





## REPORT OF THE SECOND REGIONAL TECHNICAL CONSULTATION ON RESEARCH FOR STOCK ENHANCEMENT OF SEA TURTLES (JAPANESE TRUST FUND IV PROGRAM)

Kuala Lumpur, Malaysia 5-7 June 2007



Edited by

Ku Kassim bin Ku Yaacob

Syed Abdullah bin Syed Abdul Kadir



Marine Fishery Resources Development and Management Department Southeast Asian Fisheries Development Center

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Marine Fishery Resources Development and Management Department Southeast Asian Fisheries Development Center Taman Perikanan Chendering, 21080 Kuala Terengganu, Malaysia Tel: +609-6175940, 6177867 Fax: +609-6175136, 617042 Email: .mfrdmd@seafdec.org.my Website: http://www.seafdec.org.my

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# Participants of the Second Regional Technical Consultation on Research for Stock Enhancement of Sea Turtles (Japanese Trust Fund IV Program)

Kuala Lumpur, Malaysia 5-7 June 2007



**Seated from right:** Dr. Osamu Abe, Prof Dr. Chan Eng Heng, Dr. Y. Konishi, Mr. Raja Mohammad Noordin, Dato'. Junaidi, Mr. Ikuya Tanaka, Mr. Kamarruddin, Dr. M. Halim.

**Second row from right:** Mr. Syed Abdullah, Mr. Douglas Hykle, Dr. Kongkiat, Mr. Phan Hong Dung, Mr. Cho Hla Aung, Mr. Mohd Ridzuan, Mr. Manoch Roongratri.

**Third row from right:** Mr. Somchai, Mr. Irwan Isnain, Mr. Pich Sereywath, Mr. Anucha Songjitsawat, Dr.Ngurah Wiadnyana, Mr. Abdul Wahab Abdullah.

Fourth row from right: Dr.Windia Adnyana, Mr. Ku Kassim, Dr. Yosni, Dr. Rizza Araceli, Mr. Desimawati, Mr. Arvind Devadasan, Mr. Zulkifli Talib, Ms. Lau Min Min, Ms. Wahidah, Mr. James Bali.

## Report of the Second Regional Technical Consultation on Research for Stock Enhancement of Sea Turtles (Japanese Trust Fund IV Program)

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#### INTRODUCTION

Six of seven species of sea turtles in the world are distributed in the Southeast Asian region. Most of them are highly migratory and considered as endangered species. Successful conservation and enhancement of sea turtle resources requires scientific information on their ecological aspects such as migratory routes, reproductive and feeding behavior, population genetics, and on the status of incidental catch and habitat reduction that is related to their mortality.

To obtain ecological information on distribution, migration, growth and reproductive habits, SEAFDEC started to conduct collaborative studies on sea turtle tagging with seven SEAFDEC member countries in 1998. Implementation of this tagging work had been continued in 2002 and 2003 under the Japanese Trust Fund (JTF) I program which includes an activity of sea turtle hatchery management. A total of 12,000 inconel tags have been provided by SEAFDEC to the member countries since 1998.

Starting from 2005, sea turtle research conducted by SEAFDEC has been funded under the new JTF IV Program entitled "Research for Stock Enhancement of Sea Turtles (JTF IV Program)" which is related to stock enhancement for species of international concern. This new program would be implemented in collaboration with the eight SEAFDEC member countries. The JTF IV program consists of three main projects, i.e. tagging and satellite tracking telemetry, DNA study and sea turtles – fisheries interaction, formulated at the 1st Regional Technical Consultation held on 25 and 26 April, 2005, in Kuala Terengganu, Malaysia, based on the original plan made at the Core Experts Meeting in December 2004.



The 2nd Regional Technical Consultation on Research for Stock Enhancement of Sea Turtles (Japanese Trust Fund IV Program) (RTC) was held from 5-7 June 2007 in Kuala Lumpur, Malaysia. The RTC was attended by participants from Brunei Darussalam, Cambodia, Indonesia, Malaysia, Myanmar, the Philippines, Thailand and Vietnam; and representatives from SEAFDEC-Secretariat, SEAFDEC-TD and SEAFDEC-MFRDMD. Four resource persons were invited from Japan (Ishigaki Tropical Station, Okinawa), Indonesia (Joint Program between WWF-Indonesia-TNC) and Malaysia (Universiti Kebangsaan Malaysia and Universiti Malaysia Terengganu). The RTC was also attended by observers from IOSEA, WWF, DOF Thailand and DOF Malaysia. The full list of participants appears in Annex I.

#### **OBJECTIVES**

The objectives of the RTC are:

to hold a mini-symposium on sea turtle ecology based on tagging and satellite tracking telemetry in the Southeast Asian region by national and SEAFDEC activities,

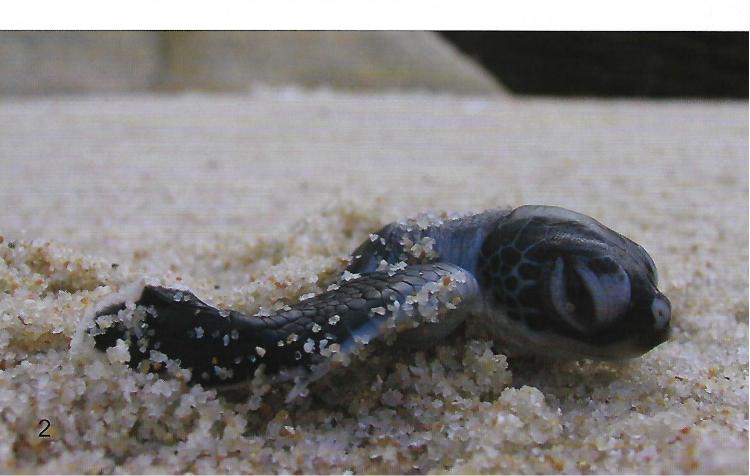
to consider regional outcomes on sea turtle ecology by tagging and satellite telemetry and genetic studies, with reference to interaction between fisheries and sea turtles,

to discuss the results and findings of the implemented activities of JTF IV program in 2005 and 2006, and

to discuss, formulate and implement the research plan of JTF IV program for 2007 and 2008.

#### **OPENING OF THE MEETING**

Mr. Raja Mohammad Noordin bin Raja Omar, the Chief of MFRDMD welcomed all the distinguished guests, participants and observers to the RTC. He then thanked the Honorable Dato' Junaidi bin Che Ayub for opening the RTC. He also thanked all the participants and observers for attending this meeting. He appreciated the hard work of the chairman and members of the secretariat for making this RTC a success. His Welcome Speech appears as <u>Annex II</u>.



In his Opening Speech, the Honorable Dato' Junaidi bin Che Ayub, the Director-General of Fisheries Malaysia and the SEAFDEC Council Director for Malaysia, on behalf of the Government of Malaysia welcomed all the participants to Malaysia. He wished all the participants a pleasant stay in Kuala Lumpur during this Visit Malaysia Year 2007. He recorded his appreciation of the work done by the DOF Malaysia as well as SEAFDEC on the enhancement and management of sea turtles in Malaysia as well as the region. The importance of conservation and management of sea turtles and their interactions with fisheries was also highlighted. He also thanked the Government of Japan for funding the sea turtles conservation program. The Honorable Dato' Junaidi lastly declared the RTC open. His Opening Speech appears in Annex III.

#### **ADOPTION OF AGENDA**

This session was chaired by Mr. Raja Mohammad Noordin bin Raja Omar. The Agenda as it appears in Annex IV was adopted.

### MINI-SYMPOSIUM ON OVERVIEW OF REGIONAL TAGGING AND SATELLITE TELEMETRY STUDIES IN SOUTHEAST ASIA

Keynote Address on the Overview of Satellite Tracking of Sea Turtles by Prof. Dr. Chan Eng Heng

An overview of the satellite tracking of sea turtles at the global-scale was presented by Prof. Dr. Chan Eng Heng from Universiti Malaysia Terengganu. She elaborated on the successful undertaking of satellite tracking programs in Malaysia, California, Africa and others. The significant movements of sea turtles were also highlighted, especially the turtle Adelita which moved from Japan to the United States and vice versa for nesting and foraging. The tracking of sea turtles from Redang Island, Malaysia, was also highlighted. These turtles had migrated for more than 1,000 km from their nesting beaches to reach coastal foraging grounds bordering the South China Sea. She stressed the importance of regional and global collaboration in managing and protecting sea turtles since poaching of these animals by foreign vessels has become rampant in recent years (she showed pictures of poached turtles in Sabah and Indonesia as examples). Her keynote address appears as Annex V.



#### Overview on Regional Satellite Telemetry by Regional Coordinator

The status and progress of this work were presented by Mr Syed Abdullah bin Syed Abdul Kadir, Regional Coordinator for the JTF IV Program. The scenario of this project from 1998 to 2006 was presented as well. The new JTF IV from 2005-2008 was also touched upon. He concluded that 8 countries in the region had implemented the sea turtle tagging program, of which 6 countries (Indonesia, Malaysia, Myanmar, Thailand, the Philippines and Vietnam) implemented the satellite telemetry studies (Annex VI).

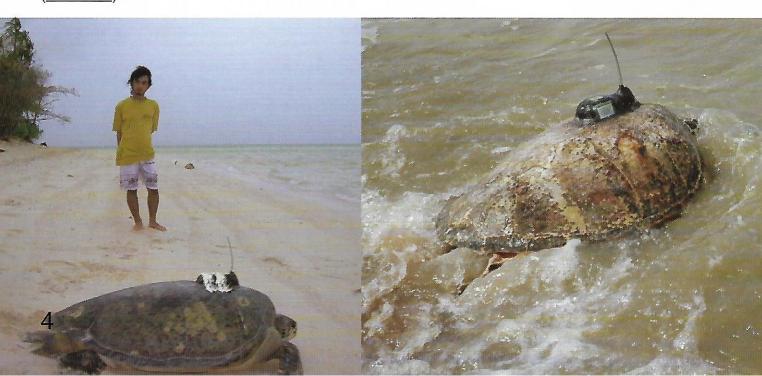
Mr. Zulkifli bin Talib presented the results of satellite telemetry study of sea turtles conducted in selected member countries. The hawksbill turtle attached with a PTT released on 16 June 2006 from Pulau Upeh, in Melaka, Malaysia was found to move southward to Riau Archipelago and has remained there until now. The green turtle released from Sangalaki Island in Indonesia on 16 September 2006 moved to southeast of Sabah and stayed there until 30 March 2007 when transmission ceased. The olive ridley turtle was released on 3 January 2007 in Kadongalay, Myanmar. Transmission ceased on 14 January 2007, after the turtle migrated for about 100 km (Annex VII).

#### Presentation by Brunei Darussalam

The presentation for Brunei Darussalam was presented by Ms Desimawati Hj Metali (<u>Annex VIII</u>). Olive ridley, hawksbill and green turtles were confirmed to nest in Brunei Darussalam. Tagging program started in 1999 funded by JTF. Fourty-one turtles were tagged and since then only two have returned to nest. There is no turtle tagged with a satellite transmitter so far. The establishment of turtle sanctuary was also initiated by the government.

#### Presentation by Indonesia

The presentation for Indonesia entitled Current Status of Marine Turtle Population in Berau District, East Kalimantan – Preliminary results of Tagging Studies in Nesting and Feeding Grounds was presented by Dr. Matheus H. Halim and Dr. Windia Adnyana. The high concentration of green and hawksbill turtle populations as well as their nesting trends in Sangalaki and Derawan Islands in 2002-2006 were highlighted. The Telonics transmitters were used on three post-nesting green turtles. The turtles deployed in Derawan migrated to Banggi Island, Sabah; Socol Island, Philippines and Sandakan waters (Sabah). Tagged green turtles from Terengganu and Sabah (Malaysia) and the Philippines were found feeding on seagrass bed in Panjang Island. This has been confirmed by the genetic study undertaken on nesting and foraging grounds in Derawan Archipelago. The common threats on sea turtles, and the steps taken to overcome these threats were also discussed (Annex IX).



#### Presentation by Malaysia - Peninsular Malaysia

Mr. Abdul Wahab bin Abdullah presented the recent satellite telemetry and tagging activities in Peninsular Malaysia (Annex X). The satellite tagging was conducted using 4 units of PTT at Ma' Daerah, Terengganu in 2005; and one unit at Pantai Kerachut, Pulau Pinang, in 2007. The female green turtles from Ma' Daerah had reached Vietnam coastal area, Sulu Sea as well as Jakarta Bay. The male green turtle had reached and remained in the Mersing area (only 350 km in distance). The female green turtle from Pantai Kerachut has so far reached Bintan Island, Indonesia (706 km) in a month. The on-going flipper tagging study is conducted at 2 sites on the west coast and 3 sites on the east coast.

#### Presentation by Malaysia – Sabah

The Sea Turtle Management and Ecology in Sabah Turtle Islands was presented by Mr. Irwan Isnain. The conservation of turtles in Sabah started in 1927. Turtle Islands Park (TIP) consists of three islands which represents major nesting sites for green and hawksbill turtles. Enforcement, patrolling, hatchery management activities and others were implemented in TIP for conservation of sea turtles. From 1970-1999 about 60,000 turtles had been tagged. 123 tags were recovered in the waters of neighboring countries while 5 were recovered in the waters of Sabah. Nesting behaviour of hawksbills and green turtles was presented. PTTs had been attached to 3 green turtles, and three hawksbills so far. One of the hawksbills had traveled 821 km to Indonesia waters. The others were observed in the feeding ground along the coast of Sabah. His full paper is attached as Annex XI.

#### Presentation by Malaysia – Sarawak

The turtle conservation program in Sarawak located in Sarawak Turtle Islands. The satellite telemetry of green turtles from this location migrated to Sabah Turtle Islands; Banggi Island (Sabah); and Panjang Island, Indonesia (1,729 km, 52.4 km/day); Doc Can Island, Philippines (1493 km, 40.35 km/day); Sandakan, Sabah (1,178 km, 43.63 km/day), Sibutu Island, Philippines (1,459 km, 44 km/day); Labuan; and West Kalimantan (698 km, 53.7 km/day). The average migration period of green turtles was 27.9 days. The hawksbill movement ended at Brunei Bay (Sabah, Sarawak and Brunei). An average of 7.5% remigrant turtles were recorded annually in Sarawak from 1996-2005. In 2006, 2,612 individual turtles nest in Sarawak Turtle Islands which 30% of them were remigrants. Sarawak needs 3,000-4,000 inconel tags per year. He concluded that the nesting green turtles of Sarawak share the same feeding grounds with those of other countries. His paper appears in Annex XII.



#### Presentation by Myanmar

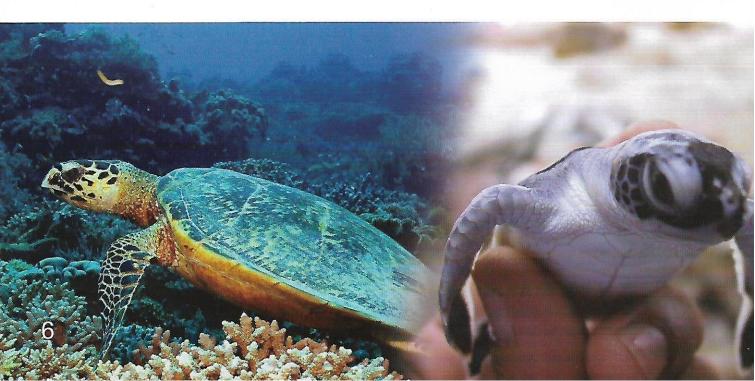
The Tagging and Satellite Tracking Activities in Myanmar was presented by Mr Cho Hla Aung. As the introduction, there were 5 species in Myanmar including the nearly extinct species of Loggerhead and Leatherback turtles. From the total of 3,000 inconel tags provided by MFRDMD in 2001, only 355 recorded by the DOF staff in 2006. A total 25 PIT tags were applied to the turtles in Thameehla Island. So far there was no tagged turtle reported from the fishermen, possibly of their poor knowledge on that program. One unit of PTT was attached to an Olive Ridley turtle in Kadongalay in January 2007. His full paper appears as Annex XIII.

#### Presentation by the Philippines

Dr. Rizza Araceli F. Salinas presented the Updates on Tagging Activities in the Philippines. The tags were provided by MFRDMD. The turtles tagged included juveniles, sub-adults and adults accidentally caught in various fishing gears, as well as females found on nesting beaches. From 1992, 21 turtles tagged in Turtle Islands (Philippines) were reportedly recovered in various areas in the Philippines waters (i.e. Jolo, Tawi Tawi, Misamis Occidental and Antique). There were also turtles with Malaysian tags that were recovered in the Philippines. These tagged turtles were mostly recovered in the seagrass and coral reef areas could be foraging habitat of sea turtles. The satellite telemetry studies were done in Turtle Islands Heritage Protected Area (TIHPA) in 1998 to 2001. Her presentation appears as Annex XIV.

#### Presentation by Thailand

Dr. Kongkiat Kittiwattanawong presented a paper entitled Sea Turtle Nesting Biology and Satellite Telemetry Studies in Thailand as appeared in Annex XV. There were 4 species of sea turtles nesting in Thailand; green (78%), hawksbill (20%), olive ridley (1%) and leatherback (1%) turtles. In the Gulf of Thailand, only green and hawksbill turtles occurred. The decline of green, hawksbill, and olive ridley turtles had been reported since 1950. However, nesting statistics over the last 10 years revealed minor increasing trends for green and hawksbill populations. Since 1995, 51 sea turtles were deployed with PTTs. The first trial performed at Phuket Island lasted 3 days. The second trial in 2000 revealed that an 88-cm green turtle, kept in captivity for 6 years, was able to locate seagrass bed. Most of the PTT-deployed green turtles from Huyong island migrated to Andaman Islands, while in the Gulf of Thailand, majority of the turtles from Khram Island migrated to Sulu-Sulawesi seas, some of them migrated to Cambodia, south of Vietnam, and east coast of Peninsular Malaysia. The tracked hawksbill turtles migrated over much shorter distance compared



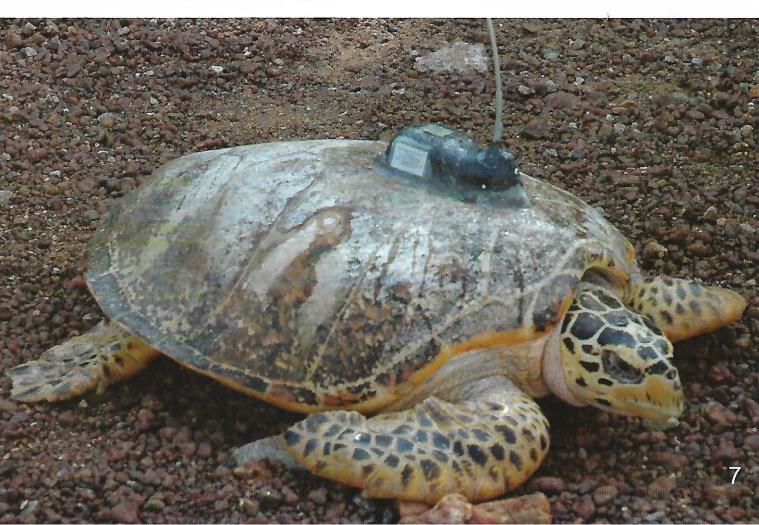
to the green turtles and most of them stayed within Thai and adjacent waters. An olive ridley turtle from Prathong Island migrated to Murgui Archipelago, Myanmar. Tracking of an adult loggerhead turtle revealed that the turtle migrated 3,935 km from Khram Island to the north of Australia in merely six months. The use of other sensors such as camera, depth recorder, ultrasonic transmitter, surface time, and application of the data recorded by these sensors were also presented.

#### Presentation by Vietnam

The Satellite Tracking and Tagging Implementation was presented by Mr. Phan Hong Dung. In 2006, Vietnam implemented the satellite tracking program for green turtles in Con Dao National Park. Four turtles were deployed with PTTs. One of the turtles (Bay Canh 1) traveled 525 km towards the southwest. Another one (Bay Canh 2) moved 1,889 km to the coastal area of north Palawan in the Philippines. The Bay Canh 3 turtle traveled 808 km to the east to end at the Spratlys. The Con Son 1 traveled 1,800 km to end at Palawan. He concluded that the turtles of Vietnam have two foraging areas, i.e. Vietnam waters as well as Palawan. Since 1998 SEAFDEC-MFRDMD has provided 1,200 inconel tags which were applied to the turtles at 7 rookeries. From 1996-2006 a total of 3,003 turtles (mostly green turtles) have been tagged, mostly at Con Dao (64%). There were very few recaptures reported by local fishermen. He suggested that those tagging activities, satellite tracking implementation etc. should be continued (Annex XVI).

## MIGRATION ROUTES AND FORAGING HABITAT OF SEA TURTLES IN SOUTHEAST ASIA WITH REFERENCE TO SEA TURTLES – FISHERIES INTERACTIONS

After discussion between representatives of each member country in their separate sessions, and after further deliberation and discussion, the RTC agreed on the migration routes, foraging habitat, fisheries interaction, inter-nesting habitat and the nesting seasons for every species of each nesting beach (<u>Annex XVII</u>). The RTC urged participating member countries to provide detailed mapping of the routes of turtle migration and foraging habitats.



## STOCK IDENTIFICATION AND MULTIPLE PATERNITY OF SEA TURTLES IN THE SOUTHEAST ASIAN REGION

The paper on Genetic Studies of Breeding Sea Turtle in Thailand (Annex XVII) was presented by Mr. Somchai Monanunsap. The analysis of control region of mtDNA revealed there was no genetic divergence between green turtle nesting populations from both sides of Thailand. The microsatellite DNA fingerprinting study confirmed that multiple paternity of green turtle is quite common in the Gulf of Thailand. Each clutch was found to be sired by 2-4 male turtles. These results were different from the green turtle population in the Great Barrier Reef which is mostly single paternity. The evidence proved that the level of multiple paternity varies among populations and nesting locations which should be further investigated.

Ms Wahidah Mohd Arshaad, Technical Officer from MFRDMD presented the paper on Stock Identification of Sea Turtles in the Southeast Asian Region (<u>Annex XVIII</u>). A total of 308 tissue samples from 14 sampling sites have been collected by member countries, of which 171 samples have been sequenced. The analysis was still in progress and the result of stock identification would be presented in final RTC in 2008. The initial findings from paternity studies (<u>Annex XIX</u>) showed that multiple paternity of green turtles occurred in Redang Island.

Realizing the lack of facilities and expertise at MFRDMD, the RTC agreed that MFRDMD should consider collaborating with universities in Malaysia and Technical Officers from Thailand in analyzing the samples and/or data analysis.



## PROPOSED SAMPLING SITES FOR TISSUE COLLECTION OF NESTING HAWKSBILL TURTLES FOR POPULATION IDENTIFICATION

Mr. Syed Abdullah bin Syed Abdul Kadir presented the proposal on this matter. After deliberation, the RTC agreed the list of proposed sampling sites as shown in the table below. Realizing the difficulties in collecting 30 samples per site for the analysis, the RTC agreed that whatever maximum number of samples successfully collected would be accepted and sent to MFRDMD.

To avoid the problem on transportation of the preserved tissue samples to MFRDMD, the participating member countries should adhere to the respective country policies on exporting the collected tissue samples.

Country	Sampling sites
Brunei Darussalam	Muara
Cambodia	keep-in-view
Indonesia	Anambas Natuna
	Kimar Island Kaniungan Island Bengkulu
Malaysia – Peninsular	Melaka Seri Buat Island
Malaysia – Sarawak	Sarawak Turtle Islands
Malaysia – Sabah Myanmar	Sabah Turtle Islands Oyster Island Coco Island
Philippines	Apo Reef Island Arena Island
Thailand Vietnam*	Davao Khram Island Son Tra Ninh Thuan

\*Vietnam should re-sample additional 30 tissues of nesting green turtles.



## PROPOSED IMPLEMENTATION PLAN FOR TAGGING AND SATELLITE TELEMETRY STUDIES

In order to promote conservation and enhancement of sea turtle in member countries, the RTC encouraged all the member countries to continue their existing national programs, as well as to formulate new programs, as appears as <u>Annex XX</u>.

The RTC also took note of the proposal by Thailand on the use of living tag in their tagging activities.

#### INTERACTION BETWEEN SEA TURTLES AND FISHERIES

The study on the interaction between sea turtles and fisheries is implemented since the mortality of sea turtles is of very much concern at the international level. In his presentation, Dr. Somboon Siriraksophon pointed out the interaction between sea turtle and longline fishery. A research cruise made in Indian Ocean on November 2003 caught two olive ridleys using J-hook longlines. The effectiveness of circle hook compared to J-hook was also investigated. Four experiments using circle hook have been conducted in Indian Ocean, Brunei waters, Sulu Sea (Philippines) and Andaman Sea in 2005-2006. None of the experiments caught sea turtle, and at the same time maintained the catch of other common species. The use of circle hook is somewhat better in catching the commercial fish and reducing the by-catch. He suggested that in order to reduce turtle mortality in tuna purse seines, the FADs should use small meshsize to avoid entanglement of sea turtle. The guidelines for pelagic longliners to reduce sea turtle mortality were also presented. The awareness program on the use of circle hook was also highlighted. Three workshops were conducted to discuss fisheriesturtle interaction with the fishermen. The gears used at the offshore and nearshore that have most effect on turtles were also listed. The use of TED in trawl nets is urged to reduce turtle mortality. His presentation appears as Annex XXI.



#### IMPLEMENTATION PLAN OF TRUST FUND IV PROGRAM

The RTC agreed on the proposed implementation plan of JTF IV for the years of 2007 and 2008 (Annex XXII). The participating countries should take note on the following matters:

The proceedings of RTC would be published and distributed during Program Committee Meeting in November 2007. All the technical reports should be submitted to MFRDMD by 15 July 2007. The draft of the proceedings would be ready in August 2007. The final version would be ready by September 2007. The printing would be done in October 2007.

The final RTC would be held in end of October 2008.

The draft of country report as well as terminal report should be submitted to MFRDMD before the final RTC. These reports will be discussed further at the final RTC. MFRDMD would provide the format of the report and send to every member country.

The samples for the stock ID analysis for hawksbill turtles should reach MFRDMD before 1 March 2008.

#### OTHER MATTERS

The RTC appreciated the presentation from IOSEA on the reporting database system for sea turtle. The RTC encouraged SEAFDEC to develop the similar database system for sea turtle reporting.

The RTC took note of the serious problem of poaching of sea turtles in the region by foreign vessels. In the last five years thousands of turtles have been poached. SEAFDEC-MFRDMD should address this issue at the relevant meetings.

The meeting was informed of a new Japanese Trust Fund (JTF) II and JTF V projects as the possible budget for the sea turtle research after termination of the present JTF IV project. The new JTF II project to be implemented from 2008 will cover researches related to the international fishery issues such as conservation of endangered species and impact of bottom trawl fisheries on the ecosystem as well as information collection and organization of seminars and workshops of the international concern. The JTF V project to be started from 2010 as the succeeding program of the JTF IV will mainly cover research activities on the stock enhancement of fisheries resources. SEAFDEC Departments and member countries are requested to submit proposals for the two new JTF programs for consideration at the planning meeting for the projects, which will be held by the SEAFDEC Secretariat on 28-29 June 2007 in Bangkok.

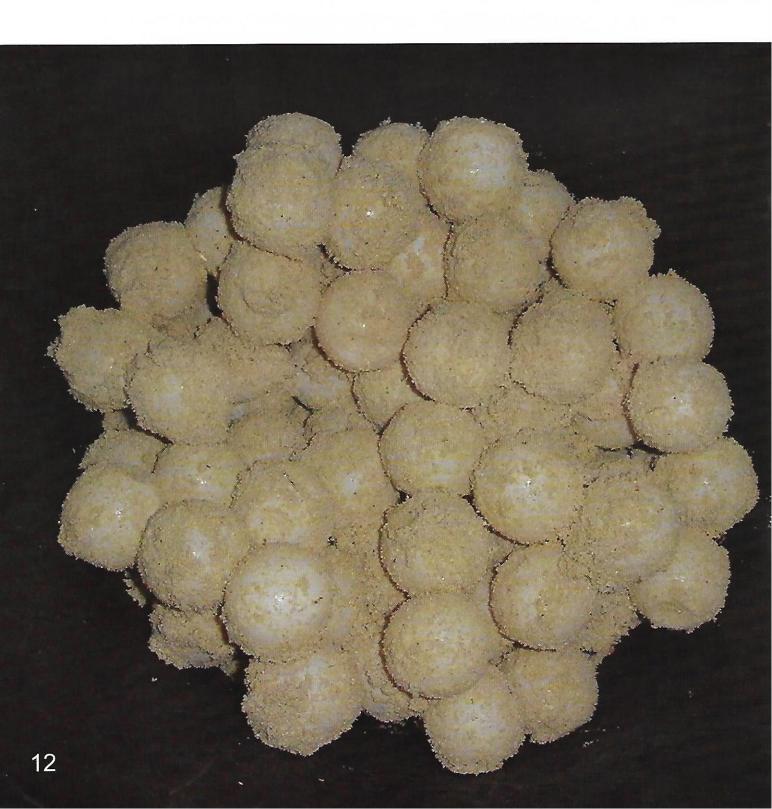


#### ADOPTION OF REPORT OF THE RTC

The Report of The Second Regional Technical Consultation on Research for Stock Enhancement of Sea Turtles (Japanese Trust Fund IV Program) was adopted on 7 June 2007.

#### **CLOSING OF THE RTC**

Dr. Yoshinobu Konishi, the Deputy Chief of MFRDMD on behalf of the Chief of MFRDMD expressed his sincere appreciation to everyone for their active participation during this RTC. He hoped to get the full technical reports from all the countries to be published in the proceedings. Then he thanked all the participants, resource persons, observers as well as members of secretariat for making this RTC a success. He wished everyone would have a safe journey home.



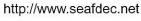
## **SEAFDEC**

The Southeast Asian Fisheries Development Center (SEAFDEC) is an autonomous intergovernmental body established as a regional treaty organization in 1967 to promote fisheries development in Southeast Asia. SEAFDEC aims specifically to develop the fishery potentials in the region through training, research and information services to improve the food supply by rational utilization and development of the fisheries resources. Its services cover the broad areas of fishing gear technology, marine engineering, fishing ground surveys and stock assessment, post-harvest technology as well as development and improvement of aquaculture techniques. SEAFDEC is currently made up of 11 Member Countries, namely Brunei Darussalam, Cambodia, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam; and has the Council of Directors, composed of nominees from Member Countries, as policy-making body to provide directives and guidance on activities of the Center. The Center has a Secretariat as its administrative arm, and four technical Departments.



#### THE SECRETARIAT

P.O.Box 1046, Kasetsart Post Office Bangkok 10903 Thailand Tel: (66-2)940-6326 Fax: (66-2)940-6336 E-mail: secretariat@seafdec.org





#### TRAINING DEPARTMENT (TD)

P.O.Box 97, Phramutchedi Samut Prakan 10290 Thailand Tel:(66-2)425-6100 Fax:(66-2)425-6110/11 Email:td@seafdec.org http://td.seafdec.org



#### MARINE FISHERIES RESEARCH DEPARTMENT (MFRD)

2 Perahu Road, off Lim Chu Kang Road, Singapore 718915 Tel:(65)790-7973 Fax:(65)861-3196 E-mail:mfrdlibr@pacific.net.sg http://mfrd.seafdec.net/



#### AQUACULTURE DEPARTMENT (AQD)

Main Office: Tigbauan, 5021 Iloilo, Philippines Tel:(63-33) 511-9171, 336-2965 Fax:(63-33) 335-1008, 511-8709, 511-9070 E-mail: aqdchief@adq.seafdec.org.ph http://www.seafdec.org.ph



#### MARINE FISHERY RESOURCES DEVELOPMENT AND MANAGEMENT DEPARTMENT (MFRDMD)

Taman Perikanan Chendering, 21080 Kuala Terengganu. Tel: (609) 617-5940 Fax: (609) 617-5136

E-mail: mfrdmd@seafdec.org.my http://www.seafdec.org.my

































