therefore, it is deemed as an important economic species by the fishermen in Eastern Taiwan.

In the last decade, the average annual catch of mahi mahi in Taiwan is about ten thousand metric tons. There major fleets targeting mahi mahi in Taiwan are distributed in three counties, which are Yilan, Pintung and Taitung respectively. The catches in these three counties occupy about 90% of the

overall mahi mahi catch in Taiwan. Taitung County ranks as the third in the mahi mahi fishery, with average annual catch of 2,600 metric tons, accounting for approximately 23.8% of the total catch in Taiwan.

There are two major fishing season for Hsin-Kang mahi mahi fishery, which are from April to June and from September to November respectively (the period may vary in accordance with the climate change). The fishing gears used to catch mahi mahi include purse seine, small and middle trawl, gillnet, pelagic longline, troll line and pole and line, and the pelagic longline is dominant among them. Most of Hsin-Kang fishing vessels are small vessels or crafts (with crew about one to five persons), operating mainly in the Eastern Taiwan coastal and offshore sea area between 20°N and 25°N. In the past four years, there are about 320 fishing vessels with annual total catch amount about 2,121 metric tons. Among which, there are 130-150 fishing vessels targeting for mahi mahi with annual total catch amount about 1,952 metric tons.

According to the existing research papers and the results of relevant stock assessment, the fishing mortality of eastern Taiwan mahi mahi fishery is below the level of maximum sustainable yield (MSY), and the spawning biomass is about 90% of the initial spawning biomass and 229% of the spawning biomass at MSY level. Therefore, in accordance with the best available scientific information, the resource is now exploited at appropriate level.

Fisheries management in Taiwan is charge by the Fisheries Agency and relevant local government respectively. At present, there are no specific regulations and harvest control rules for mahi mahi management in Taiwan, but there are general fisheries regulations that apply to all fisheries, including Hsin-Kang mahi mahi fishery. At international level, mahi mahi in the Pacific Ocean is under the jurisdiction of the Inter-American Tropical Tuna Commission (IATTC) and the Western and Central Pacific Fisheries Commission (WCPFC) respectively. However, due to the stock status of mahi mahi is believed as healthy, there are no existing management measures for this species.

There are plenty of by-catch species in the mahi mahi fishery. According to the landing and sales data from fish marker in the last three years, the primary species (accounting for more than 5% of total catch) in mahi mahi are sharks (mostly blue sharks), sail fish and yellowfin tuna. According to the

researches of relevant regional fisheries management organizations, these species are now in healthy condition. There are also by-catches of sea turtles and seabirds in Hsin-Kang mahi mahi fishery. Nevertheless, by local custom and practice of fishermen, both sea turtles and seabirds will be de-hooked or cut-lined to release. As for conservation species, pursuant to the Wildlife Conservation Act in Taiwan, protected wildlife shall not be disturbed, abused, hunted, killed, traded, exhibited, displayed, owned, imported, exported, raised or bred.

2. Result of Pre-assessment and Recommendations

Based on research papers collected and interviews with stakeholders, evaluated by the standard set forth by MSC for fisheries certification, the conclusion of the assessment team are as follows: At current stage, Hsin-Kang mahi mahi fishery has not met with the sustainable fisheries standard required by the MSC, thus it is not qualified to obtain certification. Further measures, such as Fishery Improvement Project, are still needed to facilitate the fisheries to be a sustainable one.

According to the pre-assessment, the major issue of concerned of Hsin-Kang mahi mahi fishery is lack of harvest control rules (PI 1.2.2), which means when there is at risk for stock depletion, no pre-agreed rules (such as total allowable catch) can be applied to reduce catch amount or exploitation rate. Other issues of concerned include: lack of harvest strategy (PI 1.2.1); lack of primary species management strategy (PI 2.1.2); lack of secondary species information (PI 2.2.3); lack of endangered, threatened, and protected (ETP) species information (PI 2.3.3); lack of understanding on ecosystem (PI 2.5.1); lack of ecosystem management strategy (PI 2.5.2); lack of ecosystem information (PI 2.5.3); roles and responsibilities of organizations and individuals involved are not explicitly defined (PI 3.1.2); management strategies, objectives, decision-making process, and performance review need to be further improved(PI 2.2.2, PI 2.3.2, PI 3.2.1, PI 3.2.2 and PI 3.2.4).

To address the abovementioned issues, it is recommended to improve on the following items as priority:

1. To improve data collection: At current stage, the main sources of mahi mahi fishery information are from logbook of small scale fishing vessels,

fish market trade information, data collected for research (mostly length sampling data and a few catch information of sampling vessels), and landing declaration. Even though, data collected is not complete and there is substantial room for improvement for follow stock assessment. It is recommended to increase the collection ratio of fishing logbook, implement observer program, increase the number of sampling vessel to collect data for research, so as to increase the creditability of stock assessment.

2. To establish harvest control rules and tools: In the future, based on the result of stock assessment, appropriate harvest control rules and tools, such as total allowable catch, individual vessel quota, minimum length limit of catch, fishing time/area closure, limit on fishing gear and specification, should be established and used to ensure the sustainability of this fishery.

3. To develop management strategies for primary species, secondary species, ETP species and ecosystem: Due to insufficient data collection on abovementioned species and ecosystem in mahi mahi fishery, there is not enough evidence to determine how these species and ecosystem are influenced by this fishery. To this end, further data collection through applicable channels, such as logbook for such species, observer program, and more cooperation with research institute, will be needed for better evaluation. Only based on the evaluation result, management strategies for these species and ecosystem will be able to set up to respond to any possible threat.

4. To clearly define the roles and responsibilities of stakeholders, the management objectives of the fishery, and the decision-making process: For the purpose of Hsin-Kang mahi mahi fishery improvement project, a working group and its terms of reference have been established and drafted. However, more explicit definition on the roles and responsibilities of stakeholders, as well as the management objectives of the fishery is still needed to ensure the transparency, continuity and legitimacy of Hsin-Kang mahi mahi fishery management.

Principle 1			
PI	Items of assement	Likely score	Judgment and Recommendations

1.1.1	Stock status	Above 80	According to stock assessment, there is highly likely that the mahi mahi resources will not be depleted.
1.1.2	Stock rebuilding	No need to score	The status of mahi mahi resource is in good condition, so there is no need to score for this PI.
1.2.1	Harvest Strategy	Below 60	No existing harvest strategy for mahi mahi. It is recommended to establish one to respond to any possible threat to the resource.
1.2.2	Harvest control rules and tools	Below 60	There are no harvest control rules for mahi mahi. Therefore, it is not clear now how the fleet would act to reduce the exploitation rate in the event of a decline in stock biomass. It is recommended to use suitable tools, such as total allowable catch, individual vessel quota, minimum length limit of catch, fishing time/area closure, limit on fishing gear and specification, to establish one.
1.2.3	Information and monitoring	60～80	There are some information available from the fishery management authorities and research institute. However, more information is needed to monitor the stock abundance. It is recommended to improve the collection of fishing logbook, implement observer program and strengthen data collection for research.

1.2.4	Assessment of stock status	60～80	Stock assessment has been done by individual and research institute. However, there are still factors of uncertainty that may affect the assessment result, which may be improved by further study. It is recommended that a long-term research and investigation program would be helpful to reduce the uncertainty.
Summary of assessment for Principle 1: The Scores for PI 1.1.2 and PI 1.2.1 are below 60. Assessment result indicates that this fishery is likely to fail in this category. Even though the score for these two PI have been improved, there is still possibility that this fishery may not meet the criteria due to the average score does not exceed 80. Therefore, apart from the abovementioned two PI, other three PI with score between 60 and 80 will also need to be improved as well.			
Principle 2			
PI	Items of assement	Likely score	Judgment and Recommendations
2.1.1	Primary species outcome	Above 80	Statuses of primary species are proven in good condition by researches of RFMOs. There is no problem found under this PI.
2.1.2	Primary species management strategy	Below 60	There is no explicitly defined management strategy for primary species. It is recommended to establish management strategy for these species as a priority, since there are already plenty of data collected.
2.1.3	Primary species information	Above 80	Sufficient information has been collected. There is no problem found under this PI.
2.2.1	Secondary species outcome	Above 80	Statuses of primary species are likely in good condition based on best available information and the nature of the fishery. There is no problem found under this PI.

2.2.2	Secondary species management strategy	60～80	Even though there is management scheme for these species, no explicit evidence indicates that whether the strategy is implemented successfully. It is recommended to improve data collection on secondary species for further research.
2.2.3	Secondary species information	Below 60	Only partial information is collected by a few research institute, which is not sufficient for determine the effectiveness of management strategy and follow-up action. It is recommended that educational symposium should be held to facilitate data collection. In addition, it would also be helpful to improve the collection of fishing logbook, as well as to collect data by observer program and research program.
2.3.1	ETP species outcome	Above 80	Seldom ETP encountered during fishing activities, and it is required by the law to release any of such species. There is no problem found under this PI.
2.3.2	ETP species management strategy	60～80	Even though there is management scheme for these species, no explicit evidence indicates that whether the strategy is implemented successfully. It is recommended to improve data collection on ETP species for further research.
2.3.3	ETP species information	Below 60	Seldom data is collected due to fishermen may have difficulty to identify and record necessary information. t is recommended that educational symposium should be held to facilitate data collection. In addition, it would also be helpful to improve the collection of fishing logbook, as well as to collect data by observer program and research program.

2.4.1	Habitats outcome	Above 80	Due to mahi mahi fishery use pelagic longline, it is very unlikely that habitats would be affected by the fishery.
2.4.2	Habitats management strategy	Above 80	This surface longline fishery takes place offshore in deep water and does not physically impact the seafloor during their operation. Given that this gear has no physical impact with the seabed, no management strategy is required or in place.
2.4.3	Habitats information	Above 80	This fishery does not interact with any habitat during its operation
2.5.1	Ecosystem outcome	Below 60	There is no sufficient data to determine whether the fishery would disrupt the key elements underlying ecosystem structure and bring irreversible harm, even though it is assumed unlikely based on the nature of the fishery. It is recommended that more research to be done to this end.
2.5.2	Ecosystem management strategy	Below 60	Seldom data is collected to establish management strategy. More data collection is needed for further research and evaluation.
2.5.3	Ecosystem information	Below 60	Seldom data is collected to establish management strategy. More data collection is needed for further research and evaluation.
Summary of assessment for Principle 2: There are six PIs with score below 60. It is very unlikely the fishery may pass certification under this principle. The major reason of failure is lack of necessary information. Therefore, it is recommended to improve data collection as the first priority.			
Principle 3			
PI	Items of assement	Likely score	Judgment and Recommendations
3.1.1	Legal and/or customary framework	Above 80	Suitable legal framework exists for fishery management. There is no problem found under this PI.

3.1.2	Consultation, roles, and responsibilities	60～80	A working group consisted of relevant stakeholders is established for such purpose. But, more clear definition on the roles and responsibilities is needed to ensure its functioning. This can be done by the working itself with appropriate guidance.
3.1.3	Long term objectives	Above 80	Long term objectives for general exist and are clear. There is no problem found under this PI.
3.2.1	Fishery-specific objectives	60～80	There are no specific and explicit objectives for mahi mahi management. It is recommended that the objectives may be set forth based on the assessment result of stock structure and the principle of precautionary approach, to ensure its sustainability.
3.2.2	Decision-making processes	60～80	Decision-making processes have been decided but not functioned yet in practical. It needs to be observed, and if necessary, revised to ensure that the decision-making would take into account best available scientific information and precautionary approach.
3.2.3	Compliance and enforcement	Above 80	There are existing monitoring, control and surveillance mechanism in place to ensure management measures are enforced and complied with. There is no evidence of systematic non-compliance.
3.2.4	Monitoring and management performance evaluation	60～80	There is mechanism in place to evaluate the management system, which is subject to occasional internal review. It is recommended to establish mechanism for external review, after most of the other PIs have been met.
Summary of assessment for principle 3: The performance of this principle is relatively better than Principle 1 and Principle 2, even though there is still room to be improved before a full assessment to be done to ensure the average score under this Principle is above 80. However, this may not be the priority issue, taking into account the performance under the other two Principles.			