



**Establishment and Operation of a Regional System of
Fisheries *Refugia* in the South China Sea and Gulf of Thailand**

REPORT

**BASELINE SURVEY ON SOCIO-ECONOMIC STATUS, FISHING AND
FISHERIES RESOURCES OF SHORT MACKEREL, AND LARVAL FISH
SAMPLINGS IN KOH KONG PROVINCE IN SEPTEMBER 2019**

**KOH KONG, CAMBODIA
09-14 SEPTEMBER 2019**

Prepared by
FISHERIES ADMINISTRATION, CAMBODIA

SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER
TRAINING DEPARTMENT



**Southeast Asian Fisheries
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**United Nations
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1. Field Trip Objective

- 1) To monitor the development of mackerel gonad, interview mackerel fishermen, and collect sampling fish larvae in Koh Kong province from 09 to 14 September 2019, funded by SEAFDEC/UNEP/GEF.

2. Involved Person

- 2) There are four leaders and officers from Department of Fisheries Conservation and two officers from Fisheries Administration Cantonment in Koh Kong, participating in doing a research of baseline survey short mackerel in Koh Kong province naming as following (see Annex 1, 2 & 5):
 - Ms. Ly Sokta, Officer of Department of Fisheries Conservation/FiA
 - Mr. Rous Saret, Officer of Department of Fisheries Conservation
 - Mr. Lieng Saroeun, Vice chief of Crocodile Industrial development and conservation, Department of Fisheries Conservation
 - Ms. Kin Samnang, Officer of Department of Fisheries Conservation
 - Mr. Nou Ngoy, Vice Chief of Fisheries Administration Division, Koh Kong FiAC
 - Mr. Seng Bunna, Vice Chief of Fisheries Administration Division, Koh Kong FiAC

3. Field Trip Activities

A. Collection of fish samples at landing sites and markets

- 3) In September, it is found that mackerel is available at Dornng Tung and Village 4 market, but it is still fewer quantity. Teamwork from FiA and FiAC went down to collect the sampling short mackerel at Dornng Tung market, Village 4 market and bought 81 of fish to monitor the development of its gonad (see annex 2).

B. Operate fish to monitor its gonad development

- 4) 81 fish sampling is operated to monitor its gonad development, including 36 females, 41 males, and the rest of them for non sex.
- 5) According to data analysis for female, fish starting 1st maturity in September. Its average body weight is 45.88g and average body length is 16.40cm. For its gonad stage development, it varies from 1st stage to 5th stage, including 23 fish in 1st stage, 2 fish in 2nd stage, 3 fish in 3rd stage, 4 fish in 4th stage, and 4 fish in 5th stage.
- 6) As for data analysis for male, fish starting 1st maturity in September. Its average body weight is 50.37g and average body length is 16.92cm. For its gonad stage development, it varies from 1st stage to 5th stage, including 20 fish in 1st stage, 4 fish in 2nd stage, 2 fish in 3rd stage, 2 fish in 4th stage, and 11 fish in 5th stage.

C. Preparing and storing DNA

- 7) Teamwork prepared and cut the part of 30 fish body that are stored in small plastic tubes to study and analyze its DNA (see annex 3).

D. Interview Fishermen at Village 4

- 8) The purpose of social economic and fishing survey is to want to know about short mackerel fishing status in the past until now, that provide more information on scientific data. 10 fishermen at village 4, Sangkhat Dornng Tung, Khan Kem Reak Phummin, Koh Kong province were interviewed by using semi structure questionnaire. Data collected are entered in Excel program to analyze (see annex 3).

E. Sample larvae collection

- 9) Teamwork from FiA and FiAC went down to collect sampling fish larvae at Koh Yor, Chroy Pros, and Peam Krasob sites that are 8 stations. The bongo net with the size of 1 m diameter and 5.5 meter length was applied to collect sampling fish larvae and two times/station was practiced to collect fish larvae. All sampling fish larvae were stored and kept in plastic tube with ethanol of 99.7%.

ANNEX 1**List of participants attending the baseline survey of short mackerel gonad development from 09 to 14 September 2019 in Koh Kong province**

No.	Name	Sex	Title	Organization	Telephone
1	Kin Samnang	F	Officer	DFC/FiA	077
2	Ly Sokta	F	Officer	DFC/FiA	092653427
3	Lieng Saroeun	M	Vice chief of Crocodile industrial and conservation division	DFC/FiA	092660267
4	Rous Saret	M	Officer	DFC/FiA	011664696
5	Seng Bunna	M	Vice chief of Fisheries Administration Division	Koh Kong FiAC	016885709
6	Nou Ngoy	M	Vice chief of Fisheries Administration Division	Koh Kong FiAC	016933192
7	Map Chanda	F	Student	Faculty of Fisheries Science /RUA	077511674

ANNEX 2**Schedule for baseline survey of short mackerel gonad development from 09 to 14 September 2019 in Koh Kong province**

Date/Time	Description	Responsible person
09 September 2019		
9:00am-4:00pm	Leaving Phnom Penh for Koh Kong	<ul style="list-style-type: none"> • Mr. Lieng Saroeun, • Mr. Leng Sy Vann, • Ms. Ly Sokta, and • Mr. Rous Saret
10 September 2019		
9:00am- 12:00pm	Collect sampling short mackerel at Dornng Tung market in Koh Kong province	All
12:00pm-2:00pm	Lunch break	All
2:00pm-5:00pm	Operate fish to monitor fish gonad and collect its NDA	All
11 September 2019		
8:00am-1:00pm	Sample fish larvae collection at station 2, 4, 1 and 7	All
1:00pm -3:00pm	Lunch break	All
3:00pm -5:00pm	Interview fishermen of mackerel at Village 4, Koh Kong province	All
12 September 2019		
8:00-1:00pm	Sample fish larvae collection at station 6 and 8	All
1:00pm-3:00pm	Lunch break	All
3:00pm -5:00pm	Interview fishermen of mackerel at Village 4, Koh Kong province	All
13 September 2019		
8:00-12:00pm	Sample fish larvae collection at station 3 and 5	All
12:00pm-2:00pm	Lunch break	All
2:00pm-4:00pm	Interview fishermen of mackerel at Village 4, Koh Kong province	All
14 September 2019		
9:00am-4:00pm	Leaving Phnom Penh for Koh Kong	All

ANNEX 3

Questionnaires on Socio-Economic Status, Fishing and Fisheries Resources

I. ព័ត៌មានទូទៅ General Information

1. ឈ្មោះអ្នកសម្ភាសន៍ Interviewee ថ្ងៃខែឆ្នាំសម្ភាសន៍ Date of Interview.....
2. ឈ្មោះអ្នកនេសាទ Fishermen Name..... ភេទ Sex..... អាយុ Age.....
3. ជនជាតិ Nationality : 3.1 ខ្មែរ Khmer 3.2 វៀតណាម Vietnam 3.3 ម៉ូស្លីម Muslim 3.4 ផ្សេងៗ Other
4. អាសយដ្ឋាន Address: ភូមិ Village..... ឃុំ Commune..... ស្រុក District..... ខេត្ត Province.....
5. ចំនួនសមាជិកក្នុងគ្រួសារ Family member

7.1 សរុប Total	7.2 ប្រុស Male	7.3 ស្រី Female	7.4 ចំនួនសមាជិក ចូលរួមក្នុងសកម្មភាពនេសាទ Member involved in fishing activity

6. មុខរបរស្នូលនិងមុខរបរបន្ទាប់បន្សំ Main and secondary occupation

	ប្រភេទមុខរបរ categories of occupation	8.1 ស្នូល Main	8.2 ចំណូល ប្រចាំឆ្នាំ Annual income (Riel)	8.3 បន្ទាប់បន្សំ Secondary income (Riel)	8.4 ចំណូល ប្រចាំឆ្នាំ Annual income (Riel)
1	ធ្វើស្រែ Rice field	<input type="checkbox"/>		<input type="checkbox"/>	
2	នេសាទ Fishing	<input type="checkbox"/>		<input type="checkbox"/>	
3	ដាំសារាយ Sea weed culture	<input type="checkbox"/>		<input type="checkbox"/>	
4	ចិញ្ចឹមសត្វ Animal husbandry	<input type="checkbox"/>		<input type="checkbox"/>	
5	ដាំបន្លែ Growing Vegetable	<input type="checkbox"/>		<input type="checkbox"/>	
6	ការងាររដ្ឋ (គ្រូ អាជ្ញា ធរ) Public service officers	<input type="checkbox"/>		<input type="checkbox"/>	
11	លក់ដូរតូចតាច Small business	<input type="checkbox"/>		<input type="checkbox"/>	
12	ធ្វើឧបករណ៍នេសាទ លក់ making fishing gears	<input type="checkbox"/>		<input type="checkbox"/>	
13	រត់ម៉ូតូឌុប តាក់ស៊ី Taxi and motor driver	<input type="checkbox"/>		<input type="checkbox"/>	
14	កម្មករ លក់កំលាំង ពលកម្ម labor /worker	<input type="checkbox"/>		<input type="checkbox"/>	
15	ធ្វើទូក ជួសជុលទូក Boat/vessel repairing	<input type="checkbox"/>		<input type="checkbox"/>	
16	ផ្សេងៗ Other	<input type="checkbox"/>		<input type="checkbox"/>	

II. សកម្មភាពនេសាទ Fishing activity

7. រយៈពេលនេសាទ: Fishing period.....ឆ្នាំ
8. ចំនួនថ្ងៃក្នុងមួយខែ Day number of fishing per monthថ្ងៃ
9. ចំនួនខែក្នុងមួយឆ្នាំ Month number of fishing per year.....ខែ
10. តើមានប៉ុន្មានគ្រួសារដែលកំពុងធ្វើការនេសាទក្នុងភូមិ? How many families are doing fishing activity in the village?
11. ឧបករណ៍នេសាទដែលកំពុងប្រើប្រាស់ being used fishing gears

Code	ប្រភេទឧបករណ៍ Types of fishing gears	ចំនួន Number	ប្រវែង (ម៉ែត្រ) Length (m)	តម្លៃសរុប(រៀល) Total cost (Riel)	រយៈ ពេល អាចប្រើ បាន Life span
1	លបក្តាម Crab trap				
2	លបមីក Squid trap				
3	លបត្រី Fish trap				
4	សន្លូច long line Hook				
5	អូនហ៊ុំ Circle seine				
6	រារាំងដៃដោយដៃ Catching by hand				
7	នីបរុញដោយដៃ Push net				
8	នីបរុញដោយម៉ាស៊ីន Push net with machine				
9	សំណាញ់ cast net				
10	មងត្រី Gill net				
11	មងត្រីកាម៉ុង Mackerel gill net				
12	ទូកអូស trawler vessel				
13	ឧបករណ៍ផ្សេងៗទៀត Other				

12. ប្រភេទធនធានជលផលសំខាន់ៗចំនួន៥ប្រភេទដែលចាប់បាន Main 5 fish species caught

Rank	ប្រភេទ Species	មានប៉ុន្មានភាគរយ (%)	តម្លៃក្នុង១គីឡូក្រាម Riel/Kg
1			
2			
3			
4			
5			

13. សក្តានុពលនៃការចាប់ត្រីកាម៉ុងតាមខែ (គីឡូក្រាម) Catching fish by month (Kg)

	មករា Jan	កុម្ភៈ Feb	មីនា Mar	មេសា April	ឧសភា May	មិថុនា June	កក្កដា July	សីហា Aug	កញ្ញា Sep	តុលា Oct	វិច្ឆិកា Nov	ធ្នូ Dec

ទម្ងន់សរុប(ត្រីចម្រុះ) Total catch (%)												
សរុប% (ត្រីកាម៉ុង) % of mackerel												
តម្លៃត្រីកាម៉ុង/គីឡូក្រាម Mackerel price (Riel/Kg)												
ទម្ងន់ត្រីកាម៉ុងក្នុងមួយក្បាល mackerel weight /head (g)												
ប្រភេទឧបករណ៍ Types of fishing gear												
ប្រវែងមងត្រីកាម៉ុង Length of mackerel gill net (m)												
ទំហំក្រឡាមង mesh size (mm)												
ទីតាំងនេសាទ (ប្រើលេខកូដខាងក្រោម) fishing ground (Using fishing location code below)												

សម្គាល់ទីតាំងនេសាទ៖ Remark fishing ground

1. កោះយ៉ូ Yor Koh
2. កោះគុជ Koh Kuch
3. មុខពាមក្រសែប Opposite Peam Krasob
4. មុខកោះកាពិ Opposite Koh Kapi
5. កោះកុងក្រៅ Outside Koh Kong
6. កោះស្លាម Koh chlarm
7. ទីតាំងផ្សេងៗទៀត Other

14. និន្នាការនៃផលត្រីកាម៉ុងដែលចាប់បានចាប់ពីឆ្នាំ២០១០ ដល់២០១៨ Trend of fish production of mackerel from 2010 to 2018

ឆ្នាំ Year	2010	2011	2012	2013	2014	2015	2016	2017	2018
កំប្រុក Production (Kg)									
ចំនួនទូកត្រីកាម៉ុង Vessel Number									
ចំនួនអ្នកនេសាទ Fishermen number									

III. ការវិភាគសេដ្ឋកិច្ច Economic analysis

15. ការចំណាយក្នុងមួយដើងៗ

មុខចំណាយ Items	ឯកតា (Unit)	តម្លៃក្នុង១ឯកតា (រៀល) Unit Cost /Riel	ចំណាយសរុប (រៀល) Total Cost/Riel
អាហារ Food			
កម្មករ Labor	មនុស្ស Person		
អ្នកបើកទូក Boat Driver	មនុស្ស Person		
ប្រេង (សាំង ម៉ាស៊ូត ប្រេងម៉ាស៊ីន) Gasoline	លីត្រ Liter		
ជួសជុលមង Repairing Gill net			
ជួសជុលទូក Repairing Boat			
ចំណាយផ្សេងៗ Other expenditures			
Total			

16. មួយដើងៗបានចំណូលប៉ុន្មាន? How much you can get income/time (Riel)

17. ការចែកចាយផលត្រីកាម៉ុង Mackerel distribution

- 17.1 កន្លែងឡើងត្រី៖ how many of landing site..... %
- 17.2 លក់ដុំ how many of fish trader.....%
- 17.3 លក់រាយ how many of retailer%
- 17.4 អាហារប្រចាំថ្ងៃ how many of daily consumption%

18. បញ្ហាក្នុងសកម្មភាពនេសាទ៖ Meeting Constrains during fishing activity

19. សូមសរសេរឱ្យអស់នូវត្រីនិងធនធានផលដែលអ្នកនេសាទចាប់បានក្នុងទីតាំងដែលកាត់នេសាទ

Please write all fish species catching at above mentioned fishing ground

ANNEX 4

Participants' Photos attending the baseline survey of short mackerel gonad development from 09 to 14 September 2019 in Koh Kong province





ANNEX 5

Database of short mackerel collected from local market in Koh Kong on 09 to 14 September 2019

No	TL	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD ¹
KKDT0001	17.3	15.2	3.7	54.0	M	1	0.00	0.00	DT Market	SM	10/9/19	4.11
KKDT0002	15.5	13.6	3.6	36.4	M	1	0.00	0.00	DT Market	SM	10/9/19	3.78
KKDT0003	15.5	13.7	3.3	36.3	F	1	0.00	0.00	DT Market	SM	10/9/19	4.15
KKDT0004	16.0	14.0	3.5	39.2	M	1	0.00	0.00	DT Market	SM	10/9/19	4.00
KKDT0005	17.5	15.6	3.8	54.5	M	1	0.00	0.00	DT Market	SM	10/9/19	4.11
KKDT0006	16.0	14.0	3.4	40.7	F	1	0.00	0.00	DT Market	SM	10/9/19	4.12
KKDT0007	17.7	15.6	3.8	52.1	M	5	0.60	1.15	DT Market	SM	10/9/19	4.11
KKDT0008	16.0	14.1	3.4	43.0	M	1	0.00	0.00	DT Market	SM	10/9/19	4.15
KKDT0009	15.5	13.9	3.4	37.6	F	1	0.00	0.00	DT Market	SM	10/9/19	4.09
KKDT0010	16.5	14.6	3.4	42.3	F	1	0.00	0.00	DT Market	SM	10/9/19	4.29
KKDT0011	15.0	13.4	3.2	33.7	F	1	0.00	0.00	DT Market	SM	10/9/19	4.19
KKDT0012	15.9	14.0	3.3	40.1	F	1	0.00	0.00	DT Market	SM	10/9/19	4.24
KKDT0013	16.0	14.2	3.6	40.0	F	2	0.30	0.75	DT Market	SM	10/9/19	3.94
KKDT0014	16.2	14.4	3.4	41.8	M	1	0.00	0.00	DT Market	SM	10/9/19	4.24
KKDT0015	15.3	13.7	3.4	36.3	M	2	0.30	0.83	DT Market	SM	10/9/19	4.03
KKDT0016	15.2	13.2	3.4	35.4	F	2	0.20	0.56	DT Market	SM	10/9/19	3.88
KKDT0017	16.2	14.9	3.8	52.4	F	1	0.00	0.00	DT Market	SM	10/9/19	3.92
KKDT0018	15.1	13.5	3.3	34.5	M	1	0.00	0.00	DT Market	SM	10/9/19	4.09
KKDT0019	16.0	14.4	3.5	42.2	F	1	0.00	0.00	DT Market	SM	10/9/19	4.11
KKDT0020	16.3	14.6	3.4	44.7	F	1	0.00	0.00	DT Market	SM	10/9/19	4.29
KKDT0021	16.3	14.4	3.5	44.6	M	5	0.00	0.00	DT Market	SM	10/9/19	4.11
KKDT0022	17.3	15.3	3.8	57.5	F	5	0.60	1.04	DT Market	SM	10/9/19	4.03
KKDT0023	16.9	15.0	3.6	51.1	F	1	0.00	0.00	DT Market	SM	10/9/19	4.17

¹ Fork Length (FL)/Body Deep(BD): less than or equal to 4.30 is short mackerel (SM), *Rastrelliger brachysoma*
more than 4.30 is long mackerel (LM), *Rastrelliger kanagurta*

No	TL	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD ¹
KKDT0024	16.5	14.9	3.5	43.9	M	1	0.00	0.00	DT Market	SM	10/9/19	4.26
KKDT0025	15.1	13.2	3.2	33.9	F	1	0.00	0.00	DT Market	SM	10/9/19	4.13
KKDT0026	16.0	14.3	3.4	45.4	F	1	0.00	0.00	DT Market	SM	10/9/19	4.21
KKDT0027	18.0	16.0	3.6	52.0	M	1	0.00	0.00	DT Market	LM	10/9/19	4.44
KKDT0028	15.3	13.5	3.6	33.6	F	1	0.00	0.00	DT Market	SM	10/9/19	3.75
KKDT0029	15.9	14.0	3.4	40.8	M	2	0.20	0.49	DT Market	SM	10/9/19	4.12
KKDT0030	15.1	13.5	3.2	34.3	F	1	0.00	0.00	DT Market	SM	10/9/19	4.22
KKDT0031	16.4	14.6	3.2	41.2	ND	ND	ND	ND	DT Market	LM	10/9/19	4.56
KKDT0032	16.0	14.0	3.5	43.0	F	3	0.30	0.70	DT Market	SM	10/9/19	4.00
KKDT0033	18.0	15.3	3.9	59.7	M	5	0.00	0.00	DT Market	SM	10/9/19	3.92
KKDT0034	16.0	14.1	3.4	44.0	M	3	0.80	1.82	DT Market	SM	10/9/19	4.15
KKDT0035	15.3	13.6	3.4	40.9	M	1	0.00	0.00	DT Market	SM	10/9/19	4.00
KKDT0036	15.7	14.1	3.3	36.8	ND	ND	ND	ND	DT Market	LM	10/9/19	4.27
KKDT0037	15.8	14.0	3.4	38.2	M	1	0.00	0.00	DT Market	SM	10/9/19	4.12
KKDT0038	16.0	14.0	3.3	37.7	M	1	0.00	0.00	DT Market	SM	10/9/19	4.24
KKDT0039	17.0	15.1	3.6	51.8	M	2	0.00	0.00	DT Market	SM	10/9/19	4.19
KKDT0040	15.0	13.2	3.2	30.2	F	1	0.00	0.00	DT Market	SM	10/9/19	4.13
KKDT0041	15.5	13.9	3.4	33.1	F	1	0.00	0.00	DT Market	SM	10/9/19	4.09
KKDT0042	16.2	14.1	3.6	43.8	F	1	0.00	0.00	DT Market	SM	10/9/19	3.92
KKDT0043	15.1	13.5	3.4	38.3	F	1	0.00	0.00	DT Market	SM	10/9/19	3.97
KKDT0044	16.5	14.7	3.2	44.0	M	1	0.00	0.00	DT Market	LM	10/9/19	4.59
KKDT0045	16.0	14.2	3.4	42.8	M	1	0.00	0.00	DT Market	SM	10/9/19	4.18
KKDT0046	15.9	14.1	3.2	33.2	ND	ND	ND	ND	DT Market	SM	10/9/19	4.41
KKV40001	19.0	16.5	3.9	65.1	M	5	0.00	0.00	Village 4Market	SM	10/9/19	4.23
KKV40002	17.4	15.5	3.8	53.7	M	2	0.90	1.68	Village 4Market	SM	10/9/19	4.08
KKV40003	17.5	15.4	3.9	57.8	F	4	1.40	2.42	Village 4Market	SM	10/9/19	3.95
KKV40004	17.2	15.2	3.5	49.8	M	1	0.00	0.00	Village 4Market	SM	10/9/19	4.34

No	TL	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD ¹
KKV40005	17.0	15.0	3.7	51.8	F	4	2.00	3.86	Village 4Market	SM	10/9/19	4.05
KKV40006	17.1	15.0	3.9	58.6	M	ND	ND	ND	Village 4Market	SM	10/9/19	3.85
KKV40007	16.6	14.5	3.7	48.1	F	4	0.80	1.66	Village 4Market	SM	10/9/19	3.92
KKV40008	19.0	16.5	4.3	78.2	M	5	0.70	0.90	Village 4Market	SM	10/9/19	3.84
KKV40009	16.2	14.5	3.6	46.1	M	5	0.30	0.65	Village 4Market	SM	10/9/19	4.03
KKV40010	16.5	14.6	3.7	48.8	F	3	0.60	1.23	Village 4Market	LM	10/9/19	3.95
KKV40011	18.0	16.1	3.9	61.9	M	4	1.20	1.94	Village 4Market	SM	10/9/19	4.13