



**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 SAMPLING FISH LARVAE COLLECTION IN KOH KONG**

**KOH KONG, CAMBODIA
18-21 FEBRUARY 2020**

Prepared by
FISHERIES ADMINISTRATION, CAMBODIA

**SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER
TRAINING DEPARTMENT**



First published in Phrasamutchedi, Samut Prakan, Thailand in February 2020 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. 2020. 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 Sampling Fish Larvae Collection in Koh Kong. Southeast Asian Fisheries Development Center, Training Department, Samut Prakan, Thailand; FR/REP/CAM65, 11 p.

1. Baseline Survey Objective

To monitor the development of short mackerel gonad and to collect sampling fish larvae in Koh Kong province from 18 to 21 February 2020 funded by SEAFDEC/UNEP/GEF.

2. Involved Person in the Baseline Survey

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 & 3):

- 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
- 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. Baseline Survey Activities

3.1. Collection of fish samples at landing sites and markets

Teamwork from FiA and FiAC went down to collect the fish sampling at the local markets including Village 4 market and Dornng Tung market, in which the 9kg of fish was bought to monitor the development of its gonad (see annex 3).

3.2. Operate fish to monitor its gonad development

Sampling 99 individual fish is operated to monitor its gonad development, including 51 females and 48 males.

According to data analysis for female, its average body weight is 71.80g and average total body length is 18.13cm. For its gonad development stage, it varies from 1st stage to 5th stage, including one individual fish in 1st stage, five individual fish in 3rd stage, 30 individual fish in 4th stage, and 15 individual fish in 5th stage. As for an average gonad weight, it is 2.46g

As for data analysis for male, its average body weight is 73.29g and average total body length is 18.38cm. For its gonad development stage, it varies from 1st stage to 5th stage, including one individual fish in 1st stage, six individual fish in 3rd stage, 19 individual fish in 4th stage, and 21 individual fish in 5th stage. As for an average gonad weight, it is 2.96g

Generally, in February, an average body weight of fish is 72.55g and its average total body length is 18.25cm. As for its gonad development stage, they are mostly in 4th and 5th stage and its average gonad weight is 2.71g.

3.3. Preparing and storing DNA

Teamwork prepared and cut the part of 30 individual fish body including 15 individual fish from Dornng Tung market and other 15 individual fish from Village 4 market, which are stored in small plastic tubes with ethanol of 99.7% to study and analyze its DNA (see annex 3).

3.4. Sampling Fish Larvae collection

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, 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 harvest fish larvae in the period of every 5 minute. All sampling fish larvae were stored and kept in plastic tube with ethanol of 99.7%.

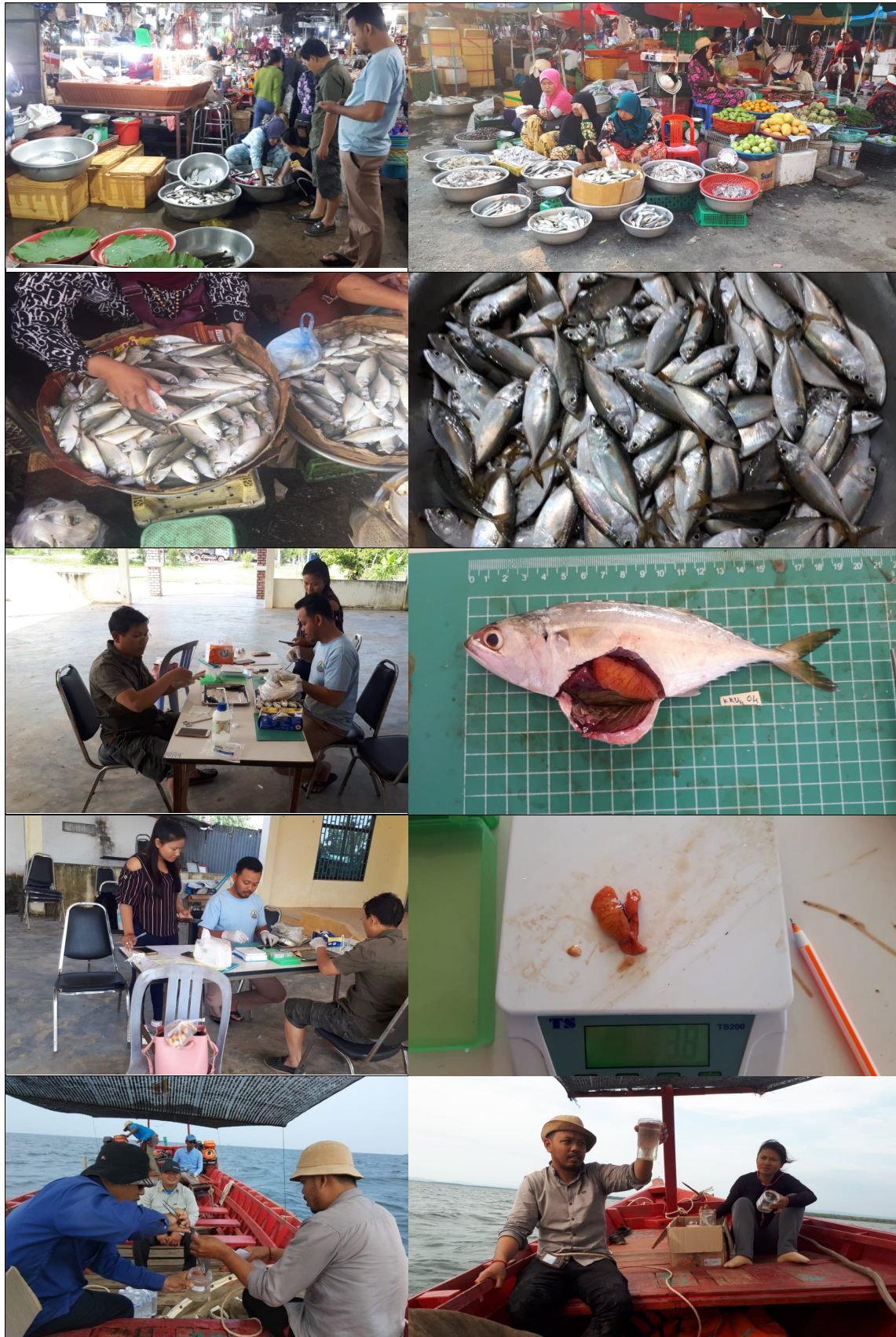
ANNEX 1: List of participants attending the baseline survey of short mackerel gonad development and fish larvae collection from 18 to 21 February 2020 in Koh Kong province

No.	Name	Sex	Title	Organization	Telephone
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	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

ANNEX 2: Schedule for the baseline survey of short mackerel gonad development and fish larvae collection from 18 to 21 February 2020 in Koh Kong province

Date/Time	Description	Responsible person
17 February 2020		
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
18 February 2020		
8:30am- 4:00pm	Sample fish larvae collection at station 2, 4, 1 and 7	All
19 February 2020		
8:30am-4:00pm	Sample fish larvae collection at station 6 and 8	All
20 February 2020		
8:30-12:00pm	Sample fish larvae collection at station 3 and 5	All
12:00pm-2:00pm	Lunch break	All
2:00pm-5:00pm	Collection of fish sampling at local market in Koh Kong province	
21 February 2020		
8:30-12:00pm	Operate fish to monitor its gonad development	All
12:00pm-2:00pm	Lunch break	All
2:00pm-5:00pm	Operate fish to monitor its gonad development	All
22 January 2020		
9:00am-4:00pm	Leaving Koh Kong for Phnom Penh	All

ANNEX 3: Participants' Photos attending the baseline survey of short mackerel gonad development and fish larvae collection from 18 to 21 February 2020 in Koh Kong province





ANNEX 4. Dataset of short mackerel gonad development and total and form length collected from local market in Koh Kong on 21 February 2020

Code No.	TL (cm)	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD ¹
KKDT0001	18.6	16.5	4.2	82.6	F	4	4.6	5.57	DT Market	SM	21/02/2020	3.93
KKDT0002	18	16.1	4	71.6	M	4	4.4	6.15	DT Market	SM	21/02/2020	4.03
KKDT0003	18	16	4	71.6	M	4	2.8	3.91	DT Market	SM	21/02/2020	4.00
KKDT0004	17.9	15.5	4	66.6	M	4	1.5	2.25	DT Market	SM	21/02/2020	3.88
KKDT0005	18.5	16.5	4	73.9	M	4	4.3	5.82	DT Market	SM	21/02/2020	4.13
KKDT0006	18	16	4	70.4	M	4	2.4	3.41	DT Market	SM	21/02/2020	4.00
KKDT0007	17.9	15.9	4	67.3	M	5	1.6	2.38	DT Market	SM	21/02/2020	3.98
KKDT0008	18	16	4	69.1	M	5	1.4	2.03	DT Market	SM	21/02/2020	4.00
KKDT0009	18.5	16.5	4.1	75	M	3	2.4	3.20	DT Market	SM	21/02/2020	4.02
KKDT0010	17.3	15.4	3.9	60	M	5	1.5	2.50	DT Market	SM	21/02/2020	3.95
KKDT0011	17.5	15.7	3.9	67	F	4	3.3	4.93	DT Market	SM	21/02/2020	4.03
KKDT0012	18.4	16.1	4.2	75.4	M	4	3.4	4.51	DT Market	SM	21/02/2020	3.83
KKDT0013	18	16	3.8	66	M	4	2	3.03	DT Market	SM	21/02/2020	4.21
KKDT0014	18	16	4	75.4	F	3	2.1	2.79	DT Market	SM	21/02/2020	4.00
KKDT0015	18.6	16.6	4.1	78.5	M	5	2.1	2.68	DT Market	SM	21/02/2020	4.05
KKDT0016	18	16.4	4.2	76.8	M	5	1.7	2.21	DT Market	SM	21/02/2020	3.90
KKDT0017	18.7	16.6	4	74	M	4	2.9	3.92	DT Market	SM	21/02/2020	4.15
KKDT0018	18	16.1	3.9	64.7	M	5	0.7	1.08	DT Market	SM	21/02/2020	4.13
KKDT0019	18	16.1	4	66.3	F	3	4.1	6.18	DT Market	SM	21/02/2020	4.03
KKDT0020	18	16.1	3.9	67.2	M	3	1.9	2.83	DT Market	SM	21/02/2020	0.24
KKDT0021	17.4	15.8	4	68.6	M	4	2.2	3.21	DT Market	SM	21/02/2020	3.95
KKDT0022	18.2	16.3	3.9	66.2	M	4	2	3.02	DT Market	SM	21/02/2020	4.18

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*.

Code No.	TL (cm)	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD ¹
KKDT0023	18.2	16.3	4	68.6	M	5	1.7	2.48	DT Market	SM	21/02/2020	4.08
KKDT0024	18.1	16.2	4.2	75	M	5	0.6	0.80	DT Market	SM	21/02/2020	3.86
KKDT0025	18.7	16.5	4.3	77.5	F	4	3.2	4.13	DT Market	SM	21/02/2020	3.84
KKDT0026	18.9	17	4.3	84.3	F	4	2.5	2.97	DT Market	SM	21/02/2020	3.95
KKDT0027	18.5	16.5	4.1	73.2	F	4	2.8	3.83	DT Market	SM	21/02/2020	4.02
KKDT0028	17.1	15.1	4	62	M	4	2.7	4.35	DT Market	SM	21/02/2020	3.78
KKDT0029	18.1	16.2	4.1	74	F	4	4	5.41	DT Market	SM	21/02/2020	3.95
KKDT0030	17.9	15.8	4.2	70.8	F	4	3.1	4.38	DT Market	SM	21/02/2020	3.76
KKDT0031	17.6	15.9	4	69.1	M	4	3.1	4.49	DT Market	SM	21/02/2020	3.98
KKDT0032	18.7	16.8	4.1	75.7	M	5	1.9	2.51	DT Market	SM	21/02/2020	4.10
KKDT0033	18	16.2	4.1	72.3	F	4	2.4	3.32	DT Market	SM	21/02/2020	3.95
KKDT0034	17.6	15.7	4.1	69.5	F	4	2.4	3.45	DT Market	SM	21/02/2020	3.83
KKDT0035	17.5	15.7	3.9	61.8	M	5	1.5	2.43	DT Market	SM	21/02/2020	4.03
KKDT0036	18.5	16.5	4.2	79.3	F	4	3.1	3.91	DT Market	SM	21/02/2020	3.93
KKDT0037	15.3	14.1	3.5	46.9	F	1			DT Market	SM	21/02/2020	4.03
KKDT0038	17.6	16	3.9	63.2	M	3	2	3.16	DT Market	SM	21/02/2020	4.10
KKDT0039	18	16	4	72.5	M	4	4	5.52	DT Market	SM	21/02/2020	4.00
KKDT0040	17.8	16.1	4	74	F	4	3.5	4.73	DT Market	SM	21/02/2020	4.03
KKDT0041	17.9	16	3.9	68	M	5	1.1	1.62	DT Market	SM	21/02/2020	4.10
KKDT0042	18.5	16.6	4.3	81.6	F	4	2.7	3.31	DT Market	SM	21/02/2020	3.86
KKDT0043	18.9	16.6	4	75.2	M	5	1.1	1.46	DT Market	SM	21/02/2020	4.15
KKDT0044	18.9	16.4	4.1	72.8	M	5	1.1	1.51	DT Market	SM	21/02/2020	4.00
KKDT0045	19	16.7	4.2	77.2	M	5	1.2	1.55	DT Market	SM	21/02/2020	3.98
KKDT0046	18.5	16.5	4.1	76.2	F	4	2.6	3.41	DT Market	SM	21/02/2020	4.02
KKDT0047	18.2	16.3	4.1	72.5	F	4	2.2	3.03	DT Market	SM	21/02/2020	3.98
KKDT0048	18.2	16.2	4.1	74.9	F	4	2.9	3.87	DT Market	SM	21/02/2020	3.95
KKDT0049	18.9	16.5	4.1	74	F	4	3	4.05	DT Market	SM	21/02/2020	4.02

Code No.	TL (cm)	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD ¹
KKDT0050	18	16	3.9	71.9	F	4	2.6	3.62	DT Market	SM	21/02/2020	4.10
KKV40001	19.9	17.7	4.2	93.7	M	5	2.5	2.67	Village 4 Market	SM	21/02/2020	4.21
KKV40002	18.2	16.2	4	72.6	F	5	0.7	0.96	Village 4 Market	SM	21/02/2020	4.05
KKV40003	20.4	18.3	4	112.7	F	4	7	6.21	Village 4 Market	LM	21/02/2020	4.58
KKV40004	18.3	16.3	4.1	76.1	F	4	3.8	4.99	Village 4 Market	SM	21/02/2020	3.98
KKV40005	19	16.9	4.1	78.3	F	4	3.2	4.09	Village 4 Market	SM	21/02/2020	4.12
KKV40006	18.8	16.4	4.1	77.9	F	4	3.9	5.01	Village 4 Market	SM	21/02/2020	4.00
KKV40007	18.3	16.3	4.1	74.8	F	3	2.2	2.94	Village 4 Market	SM	21/02/2020	3.98
KKV40008	18.7	16.4	4.1	73.9	F	5	2.1	2.84	Village 4 Market	SM	21/02/2020	4.00
KKV40009	18.2	16.2	4.1	75.8	F	5	3.7	4.88	Village 4 Market	SM	21/02/2020	3.95
KKV40010	19.3	17	4.2	78	F	3	5	6.41	Village 4 Market	SM	21/02/2020	4.05
KKV40011	18.2	16.2	3.9	72.7	F	4	2.9	3.99	Village 4 Market	SM	21/02/2020	4.15
KKV40012	19	17	4.2	76.9	F	4	3.5	4.55	Village 4 Market	SM	21/02/2020	4.05
KKV40013	18.1	16.2	4.1	74.8	M	4	3.7	4.95	Village 4 Market	SM	21/02/2020	3.95
KKV40014	17.7	15.8	3.9	69.3	F	5	1.1	1.59	Village 4 Market	SM	21/02/2020	4.05
KKV40015	18	16	3.8	63.4	M	5	0.4	0.63	Village 4 Market	SM	21/02/2020	0.25
KKV40016	19.3	17.3	4.2	80.6	F	3	1.9	2.36	Village 4 Market	SM	21/02/2020	4.12
KKV40017	18.9	16.6	4.1	78.2	M	5	0.9	1.15	Village 4 Market	SM	21/02/2020	4.05
KKV40018	18	16	3.9	53	M	5	0.9	1.70	Village 4 Market	SM	21/02/2020	4.10
KKV40019	19.1	17	4.2	78.3	M	4	3.6	4.60	Village 4 Market	SM	21/02/2020	4.05
KKV40020	19	17	4.3	77.8	F	5	1.9	2.44	Village 4 Market	SM	21/02/2020	3.95
KKV40021	19.3	17.2	4.3	89.1	F	5	2.7	3.03	Village 4 Market	SM	21/02/2020	4.00
KKV40022	18.1	16	4	66.5	M	5	18	27.07	Village 4 Market	SM	21/02/2020	0.24
KKV40023	18.4	16.5	4.1	68.3	F	4	5	7.32	Village 4 Market	SM	21/02/2020	4.02
KKV40024	17.7	16	3.8	66.7	N				Village 4 Market	SM	21/02/2020	4.21
KKV40025	18.1	16	4.1	70.3	M	5	1.8	2.56	Village 4 Market	SM	21/02/2020	3.90
KKV40026	18.2	16.2	4	67.6	M	4	3.1	4.59	Village 4 Market	SM	21/02/2020	4.05

Code No.	TL (cm)	FL(cm)	BD(cm)	BW(g)	Sex	Stage	GW(g)	GSI	Area	Species	Date	FL/BD ¹
KKV40027	18.3	16.5	4.3	87.2	F	4	3.8	4.36	Village 4 Market	SM	21/02/2020	3.84
KKV40028	18	16	3.9	68	F	3	3.4	5.00	Village 4 Market	SM	21/02/2020	4.10
KKV40029	18.4	16.6	4.2	75.7	F	4	3.1	4.10	Village 4 Market	SM	21/02/2020	3.95
KKV40030	19.8	17.6	4.4	97	F	4	4.3	4.43	Village 4 Market	SM	21/02/2020	4.00
KKV40031	17.4	15.4	3.8	61.7	M	3	2.7	4.38	Village 4 Market	SM	21/02/2020	4.05
KKV40032	17.9	16	3.9	63.3	F	3	1.6	2.53	Village 4 Market	SM	21/02/2020	4.10
KKV40033	19	16.8	4.4	87	F	4	4.1	4.71	Village 4 Market	SM	21/02/2020	3.82
KKV40034	18.7	16.3	4.1	73.6	F	4	5.2	7.07	Village 4 Market	SM	21/02/2020	3.98
KKV40035	18.3	16.4	4.2	76.8	F	4	4	5.21	Village 4 Market	SM	21/02/2020	3.90
KKV40036	18.1	16	3.9	66.5	M	5	0.3	0.45	Village 4 Market	SM	21/02/2020	4.10
KKV40037	17.9	15.8	4	70	F	5	2	2.86	Village 4 Market	SM	21/02/2020	3.95
KKV40038	18.8	16.8	4.1	79	F	5	2.1	2.66	Village 4 Market	SM	21/02/2020	4.10
KKV40039	19.5	17.2	4.1	83.6	M	4	3.4	4.07	Village 4 Market	SM	21/02/2020	4.20
KKV40040	18	16	3.9	66.8	M	5	1	1.50	Village 4 Market	SM	21/02/2020	4.10
KKV40041	18.5	16.4	4.1	74.6	F	5	1.5	2.01	Village 4 Market	SM	21/02/2020	4.00
KKV40042	18.5	16.4	4.3	82.3	F	4	3.5	4.25	Village 4 Market	SM	21/02/2020	3.81
KKV40043	19.3	17.3	4.3	89.8	F	4	6.2	6.90	Village 4 Market	SM	21/02/2020	4.02
KKV40044	17.4	15.4	3.7	58.3	M	4	1.3	2.23	Village 4 Market	SM	21/02/2020	4.16
KKV40045	19	17	4	72.5	F	5	1.7	2.34	Village 4 Market	SM	21/02/2020	4.25
KKV40046	18.3	16.4	4.1	77	F	5	1.4	1.82	Village 4 Market	SM	21/02/2020	4.00
KKV40047	17.1	15.1	3.9	59.5	M	5	0.6	1.01	Village 4 Market	SM	21/02/2020	3.87
KKV40048	19	17	4	77.4	F	5	2.1	2.71	Village 4 Market	SM	21/02/2020	4.25
KKV40049	18	16	4	67.7	M	5	0.7	1.03	Village 4 Market	SM	21/02/2020	4.00
KKV40050	15	13.6	3.3	41.8	M	1			Village 4 Market	SM	21/02/2020	4.12