



**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 NOVEMBER 2019**

**KOH KONG, CAMBODIA  
18-23 NOVEMBER 2019**

Prepared by  
**FISHERIES ADMINISTRATION, CAMBODIA**

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SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER  
TRAINING DEPARTMENT



First published in Phrasamutchedi, Samut Prakan, Thailand in November 2019 by the SEAFDEC-UNEP-GEF Fisheries Refugia Project, Training Department of the Southeast Asian Fisheries Development Center

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For citation purposes this document may be cited as:

FIA/Cambodia, 2019. Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand, Report of the Baseline Survey of Short Mackerel and Fish Larvae Collection in Koh Kong Province in November 2019. Southeast Asian Fisheries Development Center, Training Department, Samut Prakan, Thailand; FR/REP/CAM57, 12 p.

### 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 18 to 23 November 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. 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 (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 Dornng Tung market and the 10kg of fish was bought to monitor the development of its gonad (see **Annex 2**).

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

- 4) 101 fish sampling is operated to monitor its gonad development, including 50 females, 50 males, and one fish for non sex (**Annex 4**).
- 5) According to data analysis for female, its average body weight is 60.41g and average body length is 17.48cm. For its gonad stage, it varies from 1<sup>st</sup> stage to 4<sup>th</sup> stage, including one fish in 1<sup>st</sup> stage, 8 fish in 2<sup>nd</sup> stage, 33 fish in 3<sup>rd</sup> stage, and 8 fish in 4<sup>th</sup> stage. For an average gonad weight it is 2.08g.
- 6) As for data analysis for male, its average body weight is 53.75g and average body length is 16.95cm. For its gonad stage, it varies from 2<sup>nd</sup> stage to 5<sup>th</sup> stage, including 3 fish in 2<sup>nd</sup> stage, 30 fish in 3<sup>rd</sup> stage, and 16 fish in 4<sup>th</sup> stage, and one fish in 5<sup>th</sup> stage. For an average gonad weight it is 2.00g

#### 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 18 to 23 November 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 18 to 23 November 2019 in Koh Kong province**

<b>Date/Time</b>	<b>Description</b>	<b>Responsible person</b>
<b>18 November 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>19 November 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>20 November 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>21 November 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>22 November 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>23 November 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 18 to 23 November 2019 in Koh Kong province**





**ANNEX 4**  
**Database of short mackerel collected from local market in Koh Kong on 22 November 2019**

Code No.	TL	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD <sup>1</sup>
KKDT0001	19.0	17.0	4.0	77.9	F	4	4.00	5.13	DT Market	SM	22/11/19	4.25
KKDT0002	17.1	15.2	3.7	56.2	F	3	1.80	3.20	DT Market	SM	22/11/19	4.11
KKDT0003	18.1	16.0	3.9	66.7	M	4	4.60	6.90	DT Market	SM	22/11/19	4.10
KKDT0004	17.0	15.0	3.7	53.4	F	4	1.70	3.18	DT Market	SM	22/11/19	4.05
KKDT0005	18.2	16.2	4.0	63.0	M	3	1.70	2.70	DT Market	SM	22/11/19	4.05
KKDT0006	16.4	14.8	3.7	54.4	F	3	3.60	6.62	DT Market	SM	22/11/19	4.00
KKDT0007	17.6	15.7	3.8	59.1	M	4	2.50	4.23	DT Market	SM	22/11/19	4.13
KKDT0008	19.2	17.2	4.1	77.2	F	3	2.30	2.98	DT Market	SM	22/11/19	4.20
KKDT0009	16.6	14.7	3.7	50.6	M	3	2.20	4.35	DT Market	SM	22/11/19	3.97
KKDT0010	17.0	15.2	3.6	52.7	M	3	0.90	1.71	DT Market	SM	22/11/19	4.22
KKDT0011	16.7	14.9	3.8	54.9	M	3	1.40	2.55	DT Market	SM	22/11/19	3.92
KKDT0012	18.0	16.1	3.8	65.8	F	4	3.30	5.02	DT Market	SM	22/11/19	4.24
KKDT0013	19.0	17.0	4.1	72.5	M	4	1.80	2.48	DT Market	SM	22/11/19	4.15
KKDT0014	19.0	17.3	4.1	88.4	F	3	1.70	1.92	DT Market	SM	22/11/19	4.22
KKDT0015	17.9	15.9	3.9	62.7	F	4	1.80	2.87	DT Market	SM	22/11/19	4.08
KKDT0016	16.0	14.2	3.3	45.1	M	4	0.70	1.55	DT Market	SM	22/11/19	4.30
KKDT0017	16.5	14.8	3.4	48.7	M	3	1.70	3.49	DT Market	LM	22/11/19	4.35
KKDT0018	16.8	14.8	3.4	49.3	M	3	1.90	3.85	DT Market	LM	22/11/19	4.35
KKDT0019	17.2	15.6	3.4	54.1	M	3	1.20	2.22	DT Market	LM	22/11/19	4.59
KKDT0020	18.7	17.0	3.7	70.1	F	1	0.00	0.00	DT Market	LM	22/11/19	4.59
KKDT0021	16.8	15.1	3.6	57.3	F	3	3.40	5.93	DT Market	SM	22/11/19	4.19
KKDT0022	17.5	15.5	3.7	61.5	F	3	4.80	7.80	DT Market	SM	22/11/19	4.19

<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	17.5	15.6	3.7	59.2	F	2	1.80	3.04	DT Market	SM	22/11/19	4.22
KKDT0024	16.3	15.0	3.5	51.4	M	3	3.20	6.23	DT Market	SM	22/11/19	4.29
KKDT0025	16.4	14.8	3.4	48.4	F	3	1.40	2.89	DT Market	SM	22/11/19	4.35
KKDT0026	17.8	16.0	3.8	70.5	F	3	2.90	4.11	DT Market	SM	22/11/19	4.21
KKDT0027	17.8	16.0	3.8	64.7	F	2	1.50	2.32	DT Market	SM	22/11/19	4.21
KKDT0028	16.5	14.8	3.4	47.4	M	3	2.50	5.27	DT Market	LM	22/11/19	4.35
KKDT0029	16.6	15.0	3.5	52.6	M	3	2.70	5.13	DT Market	SM	22/11/19	4.29
KKDT0030	17.0	15.2	3.6	50.5	M	3	1.60	3.17	DT Market	LM	22/11/19	4.22
KKDT0031	17.8	16.2	3.7	63.8	F	2	1.70	2.66	DT Market	LM	22/11/19	4.38
KKDT0032	16.5	14.7	3.6	47.6	M	3	1.80	3.78	DT Market	SM	22/11/19	4.08
KKDT0033	16.5	15.0	3.6	53.4	F	3	1.60	3.00	DT Market	SM	22/11/19	4.17
KKDT0034	16.1	15.0	3.6	50.3	M	3	1.50	2.98	DT Market	SM	22/11/19	4.17
KKDT0035	17.7	15.6	3.6	55.3	M	4	3.40	6.15	DT Market	LM	22/11/19	4.33
KKDT0036	16.8	15.0	3.5	53.8	M	3	2.10	3.90	DT Market	SM	22/11/19	4.29
KKDT0037	16.5	14.8	3.4	50.5	M	4	3.30	6.53	DT Market	LM	22/11/19	4.35
KKDT0038	16.7	14.9	3.6	48.5	F	3	1.00	2.06	DT Market	SM	22/11/19	4.14
KKDT0039	16.5	15.0	3.5	46.3	M	4	1.40	3.02	DT Market	SM	22/11/19	4.29
KKDT0040	16.1	14.2	3.6	45.5	M	5	0.30	0.66	DT Market	SM	22/11/19	3.94
KKDT0041	16.8	15.0	3.5	48.7	M	2	0.70	1.44	DT Market	SM	22/11/19	4.29
KKDT0042	16.3	14.4	3.5	46.1	M	3	1.30	2.82	DT Market	SM	22/11/19	4.11
KKDT0043	16.4	14.8	3.4	45.0	F	3	1.50	3.33	DT Market	LM	22/11/19	4.35
KKDT0044	17.0	15.0	3.6	50.0	F	2	1.20	2.40	DT Market	SM	22/11/19	4.17
KKDT0045	16.9	15.2	3.6	53.2	M	3	1.60	3.01	DT Market	SM	22/11/19	4.22
KKDT0046	16.9	15.0	3.7	51.3	M	3	1.30	2.53	DT Market	SM	22/11/19	4.05
KKDT0047	17.0	15.3	3.5	51.2	M	3	2.00	3.91	DT Market	LM	22/11/19	4.37
KKDT0048	17.0	15.0	3.6	51.6	F	3	1.50	2.91	DT Market	SM	22/11/19	4.17
KKDT0049	17.0	15.0	3.6	49.8	F	3	1.10	2.21	DT Market	SM	22/11/19	4.17
KKDT0050	16.8	15.2	3.6	49.9	M	2	1.40	2.81	DT Market	SM	22/11/19	4.22

Code No.	TL	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD <sup>1</sup>
KKDT0051	17.0	15.2	3.8	55.4	M	4	2.90	5.23	DT Market	SM	22/11/19	4.00
KKDT0052	16.5	14.8	3.6	47.7	M	3	1.00	2.10	DT Market	SM	22/11/19	4.11
KKDT0053	17.0	15.0	3.7	51.4	F	3	1.90	3.70	DT Market	SM	22/11/19	4.05
KKDT0054	16.2	14.6	3.6	46.4	F	2	1.10	2.37	DT Market	SM	22/11/19	4.06
KKDT0055	16.1	14.3	3.4	46.7	M	3	1.80	3.85	DT Market	SM	22/11/19	4.21
KKDT0056	16.8	14.9	3.6	48.8	F	2	1.00	2.05	DT Market	SM	22/11/19	4.14
KKDT0057	18.5	16.6	4.1	73.3	M	4	3.00	4.09	DT Market	SM	22/11/19	4.05
KKDT0058	17.3	15.2	4.0	61.4	ND	ND	ND	ND	DT Market	SM	22/11/19	3.80
KKDT0059	16.4	14.9	3.7	54.2	F	3	1.20	2.21	DT Market	SM	22/11/19	4.03
KKDT0060	16.5	14.8	3.6	49.0	M	3	2.20	4.49	DT Market	SM	22/11/19	4.11
KKV40001	17.4	15.5	3.8	61.1	M	4	2.70	4.42	Village 4 Market	SM	22/11/19	4.08
KKV40002	18.6	16.7	3.8	69.2	M	4	3.60	5.20	Village 4 Market	LM	22/11/19	4.39
KKV40003	17.7	15.1	3.7	49.9	M	4	1.50	3.01	Village 4 Market	SM	22/11/19	4.08
KKV40004	17.4	15.3	3.7	58.1	M	4	2.80	4.82	Village 4 Market	SM	22/11/19	4.14
KKV40005	17.2	15.2	3.7	58.1	F	3	2.90	4.99	Village 4 Market	SM	22/11/19	4.11
KKV40006	17.0	15.2	3.7	54.0	F	3	2.00	3.70	Village 4 Market	SM	22/11/19	4.11
KKV40007	18.8	16.6	4.0	70.0	F	3	2.60	3.71	Village 4 Market	SM	22/11/19	4.15
KKV40008	18.4	16.2	3.9	69.3	F	3	4.60	6.64	Village 4 Market	SM	22/11/19	4.15
KKV40009	17.7	15.5	3.9	64.5	F	3	2.70	4.19	Village 4 Market	SM	22/11/19	3.97
KKV40010	17.3	15.3	3.8	57.1	M	2	0.70	1.23	Village 4 Market	SM	22/11/19	4.03
KKV40011	16.7	14.9	3.5	48.9	M	4	1.70	3.48	Village 4 Market	SM	22/11/19	4.26
KKV40012	17.5	15.8	3.7	58.2	F	3	2.40	4.12	Village 4 Market	SM	22/11/19	4.27
KKV40013	16.8	14.9	3.6	53.0	M	3	2.20	4.15	Village 4 Market	SM	22/11/19	4.14
KKV40014	16.5	15.0	3.6	51.2	M	3	1.10	2.15	Village 4 Market	SM	22/11/19	4.17
KKV40015	16.1	14.3	3.4	48.5	F	3	1.50	3.09	Village 4 Market	SM	22/11/19	4.21
KKV40016	17.0	15.0	3.5	52.9	F	3	1.30	2.46	Village 4 Market	SM	22/11/19	4.29

Code No.	TL	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD <sup>1</sup>
KKV40017	17.9	15.7	3.9	61.4	F	3	1.60	2.61	Village 4 Market	SM	22/11/19	4.03
KKV40018	17.0	15.3	3.8	55.6	M	3	2.80	5.04	Village 4 Market	SM	22/11/19	4.03
KKV40019	17.9	16.0	3.8	61.5	F	3	1.30	2.11	Village 4 Market	SM	22/11/19	4.21
KKV40020	17.5	15.6	3.8	59.2	F	3	1.60	2.70	Village 4 Market	SM	22/11/19	4.11
KKV40021	19.0	17.0	4.1	75.8	F	3	1.90	2.51	Village 4 Market	SM	22/11/19	4.15
KKV40022	18.0	16.0	3.9	65.3	F	4	2.00	3.06	Village 4 Market	SM	22/11/19	4.10
KKV40023	18.5	16.5	3.9	69.6	M	4	4.20	6.03	Village 4 Market	SM	22/11/19	4.23
KKV40024	17.0	15.0	3.7	55.8	F	3	2.10	3.76	Village 4 Market	SM	22/11/19	4.05
KKV40025	17.0	15.0	3.6	53.4	F	2	1.00	1.87	Village 4 Market	SM	22/11/19	4.17
KKV40026	18.0	16.1	3.8	65.4	F	3	1.60	2.45	Village 4 Market	SM	22/11/19	4.24
KKV40027	16.5	14.9	3.7	54.3	F	2	1.30	2.39	Village 4 Market	SM	22/11/19	4.03
KKV40028	19.0	16.9	4.0	74.6	F	3	2.80	3.75	Village 4 Market	SM	22/11/19	4.23
KKV40029	17.0	15.1	3.7	58.1	F	3	1.20	2.07	Village 4 Market	SM	22/11/19	4.08
KKV40030	18.2	16.1	4.1	72.7	F	4	3.00	4.13	Village 4 Market	SM	22/11/19	3.93
KKV40031	16.0	14.2	3.4	44.7	M	3	0.80	1.79	Village 4 Market	SM	22/11/19	4.18
KKV40032	17.5	16.0	3.8	62.6	M	4	3.70	5.91	Village 4 Market	SM	22/11/19	4.21
KKV40033	17.8	15.8	3.9	63.3	F	3	1.80	2.84	Village 4 Market	SM	22/11/19	4.05
KKV40034	17.0	15.1	3.7	57.8	F	4	3.00	5.19	Village 4 Market	SM	22/11/19	4.08
KKV40035	16.5	14.7	3.5	51.0	M	3	2.50	4.90	Village 4 Market	SM	22/11/19	4.20
KKV40036	18.1	16.3	4.1	70.6	F	4	2.10	2.97	Village 4 Market	SM	22/11/19	3.98
KKV40037	16.0	14.3	3.6	44.9	M	3	1.20	2.67	Village 4 Market	SM	22/11/19	3.97
KKV40038	16.9	14.5	3.5	57.2	M	3	3.10	5.42	Village 4 Market	SM	22/11/19	4.14
KKV40039	16.0	14.5	3.5	48.8	M	3	1.30	2.66	Village 4 Market	SM	22/11/19	4.14
KKV40040	17.0	15.1	3.6	56.4	M	3	0.70	1.24	Village 4 Market	SM	22/11/19	4.19

Code No.	TL	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD <sup>1</sup>
KKV40041	17.6	15.9	3.9	65.4	F	3	2.60	3.98	Village 4 Market	SM	22/11/19	4.08