



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

**REPORT**

**THE BASELINE SURVEY OF SHORT MACKEREL AND FISH LARVAE  
COLLECTION IN KOH KONG PROVINCE IN DECEMBER 2019**

**KOH KONG, CAMBODIA  
16-21 DECEMBER 2019**

Prepared by  
**FISHERIES ADMINISTRATION, CAMBODIA**

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SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER  
TRAINING DEPARTMENT



Southeast Asian Fisheries  
Development Center



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### **1. Field Trip Objective**

- 1) To monitor the development of short mackerel gonad, to interview mackerel fishermen, and to collect sampling fish larvae in Koh Kong province funded by SEAFDEC/UNEP/GEF from 16 to 21 December 2019.

### **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):
  - Mr. Leng Sy Vann, Deputy Director of the Department of Fisheries Conservation and NSTFP
  - 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. Mab Chenda, 3<sup>rd</sup> Student of Fisheries Science Faculty, Royal University of Agriculture
  - Mr. Chin Moni, Officer of Fisheries Administration Cantonment, Koh Kong FiAC
  - Mr. Seng Bunna, Vice Chief of Fisheries Administration Division, Koh Kong FiAC

### **3. Field Trip Activities (Annex 2 and 3)**

#### **A. Collection of fish samples at landing sites and markets**

- 3) Teamwork from FiA and FiAC went down to collect the fish sampling at the local markets including Village 4 market and Dorng Tung market and the 8kg of fish was bought to monitor the development of its gonad (see annex 2).

#### **B. Operate fish to monitor its gonad development**

- 4) 100 fish sampling is operated to monitor its gonad development, including 33 females, 65 males, and other two fish for non sex (Annex 4).
- 5) According to data analysis for female, its average body weight is 61.31g and average body length is 17.28cm. For its gonad stage, it varies from 1<sup>st</sup> stage to 5<sup>th</sup> stage, including 2 fish in 1<sup>st</sup> stage, 15 fish in 3<sup>rd</sup> stage, 6 fish in 4<sup>th</sup> stage and 10 fish in 5<sup>th</sup> stage. For an average gonad weight it is 1.53g
- 6) As for data analysis for male, its average body weight is 56.89g and average body length is 16.83cm. For its gonad stage, it varies from 1<sup>st</sup> stage to 5<sup>th</sup> stage, including 3 fish in 1<sup>st</sup> stage, 3 fish in 2<sup>nd</sup> stage, 23 fish in 3<sup>rd</sup> stage, and 19 fish in 4<sup>th</sup> stage, and 17 fish in 5<sup>th</sup> stage. For an average gonad weight it is 1.38g

#### **C. Preparing and storing DNA**

- 7) Teamwork prepared and cut the part of 30 fish body that are stored in small plastic tubes with ethanol of 99.7% to study and analyze its DNA.

#### **D. Fish sampling larvae collection**

- 8) 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, including 4 stations at Peam Krasob sites, 2 stations at Chroy Pros, and other 2 stations at Koh Yor sites. The bongo net with the size of 1 m diameter and 5 meter length was applied to collect sampling fish larvae and two times/station was applied 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 16 to 21 December 2019 in Koh Kong province**

<b>No.</b>	<b>Name</b>	<b>Sex</b>	<b>Title</b>	<b>Organization</b>	<b>Telephone</b>
1	Leng Sy Vann	M	Deputy Director	DFC/FiA	017446373
2	Ly Sokta	F	Officer	DFC/FiA	092653427
3	Lieng Saroeun	M	Vice chief of Crocodile industrial and conservation division	DFC/FiA	092660267
4	Mab Chenda	F	3 <sup>rd</sup> year-student	Fisheries Faculty/RUA	077511674
5	Rous Saret	M	Officer	DFC/FiA	011664696
6	Seng Bunna	M	Vice chief of Fisheries Administration Division	Koh Kong FiAC	016885709
7	Nou Ngoy	M	Vice chief of Fisheries Administration Division	Koh Kong FiAC	016933192

**ANNEX 2****Schedule for baseline survey of short mackerel gonad development from 16 to 21 December 2019 in Koh Kong province**

<b>Date/Time</b>	<b>Description</b>	<b>Responsible person</b>
<b>16 December 2019</b>		
9:00am-4:00pm	Leaving Phnom Penh for Koh Kong	<ul style="list-style-type: none"> <li>• Mr. Lieng Saroeun,</li> <li>• Mr. Leng Sy Vann,</li> <li>• Ms. Ly Sokta, and</li> <li>• Mr. Rous Saret</li> <li>• Ms. Mab Chenda</li> </ul>
<b>17 December 2019</b>		
9:00am- 12:00pm	Collect sampling short mackerel at Dorng 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
<b>18 December 2019</b>		
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
<b>19 December 2019</b>		
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
<b>20 December 2019</b>		
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
<b>21 December 2019</b>		
9:00am-4:00pm	Leaving Koh Kong for Phnom Penh	All

**ANNEX 3**

**Participants' Photos attending the baseline survey of short mackerel gonad development from 16 to 21 December 2019 in Koh Kong province**





## ANNEX 4

## Database of short mackerel collected from local market in Koh Kong on 20 December 2019

Code No.	TL	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD <sup>1</sup>
KKDT0001	17.0	15.3	4.0	62.4	M	3	1.30	2.08	DT Market	SM	20/12/19	3.83
KKDT0002	18.0	16.0	4.1	70.3	M	3	1.70	2.42	DT Market	SM	20/12/19	3.90
KKDT0003	17.0	15.1	3.8	53.9	M	2	0.70	1.30	DT Market	SM	20/12/19	3.97
KKDT0004	17.0	15.0	4.0	59.2	M	3	2.00	3.38	DT Market	SM	20/12/19	3.75
KKDT0005	17.0	15.0	3.7	56.9	M	2	1.30	2.28	DT Market	SM	20/12/19	4.05
KKDT0006	18.3	16.5	4.1	72.3	M	4	2.60	3.60	DT Market	SM	20/12/19	4.02
KKDT0007	16.5	14.9	3.8	54.4	M	3	1.40	2.57	DT Market	SM	20/12/19	3.92
KKDT0008	16.3	14.8	3.7	53.1	M	5	0.80	1.51	DT Market	SM	20/12/19	4.00
KKDT0009	16.9	15.1	3.8	57.4	M	5	0.80	1.39	DT Market	SM	20/12/19	3.97
KKDT0010	18.0	15.9	4.0	66.3	M	3	1.20	1.81	DT Market	SM	20/12/19	3.98
KKDT0011	16.8	15.0	3.8	57.8	M	4	1.10	1.90	DT Market	SM	20/12/19	3.95
KKDT0012	16.7	14.9	3.7	51.2	M	4	0.30	0.59	DT Market	SM	20/12/19	4.03
KKDT0013	17.5	15.5	3.9	61.5	F	5	0.90	1.46	DT Market	SM	20/12/19	3.97
KKDT0014	18.0	16.0	3.8	67.4	F	3	1.10	1.63	DT Market	SM	20/12/19	4.21
KKDT0015	17.0	15.1	3.9	59.7	M	2	0.70	1.17	DT Market	SM	20/12/19	3.87
KKDT0016	17.3	15.2	3.9	60.0	M	5	1.00	1.67	DT Market	SM	20/12/19	3.90
KKDT0017	16.0	14.4	3.7	52.4	M	3	0.30	0.57	DT Market	SM	20/12/19	3.89
KKDT0018	17.0	15.0	3.8	60.8	F	5	0.60	0.99	DT Market	SM	20/12/19	3.95
KKDT0019	16.8	14.9	3.7	52.3	M	3	1.70	3.25	DT Market	SM	20/12/19	4.03
KKDT0020	17.0	14.9	3.7	56.5	M	5	0.80	1.42	DT Market	SM	20/12/19	4.03
KKDT0021	16.5	15.0	3.6	53.5	M	1	0.00	0.00	DT Market	SM	20/12/19	4.17
KKDT0022	16.2	14.8	3.4	48.8	M	3	1.10	2.25	DT Market	LM	20/12/19	4.35

<sup>1</sup> 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*.



Code No.	TL	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD <sup>1</sup>
KKDT0023	17.1	15.2	3.9	59.8	F	3	1.10	1.84	DT Market	SM	20/12/19	3.90
KKDT0024	17.5	15.5	4.0	67.4	M	5	0.80	1.19	DT Market	SM	20/12/19	3.88
KKDT0025	16.8	14.9	3.7	54.2	M	5	0.80	1.48	DT Market	SM	20/12/19	4.03
KKDT0026	16.0	14.3	3.5	48.7	M	3	1.60	3.29	DT Market	SM	20/12/19	4.09
KKDT0027	16.9	15.0	3.8	61.9	M	4	1.80	2.91	DT Market	SM	20/12/19	3.95
KKDT0028	17.2	15.3	3.9	61.9	F	5	1.10	1.78	DT Market	SM	20/12/19	3.92
KKDT0029	18.3	16.3	4.0	76.5	F	3	2.90	3.79	DT Market	SM	20/12/19	4.08
KKDT0030	17.0	15.1	3.7	59.0	M	4	1.30	2.20	DT Market	SM	20/12/19	4.08
KKDT0031	16.1	14.3	3.6	49.3	M	5	1.20	2.43	DT Market	SM	20/12/19	3.97
KKDT0032	16.9	15.0	3.8	59.3	M	3	1.70	2.87	DT Market	SM	20/12/19	3.95
KKDT0033	17.3	15.7	3.7	58.9	F	3	1.30	2.21	DT Market	SM	20/12/19	4.24
KKDT0034	17.2	15.3	3.8	62.2	F	1	0.00	0.00	DT Market	SM	20/12/19	4.03
KKDT0035	17.0	15.0	3.9	62.4	M	4	2.30	3.69	DT Market	SM	20/12/19	3.85
KKDT0036	17.5	15.7	3.9	56.4	F	3	2.70	4.79	DT Market	SM	20/12/19	4.03
KKDT0037	17.8	15.9	3.9	64.2	M	4	2.30	3.58	DT Market	SM	20/12/19	4.08
KKDT0038	17.0	15.1	3.9	60.5	M	3	2.20	3.64	DT Market	SM	20/12/19	3.87
KKDT0039	18.0	16.0	4.1	69.4	F	3	1.40	2.02	DT Market	SM	20/12/19	3.90
KKDT0040	17.5	15.6	4.0	70.7	F	3	1.50	2.12	DT Market	SM	20/12/19	3.90
KKDT0041	17.6	15.6	3.9	69.0	F	3	1.50	2.17	DT Market	SM	20/12/19	4.00
KKDT0042	17.2	15.4	3.9	65.8	F	4	2.40	3.65	DT Market	SM	20/12/19	3.95
KKDT0043	17.5	15.8	4.0	67.1	F	3	1.10	1.64	DT Market	SM	20/12/19	3.95
KKDT0044	16.7	14.9	3.8	56.3	M	4	1.20	2.13	DT Market	SM	20/12/19	3.92
KKDT0045	18.1	16.0	3.9	69.4	M	3	1.20	1.73	DT Market	SM	20/12/19	4.10
KKDT0046	16.9	15.0	3.8	56.2	M	5	1.50	2.67	DT Market	SM	20/12/19	3.95
KKDT0047	17.8	15.9	3.8	63.8	F	5	0.80	1.25	DT Market	SM	20/12/19	4.18
KKDT0048	17.4	15.8	3.9	66.0	F	4	1.30	1.97	DT Market	SM	20/12/19	4.05
KKDT0049	17.0	15.0	3.8	61.1	F	4	7.70	12.60	DT Market	SM	20/12/19	3.95
KKDT0050	17.0	15.0	3.8	59.1	M	3	2.10	3.55	DT Market	SM	20/12/19	3.95

Code No.	TL	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD <sup>1</sup>
KKV40001	17.0	15.3	3.7	61.4	F	3	2.20	3.58	Village 4 Market	SM	20/12/19	4.14
KKV40002	17.2	15.2	3.8	62.1	M	1	0.00	0.00	Village 4 Market	SM	20/12/19	4.00
KKV40003	17.1	15.3	3.8	66.0	M	5	2.00	3.03	Village 4 Market	SM	20/12/19	4.03
KKV40004	17.3	15.5	3.7	59.1	F	5	0.00	0.00	Village 4 Market	SM	20/12/19	4.19
KKV40005	17.0	15.0	3.7	58.2	M	4	1.90	3.26	Village 4 Market	SM	20/12/19	4.05
KKV40006	17.0	15.0	3.9	57.3	M	4	1.60	2.79	Village 4 Market	SM	20/12/19	3.85
KKV40007	17.5	15.8	4.0	68.8	F	4	1.60	2.33	Village 4 Market	SM	20/12/19	3.95
KKV40008	17.0	15.1	3.7	55.2	F	3	2.00	3.62	Village 4 Market	SM	20/12/19	4.08
KKV40009	16.0	14.6	3.5	50.4	F	3	1.00	1.98	Village 4 Market	SM	20/12/19	4.17
KKV40010	17.3	15.3	3.9	60.5	M	5	0.60	0.99	Village 4 Market	SM	20/12/19	3.92
KKV40011	16.7	15.0	3.5	51.9	F	5	0.00	0.00	Village 4 Market	SM	20/12/19	4.29
KKV40012	17.0	15.2	3.7	54.6	F	5	0.70	1.28	Village 4 Market	SM	20/12/19	4.11
KKV40013	16.6	15.0	3.7	55.1	M	5	2.20	3.99	Village 4 Market	SM	20/12/19	4.05
KKV40014	17.5	15.4	3.8	59.1	F	5	0.00	0.00	Village 4 Market	SM	20/12/19	4.05
KKV40015	16.6	14.9	3.7	54.7	M	5	0.60	1.10	Village 4 Market	SM	20/12/19	4.03
KKV40016	16.0	14.4	3.5	51.2	M	1	0.00	0.00	Village 4 Market	SM	20/12/19	4.11
KKV40017	16.8	15.1	3.5	57.1	M	4	2.20	3.85	Village 4 Market	SM	20/12/19	4.31
KKV40018	17.2	15.3	3.7	63.2	M	3	1.30	2.06	Village 4 Market	SM	20/12/19	4.14
KKV40019	17.8	16.2	3.8	66.3	F	4	2.00	3.02	Village 4 Market	SM	20/12/19	4.26
KKV40020	16.1	14.5	3.5	48.6	ND	ND	ND	ND	Village 4 Market	SM	20/12/19	4.14
KKV40021	16.5	14.8	3.4	52.7	M	3	1.20	2.28	Village 4 Market	LM	20/12/19	4.35
KKV40022	16.4	14.7	3.4	50.0	F	5	0.50	1.00	Village 4 Market	LM	20/12/19	4.32
KKV40023	15.2	13.9	3.3	42.7	M	3	1.20	2.81	Village 4 Market	SM	20/12/19	4.21
KKV40024	16.7	15.1	3.6	54.0	M	4	1.60	2.96	Village 4 Market	SM	20/12/19	4.19
KKV40025	18.0	16.2	4.0	65.7	F	5	0.80	1.22	Village 4 Market	SM	20/12/19	4.05
KKV40026	16.8	15.2	3.2	50.0	ND	ND	ND	ND	Village 4 Market	LM	20/12/19	4.75
KKV40027	17.0	15.2	3.7	58.2	F	3	0.90	1.55	Village 4 Market	SM	20/12/19	4.11

Code No.	TL	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD <sup>1</sup>
KKV40028	17.0	15.2	3.7	57.0	M	3	0.70	1.23	Village 4 Market	LM	20/12/19	4.11
KKV40029	16.4	14.7	3.5	50.6	M	4	2.00	3.95	Village 4 Market	SM	20/12/19	4.20
KKV40030	17.8	16.4	3.8	68.4	M	4	1.80	2.63	Village 4 Market	LM	20/12/19	4.32
KKV40031	16.5	14.8	3.5	48.4	M	3	1.10	2.27	Village 4 Market	SM	20/12/19	4.23
KKV40032	17.0	15.4	3.7	58.5	M	3	2.20	3.76	Village 4 Market	SM	20/12/19	4.16
KKV40033	16.3	14.8	3.5	55.5	M	3	1.20	2.16	Village 4 Market	SM	20/12/19	4.23
KKV40034	18.2	16.4	4.0	71.0	M	5	0.00	0.00	Village 4 Market	SM	20/12/19	4.10
KKV40035	16.2	14.6	3.6	49.8	M	4	1.00	2.01	Village 4 Market	SM	20/12/19	4.06
KKV40036	16.4	14.8	3.7	53.8	M	3	1.50	2.79	Village 4 Market	SM	20/12/19	4.00
KKV40037	16.7	15.1	3.5	55.5	M	4	1.60	2.88	Village 4 Market	LM	20/12/19	4.31
KKV40038	17.0	15.5	3.8	60.1	F	3	0.60	1.00	Village 4 Market	SM	20/12/19	4.08
KKV40039	16.0	14.5	3.7	50.8	M	3	1.00	1.97	Village 4 Market	SM	20/12/19	3.92
KKV40040	16.4	14.6	3.5	50.0	M	3	0.60	1.20	Village 4 Market	SM	20/12/19	4.17
KKV40041	17.0	15.3	3.7	55.3	F	4	0.50	0.90	Village 4 Market	SM	20/12/19	4.14
KKV40042	16.4	15.3	3.7	55.4	M	5	0.00	0.00	Village 4 Market	SM	20/12/19	4.14
KKV40043	17.0	15.1	3.6	54.7	M	4	1.60	2.93	Village 4 Market	SM	20/12/19	4.19
KKV40044	17.3	15.3	3.7	60.0	M	5	1.90	3.17	Village 4 Market	SM	20/12/19	4.14
KKV40045	16.8	15.0	3.3	52.6	F	1	0.00	0.00	Village 4 Market	LM	20/12/19	4.55
KKV40046	17.0	15.4	3.7	56.3	F	3	0.60	1.07	Village 4 Market	SM	20/12/19	4.16
KKV40047	17.0	15.1	3.7	54.8	M	4	1.90	3.47	Village 4 Market	SM	20/12/19	4.08
KKV40048	16.0	14.2	3.5	49.5	M	5	0.90	1.82	Village 4 Market	SM	20/12/19	4.06
KKV40049	16.4	14.8	3.6	54.2	M	4	1.60	2.95	Village 4 Market	SM	20/12/19	4.11
KKV40050	16.2	14.6	3.6	54.1	M	5	0.90	1.66	Village 4 Market	SM	20/12/19	4.06