Inland Fisheries Research and Development Institute

INTEGRATED REPORT OF ACTIVITIES

ON

FISHERMAN SURVEYS IN CAMBODIA'S MEKONG DELTA

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1. Introduction

Eleven hydroelectric projects have been identified and proposed along mainstream Mekong River from Chiang Saen to Sambor. Construction and operation of any or all of these proposed projects could potentially have substantial and wide-ranging socio-economic and environmental effects in all four riparian countries in the Lower Mekong Basin. Recently, several important research studies have been proposed and conducted across the whole basin, with high expectation to understand the possible positive and negative impacts of those proposed damming in order to optimize the Mekong basin development. Four outstanding studies are ranging here: 1) The Council Study conducts by Mekong River Commission Secretariat aiming to understand the impacts of 6 thematic area - Irrigation, Agriculture and land use change, Domestic and industrial water use, Flood protection structures and floodplain infrastructure, Hydropower development, and Transportation on Social, Economic and Environment of the whole basin. 2) The Delta study initiated by Vietnamese Government to assess the impact of Basin Development, in particular mainstream hydroelectric development on the Mekong delta. 3) Study on fish migration across the Khone Falls at the Lao PDR-Cambodia border conducts by Inland Fisheries Research and Development Institute (IFReDI) of Fisheries Administration, Cambodia to define spawning habitat of migratory fish species through analysis age of Larvae Vis-à-Vis water flow velocity. 4) Fish Migration at Khone Falls conducts by World Fish to document how fishes pass the falls.

This report is presented the result of a specific research activity 3 “Fisherman surveys in Cambodia’s Mekong Delta Surveys in Cambodia’s Mekong Delta” under one of six components within the framework of the Delta study. The specific objective of this activity is to understand the distribution and diversity of fishing gears in the Delta and floodplain area to relate to the catch assessment of individual fishers in communities.

2. Methodologies

2.1 Study locations

Scope of the study was Cambodia's Mekong Delta covering 6 provinces - Kampong Cham (which is dividing to two provinces, Kampong Cham and Thbaung Khmom), Kandal, Preveng, Svay Reang, Part of Kampong Speu and a part of Takeo. In total, five sites across the whole basin presumably representative habitats were selected for the study. 1) Tonle Bit was the representative of flooded forest habitat, located at Tuol Vihear village, Chirou Pir commune, Tbuong Khmom district, Tboung Khmom province, 2) Ou Reang Ov was a representative of flooded rice field habitat, located at Kampong Boeng Cheung village, Mien commune, Ou Reang Ov district, and Tboung Khmom province, 3) Cheung Prey was a representative of flooded rice field habitat, located at Boeng Chrouy village, Soutip commune, Cheung Prey district, Kampong Cham province, 4) Muk Kampul was the Mekong mainstream habitat. Located at Chrouy Metrey Ler village, Reussey Chrouy commune, Muk Kampul district, Kandal province, and 5) Peam Ro was the Mekong tributary located at Peam Ro village, Peam Ro commune, Peam Ro district, Prey Veng province.

2.2 Methodology

The total representative sample survey of 175 individuals were randomly selected within the 5 study sites of which 35 individuals were selected in each study site. The survey objective aimed to understand the current status of both wild fisheries and aquaculture including other aquatic animals; and the information on type of common uses fishing gears in each habitat and season were also explored (annex questionnaires).

3. Result of the study

3.1 General Information of the respondents

Table 1 Res pondent characteristics by age, household member and fishing experiences

Characteristics	n	Minimum	Maximum	Mean	Std. Deviation
Fisher's age	175	17	68	42.41	11.718
Fisher household dependents	174	2	12	5.43	1.900
Fishing experiences (year)	174	2	50	17.63	11.313

The average age of respondents was 42.4 years old. Regarding to fisher household member, an average was 5.4 persons/household. The average fishing experience of respondents was 17.6 years (table 1).

Table 2 Percentage distribution of respondents by fishing activities.

Fishing Activities	Frequency	Percent (%)
Full-time fishing	89	50.6
Part-time fishing	86	48.9

More than half (50.6%) of the respondents generated their income from full-time fishing activities, while nearly 49% was as part-time fihers (Table 2)

Table 3 Percentage distribution of respondents by occupations.

Respondent's Occupations	Frequency	Percent (%)
No job except fishing	53	30.1
Agricultural farmer (rice, fruit, vegetable)	80	45.5
Aquaculture	1	.6
Labor	16	9.1
Motorbike Taxi	10	5.7
Trading/business	1	.6
Fish processing	4	2.3
Other occupations (Animal husbandry, Palm juice exploiter, Horse cart driver, House constructor, Fishing gear maker, Classic musician, and Chef)	10	5.7

More than forty five percent (45.5%) of the respondents derived income from agriculture, followed by fishing and labor force, which accounted for about 30.1% and 9.1%, respectively. Up to around 5.7%

generated income from other 8 different job items such as animal husbandry, palm juice exploiter, horse cart driver, House constructor, fishing gear maker, classic musician, and Chef (Table 2).

3.2 Fishing gear use and fishing boat possessions

1.1 Fishing gaer use and fishing boat by all respondents

Table 4 Percentage distribution of respondents by fishing gear use

Fishing Gears	Frequency	Percentage (%)
Stationary Gillnet	161	92.00
Hook Long Line	43	24.57
Vertical Cyclinder Trap	15	8.57
Cast Net	14	8.00
Drift gillnet	12	6.86
Lob-Luk	12	6.86
Single Hook Set Pole	8	4.57
Veil	8	4.57
Big Bamboo Vertical	5	2.86
Griff Gillnet	5	2.86
Mainh	4	2.29
Vertical Cyclinder T	4	2.29
Giant Lift Net	3	1.71
Stationary Gillnet	3	1.71
Encircling Seine Net	2	1.14
Giant Cast Net	2	1.14
Viel	2	1.14
Boat drege clam	1	0.57
Hook Long Line	1	0.57
Horizontal Cylinder	1	0.57
Samras	1	0.57

Up to 92% of respondents used stationary gillnet as their fishing mean. Followed by hook long line was about one-fourth (24.6%) (Table 4).

Table 5 Percentage distribution of respondents by fishing boat possessions.

Fishing boat possessions	Frequency	Percentage
Fishers with fishing boat	170	97.143
Fishers without fishing boat	5	2.857
Boat with engine	135	79.41
Boat without engine	35	20.59

Almost all respondents (97.1%) has fishing boat and only 2.8% of fisher has no fishing boat, of which nearly 80% of boats with engine and 20.6% of boat without engine.

2.2. Fishing gaer use and fishfing boat possessions of respondents by sites

Table 6 Percentage distribution of respondents by fishing gear use and fishing boat possessions at mmainsteam site

Sites	Characteristics	Frequency	Percentage
	Fishing gear use		
Mainsteam, Muk Kampul	Stationary Gillnet	39	111.43
	Drift gillnet	4	11.43
	Mainh	4	11.43
	Giant Cast Net	2	5.71
	Cast Net	1	2.86
Mainsteam, Muk Kampul	Fishing boat possession		
	Fishers with fishing boat	35	100.00
	Boat with Engine	32	91.43
	Boat without Engine	3	8.57

For mainstream site in Muk Kampul, Kandal province, up to 111.4% of respondents used stationary gillnet as their fishing gear. Followed by drift gillnet and Mainh were the same percentage accouting for 11.4% and 11.4%, respectively. All respondents had fishing boats, of which more that 90% of boats with engine and about 9% without engine (Table 6).

Table 7 Percentage distribution of respondents by fishing gear use and fishing boat possessions at tributary.

Sites	Characteristics	Frequency	Percentage
	Fishing gear use		
Tributary, Peam Ro	Stationary Gillnet	25	71.43
	Lob-Luk	12	34.29
	Cast Net	11	31.43
	Drift gillnet	8	22.86
	Griff Gillnet	5	14.29
	Vertical Cyclinder Trap	5	14.29
	Hook Long Line	2	5.71
	Stationary Gillnet	2	5.71
	Viel	2	5.71
	Samras	1	2.86
	Vertical Cyclinder T	1	2.86
Tributary, Peam Ro	Fishing boat possessions		
	Fishers with fishing boat	35	100.00
	Boat with Engine	31	88.57
	Boat without Engine	4	11.43

For tributary site in Peam Ro, Prey Veng province, respondents used stationary gillnet was 71.4% as their fishing gears. Lob Luk and Cast Net were the second and third fishing gears used by fisheres, accounting for 34.3% and 31.4%, respectively. All respondents had fishing boats, of which more that 88.5 % of boats with engine and about 11.4% without engine (Table 7).

Table 8 Percentage distribution of respondents by fishing gear use and fishing boat possessions at flooded forest

Sites	Characteristics	Frequency	Percentage
	Fishing gear use		
Flooded forest, Tboung Khmom	Stationary Gillnet	34	97.14
	Hook Long Line	21	60.00
	Vertical Cyclinder Trap	4	11.43
	Giant Lift Net	3	8.57
	Veil	3	8.57
	Cast Net	2	5.71
	Boat drege clam	1	2.86
Flooded forest, Tboung Kmum	Fishing boat possessions		
	Fishers with fishing boat	34	97.14
	Fishers without fishing boat	1	2.86
	Boat with Engine	18	52.94
	Boat without Engine	16	47.06

For flooded forest site in Tboung Kmum, Tboung Khmom province, up to 97.1 % respondents fished stationary gillnet as their fishing gears. Hook Long Line and Vertical Cyclineder Trap were the second and third using as their fishing means, accounting for 60% and 11.4%, respectively. More than 97% of respondents had fishing boats, of which about 53% of boats with engine and about 47% without engine (Table 8).

Table 9 Percentage distribution of respondents by fishing gear use and fishing boat possessions at Flooded rice field, O Roeung Ouv.

Sites	Characteristics	Frequency	Percentage
	Fishing gear use		
Flooded rice field, Ou Roeung Ov	Stationary Gillnet	35	100.00
	Hook Long Line	10	28.57
	Vertical Cyclinder Trap	5	14.29
	Encircling Seine Net	1	2.86
	Veil	1	2.86
Flooded rice field, Ou Roeung Ov	Fishing boat possessions		
	Fishers with fishing boat	33	94.29
	Fishers without fishing boat	2	5.714
	Boat with Engine	24	72.73
	Boat without Engine	9	27.27

For Flooded rice field in Ou Roeung Ov, Tboung Khmom province, all respondents used stationary gillnet as their fishing gears. Hook Long Line and Vertical Cyclineder Trap were the second and third using as their fishing means, accounting for 28.5% and 14.3%, respectively. More than 94% of respondents had fishing boats, of which about 72.7% of boats with engine and about 27.3% without engine (Table 9).

Table 10. Percentage distribution of respondents by fishing gear use and fishing boat possessions at Flooded rice field, Choeung Prey.

Sites	Characteristics	Frequency	Percentage
	Fishing gear use		
Flooded rice field, Choeung Prey	Stationary Gillnet	28	80.00
	Hook Long Line	10	28.57
	Single Hook Set Pole	8	22.86
	Big Bamboo Vertical	5	14.29
	Veil	4	11.43
	Vertical Cyclinder T	3	8.57
	Encircling Seine Net	1	2.86
	Hook Long Line	1	2.86
	Horizontal Cylinder	1	2.86
	Stationary Gillnet	1	2.86
	Vertical Cyclinder Trap	1	2.86
Flooded rice field, Choeung Prey	Fishing boat possessions		
	Fishers with fishing boat	33	94.29
	Fishers without fishing boat	2	5.714
	Boat with Engine	30	90.91
	Boat without Engine	3	9.09

For Flooded rice field, Choeung Prey, Kampong Chham province, 80% of respondents used stationary gillnet as their fishing gears. Hook Long Line and Single Hook Set Pole were the second and third using as their fishing means, accounting for 28.5% and 22.8%, respectively. More than 94% of respondents had fishing boats, of which about 91% of boats with engine and about 9% without engine (Table 10).

3.3 Top 10 species caught in last 12 months: For mainstream site; tributary habitats site; flooded forest site, flooded rice field site , O Roeung Ouv; and flooded rice field site, Choeung Prey.

Table 11. The fish species caught in last 12 months for all sites and all individuals

No.	Khmer Name	Scientific Name	Average per fisher/year (kg)	Percentage
1	ត្រីម៉ៀល	Gymnosstomus sp.	666.46	8.22
2	ត្រីអាចម៍កុក	Labiobarbus siamensis	382.77	4.72
3	ត្រីផ្ទក់	Channa striata	314.50	3.88
4	ត្រីច្រកែង	Puntioplites proctozysron	304.87	3.76
5	ត្រីក្រឡង់/ត្រីព្រួល	Cirrhinus microlepsis	288.83	3.56
6	ត្រីជន្ទាសភ្នុក	Parachela ouygastoides	278.67	3.44
7	ត្រីអង្កត់ប្រាក់	Puntius rhombeus	247.00	3.05
8	ត្រីខ្ចាន	Hampala sp.	242.38	2.99
9	ត្រីចង្វា	Oryzias sp.	230.33	2.84
10	ត្រីស្ងួត	Notopterus notopterus	228.97	2.82
11	ត្រីក្រុស	Osteochilus sp.	210.89	2.60
12	ត្រីកញ្ឆុះ	Akysis sp.	203.79	2.51
13	ត្រីបុងឡាវ	Panagasius krempfi	200.33	2.47
14	ត្រីក្អែក	Labeo Chrysophekadion	182.45	2.25
15	ត្រីលិញ	Thynnichthys Thynnoides	171.53	2.11
16	ត្រីក្រពុលបាយ	Cosmochilus harmandi	171.40	2.11
17	ត្រីក្តាំងហាយ	Belodontichthys truncatus	159.16	1.96
18	ត្រីឆ្ពាក	Chyclocheilichthys enoplos	157.47	1.94
19	ត្រីស្លឹកឬស្សី	paralaubuca barroni	157.28	1.94
20	ត្រីពោ	Pangasius larnaudii	154.82	1.91
21	ត្រីកេស	Kryptoplerus sp.	153.86	1.90
22	ត្រីលលកស	Osteochilus schlegeli	147.50	1.82
23	ត្រីគ្រុំ	Osteochilas melanpleura	143.16	1.77
24	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	142.80	1.76
25	ត្រីគ្គិន	Hypsitarbus sp.	142.16	1.75
26	ត្រីឈ្វាត	Pangasius mekongensis	139.46	1.72
27	ត្រីកន្ត្រៃ	Pristolepis fasciata	136.21	1.68
28	ត្រីការ៉ោ / ត្រីគល់រាំង	Catlocarpio siamensis	129.67	1.60
29	ត្រីស្រការក្តាម	Cyclocheilichthys sp.	128.36	1.58
30	ត្រីប្រា	Pangasius sp.	125.14	1.54
31	ត្រីឆ្នាំង	Hemibagrus sp.	125.10	1.54
32	ត្រីបណ្តូលអំពៅ	Clupeichthys sp.	122.50	1.51
33	ត្រីកែ	Pangasius conchophilus	118.65	1.46
34	ត្រីកំភ្លាញ	Trichohodus sp.	117.27	1.45

35	ត្រីត្រសក់	Probarbus sp.	105.00	1.29
36	ត្រីប្រម៉ា	Boesemania microlepis	90.56	1.12
37	ត្រីឆ្នុង(ម៉ៀលថ្ម)	Babichthys laevis	90.00	1.11
38	ត្រីក្រាញ់	Anabas testudineus	87.55	1.08
39	ត្រីអណ្តែង	Amblyceps sp.	87.50	1.08
40	ត្រីក្រាយ	Chitala ornate	75.00	0.92
41	ត្រីអណ្តាតង្កែ	Cynoglossus sp.	73.77	0.91
42	ត្រីទីឡាព្យា	Oreochromis sp.	71.50	0.88
43	ត្រីឆ្នូញ	Macrognathus sp.	71.38	0.88
44	ត្រីកណែ	Barbonymus sp.	71.29	0.88
45	ត្រីខ្នងដង	Labiobarbus leptocheila	67.04	0.83
46	ត្រីចង្វា	Rasbora sp.	65.34	0.81
47	ត្រីដំរី	Oxyeleotris	52.50	0.65
48	ត្រីកញ្ជក	Yasuhikotakia sp.	50.25	0.62
49	ត្រីត្រនិន	Ompok eugeneiatus	48.75	0.60
50	ត្រីឆ្មា	Lycothrissa crocodilus	45.00	0.55
51	ត្រីក្រឡង់	Cirrhinus microlepis	31.25	0.39
52	ត្រីចកចុំ	Bagrichthys obscurus	30.25	0.37
53	ត្រីផ្ទោង	Xenentodon cancila	17.50	0.22
54	ត្រីស្មើកខ្មុយ	Pangasius polyuranodom	16.50	0.20
55	ត្រីជញ្ជាញមាន់	Coilia lindmani	12.00	0.15
56	ត្រីខ្ជឹង	Mastacembelus armatus	10.00	0.12
57	ត្រីកំបុតច្រមុះ	Amblyrhynchichthys micracanthus	8.00	0.10
58	ត្រីកំព្រាម	Polynemus sp.	7.00	0.09

The average fish catch per fisher/ year of the top 10 fish species caught in last 12 months for individuals: 1. Gymnosstomus sp. was 666.5 kg/year (8.2%), 2. Labiobarbus siamensis was 382.5 kg/year (4.72%), 3. Channa striata was 314.5 kg/year (3.9%), 4. Puntioplites proctozysron was 304.87 kg/year (3.8%), 5. Cirrhinus microlepsis was 288.83 kg/year (3.6%), 6. Parachela ouygastoides was 278.67 kg/year (3.4%), 7. Puntius rhombeus was 247.00 kg/year (3.05%), 8. Hampala sp was 242.38 kg/year (2.99%), 9. Oryzias sp was 230.33kg/year (2.84%), and 10. Notopterus notopterus was 228.97 kg/year (2.82 %) (Table 11).

Table 12. The fish species caught in last 12 months in mainstream, Muk Kampul, Kandal Province

No.	Khmer Name	Scietific Name	Average caught per fisher/year (kg)	Percentage
1	ត្រីម៉ៀល	Gymnosstomus sp.	1317.27	18.86
2	ត្រីអាចម៍កុក	Labiobarbus siamensis	642.00	9.19
3	ត្រីចង្វា	Oryzias sp.	500.00	7.16
4	ត្រីច្រកែង	Puntioplites proctozysron	437.50	6.26
5	ត្រីក្រឡង់/ត្រីព្រួល	Cirrhinus microlepsis	407.67	5.84
6	ត្រីក្រុស	Osteochilus sp.	360.00	5.16

7	ត្រីបុងឡាវ	Panagasius krempfi	298.33	4.27
8	ត្រីស្លឹកឫស្សី	paralaubuca barroni	266.63	3.82
9	ត្រីលិញ	Thynnichthys Thynnoides	191.25	2.74
10	ត្រីឈ្វាត	Pangasius mekongensis	184.40	2.64
11	ត្រីកេស	Kryptoplerus sp.	166.78	2.39
12	ត្រីរ៉ែក	Labeo Chrysophekadion	161.93	2.32
13	ត្រីឆ្កោក	Chyclocheilichthys enoplos	161.38	2.31
14	ត្រីពោ	Pangasius larnaudii	159.79	2.29
15	ត្រីកែ	Pangasius conchophilus	148.17	2.12
16	ត្រីខ្នងដង	Labiobarbus leptocheila	142.00	2.03
17	ត្រីប្រា	Pangasius sp.	138.02	1.98
18	ត្រីគ្រុំ	Osteochilas melanpleura	134.68	1.93
19	ត្រីឆ្នុង(ម៉ៀលថ្ម)	Babichthys laevis	120.00	1.72
20	ត្រីប្រម៉ា	Boesemania microlepis	119.78	1.72
21	ត្រីឆ្នាំង	Hemibagrus sp.	109.36	1.57
22	ត្រីត្រសក់	Probarbus sp.	105.00	1.50
23	ត្រីឆ្ពិន	Hypsitarbus sp.	102.70	1.47
24	ត្រីក្តាំងហាយ	Belodontichthys truncatus	79.70	1.14
25	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	75.33	1.08
26	ត្រីក្រពុលបាយ	Cosmochilus harmandi	65.00	0.93
27	ត្រីចង្វា	Rasbora sp.	60.00	0.86
28	ត្រីផ្គក់	Channa striata	60.00	0.86
29	ត្រីទីឡាព្យា	Oreochromis sp.	45.00	0.64
30	ត្រីឆ្មា	Lycothrissa crocodilus	45.00	0.64
31	ត្រីរចកខ្មុំ	Bagrichthys obscurus	38.00	0.54
32	ត្រីអណ្តាតដង្កែ	Cynoglossus sp.	36.75	0.53
33	ត្រីកាហែ	Barbonymus sp.	34.50	0.49
34	ត្រីកញ្ជុះ	Akysis sp.	22.00	0.32
35	ត្រីស្លឹកខ្មុយ	Pangasius polyuranodom	16.50	0.24
36	ត្រីជញ្ជាញមាន់	Coilia lindmani	12.00	0.17
37	ត្រីកញ្ជក	Yasuhikotakia sp.	11.00	0.16
38	ត្រីកំបុតច្រមុះ	Amblyrhynchichthys micracanthus	8.00	0.11

The average fish catch per fisher/ year of the top 10 fish species caught in last 12 months in mainstream site, Muk Kampul, Kandal Province: 1. Gymnosstomus sp. was 666.5 kg/year (8.2%), 2. Labiobarbus siamensis was 382.5% (4.72%), 3. Channa striata was 314.5% (3.9%), 4. Puntioplites proctozysron was 437.50 kg/year (6.26 %), 5. Cirrhinus microlepsis was 407.67 kg/year (5.84 %), 6. Osteochilus sp. Was 360 kg/year (5.16 %), 7. Panagasius krempfi was 298.33 kg/year (4.27 %), 8. paralaubuca barroni was 266.63 kg/year (3.82 %), 9. Thynnichthys Thynnoides was 191.25 kg/year (2.74 %), and 10. Pangasius mekongensis was 184.40 kg/year (2.64 %) (Table 12).

Table 13. The fish species caught in last 12 months in tributary habitats site, Peam Ro, Prey Veng province

No.	Khmer Name	Scientific Name	Average caught per fisher/ year (kg)	Percentage
1	ត្រីក្រឡង់/ត្រីព្រួល	Cirrhinus microlepsis	300.00	6.496096
2	ត្រីស្ពាត	Notopterus notopterus	300.00	6.496096
3	ត្រីផ្គក់	Channa striata	255.57	5.534055
4	ត្រីម៉ៀល	Gymnosstomus sp.	239.13	5.17811
5	ត្រីច្រកែង	Puntioplites proctozysron	232.37	5.031632
6	ត្រីអ្អែក	Labeo Chrysophekadion	230.55	4.992151
7	ត្រីខ្ទាន	Hampala sp.	220.80	4.781126
8	ត្រីក្រពុលបាយ	Cosmochilus harmandi	198.00	4.287423
9	ត្រីក្តាំងហាយ	Belodontichthys truncatus	190.56	4.126224
10	ត្រីលិញ	Thynnichthys Thynnoides	178.44	3.863823
11	ត្រីគ្រុំ	Osteochilas melanpleura	170.00	3.681121
12	ត្រីអម្ពែង	Amblyceps sp.	152.50	3.302182
13	ត្រីឆ្ពិន	Hypsitarbus sp.	137.34	2.973913
14	ត្រីប្រា	Pangasius sp.	123.00	2.663399
15	ត្រីពោ	Pangasius larnaudii	112.50	2.436036
16	ត្រីកញ្ឆុះ	Akysis sp.	110.56	2.394082
17	ត្រីកេស	Kryptoplerus sp.	108.00	2.338594
18	ត្រីកន្ត្រៀប	Pristolepis fasciata	103.13	2.233033
19	ត្រីឆ្នាំង	Hemibagrus sp.	102.82	2.226356
20	ត្រីបុងឡាវ	Panagasius krempfi	102.33	2.21589
21	ត្រីក្រុស	Osteochilus sp.	92.00	1.992136
22	ត្រីជង្គាសត្វក	Parachela ouygastoides	91.00	1.970482
23	ត្រីក្រាញ់	Anabas testudineus	86.58	1.874845
24	ត្រីអណ្តាតង្កែ	Cynoglossus sp.	85.16	1.844058
25	ត្រីស្លឹកឬស្សី	paralaubuca barroni	76.00	1.645678
26	ត្រីស្រែការក្តាម	Cyclocheilichthys sp.	68.29	1.478635
27	ត្រីចង្វា	Rasbora sp.	66.11	1.431461
28	ត្រីឈ្វាត	Pangasius mekongensis	63.73	1.379928
29	ត្រីប្រម៉ា	Boesemania microlepis	57.69	1.249145
30	ត្រីបណ្តូលអំពៅ	Clupeichthys sp.	57.00	1.234258
31	ត្រីកែ	Pangasius conchophilus	52.25	1.131403
32	ត្រីកំភ្លាញ	Trichohodus sp.	41.00	0.8878
33	ត្រីឆ្លុញ	Macrognathus sp.	38.33	0.830057
34	ត្រីក្រឡង់	Cirrhinus microlepis	34.00	0.736224
35	ត្រីទីឡាព្យា	Oreochromis sp.	31.33	0.678481
36	ត្រីចង្វា	Oryzias sp.	31.00	0.671263
37	ត្រីខ្នងដង	Labiobarbus leptocheila	17.60	0.381104

38	ត្រីផ្ដោង	Xenentodon cancila	17.50	0.378939
39	ត្រីអំរ៉ី	Oxyeleotris	15.00	0.324805
40	ត្រីត្រឪន	Ompok eugeneiatus	15.00	0.324805
41	ត្រីឆែកខុំ	Bagrichthys obscurus	7.00	0.151576
42	ត្រីកំព្រាម	Polynemus sp.	7.00	0.151576

The average fish catch per fisher/ year of the top 10 fish species which were cought during last 12 months tributary habitats site at Peam Ro, Prey Veng province 1. Cirrhinus microlepsis 300 kg/year (6.5 %), 1. Notopterus notopterus 300 kg/year (6.5 %), 3. Channa striata 255.57 kg/year (5.53 %), 4. Gymnosstomus sp. 239.13 kg/year (5.18 %), 5. Puntioplites proctozysron 232.37 kg/year (5.03%), 6. Labeo Chrysophekadion 230.55 kg/year (4.99 %), 7. Hampala sp. 220.80 kg/year (4.78 %), 8. Cosmochilus harmandi 198.00 kg/ year (4.29 %), 9. Belodontichthys truncates 190.56 kg/year (4.13 %), and 10. Thynnichthys Thynnoides 178.44 kg/year (3.86 %) (Table 13).

Table 14. The fish species caught in last 12 months in flooded forest, Tboung Khmom

No.	Khmer Name	Scientific Name	Average caught per fisher/ year (kg)	Percentage
1	ត្រីបណ្ដូលអំពៅ	Clupeichthys sp.	450.00	7.87
2	ត្រីជង្គាសក្កុក	Parachela ouygastoides	341.67	5.98
3	ត្រីផ្ដក់	Channa striata	329.39	5.76
4	ត្រីខ្ទាន	Hampala sp.	278.33	4.87
5	ត្រីស្រការក្តាម	Cyclocheilichthys sp.	272.67	4.77
6	ត្រីអង្គត់ប្រាក់	Puntius rhombeus	247.00	4.32
7	ត្រីម៉ៀល	Gymnosstomus sp.	225.31	3.94
8	ត្រីរ៉ែក	Labeo Chrysophekadion	195.00	3.41
9	ត្រីក្តាំងហាយ	Belodontichthys truncatus	187.50	3.28
10	ត្រីកញ្ឆុះ	Akysis sp.	184.11	3.22
11	ត្រីស្លាត	Notopterus notopterus	183.44	3.21
12	ត្រីអាចម៍កុក	Labiobarbus siamensis	183.07	3.20
13	ត្រីច្រកែង	Puntioplites proctozysron	177.65	3.11
14	ត្រីក្រុស	Osteochilus sp.	171.17	2.99
15	ត្រីរេស	Kryptoplerus sp.	170.00	2.97
16	ត្រីឆ្នាំង	Hemibagrus sp.	169.73	2.97
17	ត្រីចង្ហា	Oryzias sp.	160.00	2.80
18	ត្រីលលកស	Osteochilus schlegeli	147.50	2.58
19	ត្រីកាហែ	Barbonymus sp.	146.50	2.56
20	ត្រីលិញ	Thynnichthys Thynnoides	146.11	2.56
21	ត្រីឆ្ពិន	Hypsitarbus sp.	138.09	2.41
22	ត្រីកំភ្លាញ	Trichohodus sp.	133.50	2.33

23	ត្រីក្រឡង់/ត្រីព្រួល	Cirrhinus microlepsis	120.00	2.10
24	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	116.67	2.04
25	ត្រីឆ្តោក	Chyclocheilichthys enoplos	116.35	2.03
26	ត្រីកន្ត្រៃប់	Pristolepis fasciata	96.91	1.69
27	ត្រីក្រាយ	Chitala ornate	75.00	1.31
28	ត្រីអំរី	Oxyeleotris	65.00	1.14
29	ត្រីកញ្ជ្រុក	Yasuhikotakia sp.	63.33	1.11
30	ត្រីត្រឪន	Ompok eugeneiatus	60.00	1.05
31	ត្រីឆ្នុង(ជ្រៀលថ្ម)	Babichthys laevis	60.00	1.05
32	ត្រីក្រាញ់	Anabas testudineus	58.75	1.03
33	ត្រីប្រា	Pangasius sp.	55.20	0.97
34	ត្រីស្លឹកឬស្សី	paralaubuca barroni	49.20	0.86
35	ត្រីឆ្នូញ	Macrognathus sp.	48.50	0.85
36	ត្រីក្រឡង់	Cirrhinus microlepis	28.50	0.50
37	ត្រីឈ្វាត	Pangasius mekongensis	26.00	0.45
38	ត្រីខ្នងម័ង	Labiobarbus leptocheila	16.00	0.28
39	ត្រីអណ្តែង	Amblyceps sp.	15.00	0.26
40	ត្រីខ្ជិង	Mastacembelus armatus	10.00	0.17

The everage fish catch per fisher/ year of the top 10 fish species which were cought during last 12 months in flooded forest at Tboung Khmom, Tboung Khmom province: 1. Clupeichthys sp. was 450 kg/year (7.87 %), 2. Parachela ouygastoides was 341.67 kg/year (5.98 %), 3. Channa striata was 329.39 kg/year (5.76 %), 4. Hampala sp. was 278.33 kg/year (4.87 %), 5. Cyclocheilichthys sp. was 272.67 kg/year (4.77 %), 6. Puntius rhombeus was 247 kg/year (4.32 %), 7. Gymnosstomus sp. was 225.31 kg/year (3.94 %), 8. Labeo Chrysophekadion was 195.00 kg/ year (3.41 %), 9. Belodontichthys truncates was 187.50 kg/year (3.28 %), and 10. Akysis sp. was 184.11 kg/year (3.22 %) (Table 14).

Table 15. The fish species caught in last 12 months in flooded rice field, Ou Reung Ov, Tboung Khmom province

No.	Khmer Name	Scientific name	Average caught per year (kg)	Percentage
1	ត្រីឈ្វាត	Pangasius mekongensis	750.00	15.42
2	ត្រីជ្រៀល	Gymnosstomus sp.	497.11	10.22
3	ត្រីអាចម៍កុក	Labiobarbus siamensis	448.86	9.23
4	ត្រីកង្គុះ	Akysis sp.	385.13	7.92
5	ត្រីផ្ទក់	Channa striata	286.67	5.89
6	ត្រីច្រកែង	Puntioplites proctozysron	273.11	5.62
7	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	248.75	5.11
8	ត្រីក្តាំងហាយ	Belodontichthys truncatus	240.00	4.93

9	ត្រីឆ្នាំង	Hemibagrus sp.	201.00	4.13
10	ត្រីក្រុស	Osteochilus sp.	200.00	4.11
11	ត្រីឆ្ពិន	Hypsitarbus sp.	196.00	4.03
12	ត្រីអេស	Kryptoplerus sp.	162.50	3.34
13	ត្រីទីឡាព្យា	Oreochromis sp.	145.00	2.98
14	ត្រីកំភ្លាញ	Trichohodus sp.	134.43	2.76
15	ត្រីក្រាញ់	Anabas testudineus	105.78	2.17
16	ត្រីកាហោ / ត្រីគល់រាំង	Catlocarpio siamensis	104.50	2.15
17	ត្រីស្វ៊ីកឬស្សី	paralaubuca barroni	100.00	2.06
18	ត្រីស្ងួត	Notopterus notopterus	93.33	1.92
19	ត្រីឆ្លូញ	Macrognathus sp.	93.29	1.92
20	ត្រីកន្ត្រៃ	Pristolepis fasciata	79.29	1.63
21	ត្រីកាប៉ោ	Barbonymus sp.	68.00	1.40
22	ត្រីស្រការក្តាម	Cyclocheilichthys sp.	51.00	1.05

The average fish catch per fisher/ year of the top 10 fish species which were cought during last 12 months in Ou Reung Ov, Tboung Kmum province: 1. Pangasius mekongensis was 750.00 kg/year (15.42 %), 2. Gymnosstomus sp. was 497.11 kg/year (10.22 %), 3. Labiobarbus siamensis was 448.86 kg/year (9.23 %), 4. Akysis sp. was 385.13 kg/year (7.92 %), 5. Channa striata was 286.67 kg/year (5.89 %), 6. Puntioplites proctozysron was 273.11 kg/year (5.62 %), 7. Wallago attu was 248.75 kg/year (5.11 %), 8. Belodontichthys truncates was 240.00 kg/ year (4.93 %), 9. Hemibagrus sp. was 201 kg/year (4.13 %), and 10. Osteochilus sp. was 200 kg/year (4.11 %) (Table 15).

Table 16. The fish species caught in last 12 months in flooded rice field, Chhoeung Prey, Kampong Chham province

No.	Khmer Name	Scintific Name	Average caught per year (kg)	Percentage
1	ត្រីផ្ដក់	Channa striata	520.00	11.53
2	ត្រីជន្ធាសភ្លុក	Parachela ouygastoides	465.00	10.31
3	ត្រីកញ្ឆុះ	Akysis sp.	425.00	9.42
4	ត្រីក្រុស	Osteochilus sp.	384.29	8.52
5	ត្រីស្ងួត	Notopterus notopterus	369.00	8.18
6	ត្រីឆ្ពិន	Hypsitarbus sp.	350.00	7.76
7	ត្រីកន្ត្រៃ	Pristolepis fasciata	347.50	7.70
8	ត្រីច្រកែង	Puntioplites proctozysron	345.00	7.65
9	ត្រីម៉ៀល	Gymnosstomus sp.	345.00	7.65
10	ត្រីកាហោ / ត្រីគល់រាំង	Catlocarpio siamensis	180.00	3.99
11	ត្រីក្រពាត់ / ត្រីសណ្ដាយ	Wallago attu	172.50	3.82
12	ត្រីស្រការក្តាម	Cyclocheilichthys sp.	150.00	3.33

13	ត្រីឆ្នាំង	Hemibagrus sp.	145.71	3.23
14	ត្រីក្រាញ់	Anabas testudineus	102.00	2.26
15	ត្រីក្រឡង់/ត្រីព្រួល	Cirrhinus microlepsis	90.00	2.00
16	ត្រីឆ្ពញ	Macrognathus sp.	90.00	2.00
17	ត្រីអណ្តែង	Amblyceps sp.	30.00	0.67

The average fish catch per fisher/ year of the top 10 fish species which were cought during last 12 months in flooded rice field, Choeung Prey, Kampong Cham province: 1. Channa striata was 520.00 kg/year (11.53 %), 2. Parachela ouygastoides was 465 kg/year (10.31 %), 3. Akysis sp. was 425 kg/year (9.42 %), 4. Osteochilus sp. was 384.29 kg/year (8.52 %), 5. Notopterus notopterus was 369 kg/year (8.18 %), 6. Hypsitarbus sp. was 350 kg/year (7.76 %), 7. Pristolepis fasciata was 347.50 kg/year (7.70 %), 8. Puntioplites proctozysron was 345.00 kg/ year (7.65 %), 9. Gymnosstomus sp. was 345.00 kg/ year (7.65 %), and 10. Catlocarpio siamensis was 180 kg/year (3.99 %) (Table 16)..

3.4 Other Aquatic Animals (OAAs) caught in Last 12 months

Table 17. Frogs caught in last 12 months by all individuals

Catch Time	Total Catch (kg)	Average (kg)
All year round	275.5	91.83
Dry Season	1	1

The average frog catch in last 12 months was 91.8kg/person/year all year all, while an average frog catch in dry season ony 1 kg/person/year (Table 17)

Table 18. Frogs caught in last 12 months by sites

Sites	Catch Time	Total Catch (kg)	Average (kg)
Tributary	Dry Season	1	1.00
Flooded rice field, O Roeung Ouv	All year round	200.5	100.25
Flooded rice field, Choeung Prey	All year round	75	75

The average frog catch in last 12 months in flooded rice field, in Ou Reung Ov, Tboung Khmom province was 100.2 kg/person/year all year all. The second frog catch founed to be in flooded rice field, Choeung Prey, Kampong Cham province was 75kg/person/year in all year all. While an average frog catch in tributary, Peam Ro, Prey Veng province in dry season ony 1 kg/person/year (Table 18)

Table 19. Shrimps caught in last 12 months by all fishers

Catch Time	Total Catch (kg)	Average (kg)

All year round	1817.5	139.81
Dry Season	5	5.00
Flood season	1841.3	153.44

The average shrimp catches in last 12 months was 139.8kg/person/year for all year all and the average shrimp catch in flood season 153.4 kg per person/year. While in dry season, shrimp catch was only 5kg/person/year (Table 19).

Table 20. Shrimps caught in last 12 months by sites

Sites	Catch Time	Total Catch (kg)	Average (kg)
Tributary	Dry Season	79	39.5
	Flood season	0.3	0.3
Flooded forest	Flood season	120	40
Flooded rice field, O Roeung Ouv	All year round	1480.5	370.12
	Flood season	1260	315
Flooded rice field, Choeung Prey	All year round	258	36.85
	Dry Season	5	5
	Flood season	461	115.25

The average shrimp catches in last 12 months in flooded rice field ,Ou Reung Ov, Tboung Khmom province founded to be highest among others sites was 370.1kg/person/year all year round. Followed by flooded rice field, Choeung Prey, Kampong Cham province was 115.2%kg/person/year in flood season (Table 20)

Table 21. Crabs caught in last 12 months by all fishers

Catch Time	Total Catch (kg)	Average (kg)
All year round	22375.5	438.74
Dry Season	4353	1451.00
Flood season	3171	186.53

The average crab catches in last 12 months in dry season was 1451kg/person/year in dry season, followed by all year round the average crab catch was 438.7kg/person/year. While in flood season was 186.5kg/person/year (Table 21).

Table 22. Crabs caught in last 12 months by sites

Sites	Catch Time	Total Catch (kg)	Average (kg)
Tributary	All year round	2349	261.00
	Dry Season	3	3.00
	Flood season	32	16.00

Flooded forest	All year round	1665.5	118.96
	Flood season	512	102.40
Flooded rice field, O Roeung Ouv	All year round	3451	345.10
	Flood season	1369	273.80
Flooded rice field, Choeung Prey	All year round	14910	828.33
	Flood season	1258	251.60

Across the studied sites, flooded rice field, Choeung Prey, Kampong Cham province founded to be the highest crab catch with an average crab catch 828.3kg/person/year all year round and 251.6kg/person/yaer in flood season. Followed by flooded rice field, Ou Roeung Ov, Tboung Khmom with the average crab catch 345.1kg/person/year all year round and 273.8kg/person/year in flood season (Table 22)

Table 23. Snakes caught in last 12 months by all individuals

Catch Time	Total Catch (kg)	Average (kg)
All year round	16085	1005.31
Dry Season	245	40.83
Flood season	62	8.86

The average water snake catch in last 12 months all year round was 1005.3kg/person/year, followed by dry season, the average water sanke catch was 40.8kg/person/year. While in flood season was 8.8 kg/person/year (Table 23).

Table 24. Sankes caught in last 12 months by sites

Sites	Catch Time	Total Catch (kg)	Average (kg)
Tributary	All year round	1	1.00
Flooded forest	All year round	53	10.60
	Dry Season	62	31.00
	Flood season	50	25.00
Flooded rice field, O Roeung Ouv	All year round	9	2.25
	Dry Season	1	1.00
	Flood season	4	1.33
Flooded rice field, Choeung Prey	All year round	16022	2670.33
	Dry Season	182	60.67
	Flood season	8	4.00

Flooded rice field, Choeung Prey, Kampong Cham province founded to be the highest water sanke catch with an average water snake catch 2670.3kg/person/year all year round and 60.66kg/person/yaer in dry

season. Followed by flooded forest, Tboung Kmum province with the average water sanke catch 31 kg/person/year in dry season (Table 24).

3.5 Fish species most recent catch

Table 25. Fish species most recent catch by all sites and all individuals

No.	Khmer Name	Scientific Name	Frequency	Percentage
1	ត្រីម៉ៀល	Gymnosstomus sp.	72	9.34
2	ត្រីច្រកែង	Puntioplites proctozysron	68	8.82
3	ត្រីកញ្ឆុះ	Akysis sp.	57	7.39
4	ត្រីប្រា	Pangasius sp.	39	5.06
5	ត្រីឆ្នាំង	Hemibagrus sp.	36	4.67
6	ត្រីក្អែក	Labeo Chrysophekadion	34	4.41
7	ត្រីឆ្ពិន	Hypsitarbus sp.	33	4.28
8	ត្រីអណ្តែតចម្ការកុក	Labiobarbus siamensis	32	4.15
9	ត្រីក្រាញ់	Anabas testudineus	29	3.76
10	ត្រីក្រុស	Osteochilus sp.	25	3.24
11	ត្រីស្វ័កឬស្សី	paralaubuca barroni	24	3.11
12	ត្រីជន្ទាសភ្នុក	Parachela ouygastoides	24	3.11
13	ត្រីកត្រែប់	Pristolepis fasciata	23	2.98
14	ត្រីកហែ	Barbonymus sp.	18	2.33
15	ត្រីឆោ	Pangasius larnaudii	18	2.33
16	ត្រីឆ្នូញ	Macrognathus sp.	17	2.20
17	ត្រីឈ្វាត	Pangasius mekongensis	15	1.95
18	ត្រីស្រការក្តាម	Cyclocheilichthys sp.	15	1.95
19	ត្រីគ្រុំ	Osteochilas melanpleura	14	1.82
20	ត្រីកញ្ជ្រុក	Yasuhikotakia sp.	13	1.69
21	ត្រីលិញ	Thynnichthys Thynnoides	12	1.56
22	ត្រីកំភ្លាញ	Trichohodus sp.	11	1.43
23	ត្រីក្តាំងហាយ	Belodontichthys truncatus	10	1.30
24	ត្រីខ្នងង៉ង	Labiobarbus leptocheila	9	1.17
25	ត្រីផ្គក់	Channa striata	9	1.17
26	ត្រីបណ្តូលអំពៅ	Clupeichthys sp.	9	1.17
27	ត្រីឆ្ពាក	Chyclocheilichthys enoplos	8	1.04
28	ត្រីចង្វា	Rasbora sp.	8	1.04
29	ត្រីកែ	Pangasius conchophilus	8	1.04
30	ត្រីអណ្តាតម៉ែ	Cynoglossus sp.	7	0.91
31	ត្រីក្រពុលបាយ	Cosmochilus harmandi	6	0.78
32	ត្រីការហា / ត្រីគល់រាំង	Catlocarpio siamensis	6	0.78

33	ត្រីកេស	Kryptoplerus sp.	5	0.65
34	ត្រីឆែកខុំ	Bagrichthys obscurus	5	0.65
35	ត្រីចង្វា	Oryzias sp.	5	0.65
36	ត្រីស្លាត	Notopterus notopterus	5	0.65
37	ត្រីអ៊ីរី	Oxyeleotris	4	0.52
38	ត្រីប្រម៉ា	Boesemania microlepis	4	0.52
39	ត្រីកញ្ឆាញ់ច្រាស	Parambassis sp.	4	0.52
40	ត្រីក្រឡង់/ត្រីព្រួល	Cirrhinus microlepsis	3	0.39
41	ត្រីអណ្តែង	Amblyceps sp.	3	0.39
42	ត្រីឆ្ពិង	Mastacembelus armatus	3	0.39
43	ត្រីខ្ចាន	Hampala sp.	3	0.39
44	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	2	0.26
45	ត្រីទីឡាព្យា	Oreochromis sp.	2	0.26
46	ត្រីលលកស	Osteochilus schlegeli	2	0.26
47	ត្រីផ្នោង	Xenentodon cancila	2	0.26
48	ត្រីត្រសក់	Probarbus sp.	1	0.13
49	ត្រីស្មើកន្ទុយ	Pangasius polyuranodom	1	0.13
50	ត្រីជញ្ជូញមាន់	Coilia lindmani	1	0.13
51	ត្រីក្រឡង់	Cirrhinus microlepis	1	0.13
52	ត្រីកាបស	Hypophthalmichthys molitrix	1	0.13
53	ត្រីប៉ាសេអ៊ី	Mekongina erythrospila	1	0.13
54	ត្រីត្រឌិន	Ompok eugeneiatus	1	0.13
55	ត្រីកន្ទ្រែងប្រេង	Parambassis wolffii	1	0.13
56	ត្រីឆ្ពុង(ម៉ៀលថ្ម)	Babichthys laevis	1	0.13
57	ត្រីព្រលួង	Leptobarbus hoeveni	1	0.13

Fish species are most recent catch by all sites and all individuals founded 57 fish species. Frequency and percent distribution of the top 10 fish species: 1. Gymnosstomus sp. was 72 (9.3%), 2. Puntioplites proctozysron was 68 (8.8%), 3. Akysis sp. was 57 (7.4%), 4. Pangasius sp. was 39 (5.1%), 5. Hemibagrus sp. was 36 (4.7%), 6. Labeo Chrysophekadion was 34 (4.4%), 7. Hypsitarbus sp. was 33 (4.3%), 8. Labiobarbus siamensis was 32 (4.2%), 9. Anabas testudineus was 29 (3.8%), and 10. Osteochilus sp. was 25 (3.2%) (Table 25).

Table 26. Fish species most recent catch in mainstream, Muk Kampul, Kandal Province

No.	Khmer Name	Scientific Name	Frequency	Percentage
1	ត្រីច្រកែង	Puntioplites proctozysron	12	11.01
2	ត្រីក្អែក	Labeo Chrysophekadion	11	10.09
3	ត្រីប្រា	Pangasius sp.	11	10.09
4	ត្រីម៉ៀល	Gymnosstomus sp.	10	9.17
5	ត្រីឆ្ពិន	Hypsitarbus sp.	8	7.34
6	ត្រីគ្រុំ	Osteochilas melanpleura	6	5.50
7	ត្រីឆ្នាំង	Hemibagrus sp.	6	5.50
8	ត្រីរ៉ែ	Pangasius conchophilus	6	5.50
9	ត្រីឈ្វាត	Pangasius mekongensis	6	5.50
10	ត្រីរោ	Pangasius larnaudii	6	5.50
11	ត្រីកេស	Kryptoplerus sp.	3	2.75
12	ត្រីអណ្តាតរ៉ែង	Cynoglossus sp.	3	2.75
13	ត្រីអាចម័ក	Labiobarbus siamensis	3	2.75
14	ត្រីឆ្លាក	Chyclocheilichthys enoplos	2	1.83
15	ត្រីលិញ	Thynnichthys Thynnoides	1	0.92
16	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	1	0.92
17	ត្រីទីឡាព្យា	Oreochromis sp.	1	0.92
18	ត្រីស្លឹកឬស្សី	paralaubuca barroni	1	0.92
19	ត្រីអ័រី	Oxyeleotris	1	0.92
20	ត្រីរចកខុំ	Bagrichthys obscurus	1	0.92
21	ត្រីខ្នងង៉ង	Labiobarbus leptocheila	1	0.92
22	ត្រីប្រម៉ា	Boesemania microlepis	1	0.92
23	ត្រីស្ងើកខ្នុយ	Pangasius polyuranodom	1	0.92
24	ត្រីក្រុស	Osteochilus sp.	1	0.92
25	ត្រីចង្ហា	Oryzias sp.	1	0.92
26	ត្រីកាបស	Hypophthalmichthys molitrix	1	0.92
27	ត្រីកញ្ជ្រុក	Yasuhikotakia sp.	1	0.92
28	ត្រីកាហា / ត្រីគល់រាំង	Catlocarpio siamensis	1	0.92
29	ត្រីឆ្ពុង(ម៉ៀលថ្ម)	Babichthys laevis	1	0.92
30	ត្រីព្រលូង	Leptobarbus hoeveni	1	0.92

Fish species are most recent catch in Mainstream, Muk Kampul, Kandal province founded 30 fish species. Frequency and percent distribution of the top 10 fish species: 1. Puntioplites proctozysron was 12 (11%), 2. Labeo Chrysophekadion was 11 (10.1%), 3. Pangasius sp. was 11 (10.1%), 4. Gymnosstomus sp. was 10 (9.2%), 5. Hypsitarbus sp. was 8 (7.3%), 6. Osteochilas melanpleura was 6 (5.5%), 7. Hemibagrus sp. was 6 (5.5%), 8. Pangasius conchophilus was 6 (5.5%), 9. Pangasius mekongensis was 6 (5.5%), and 10. Pangasius larnaudii was 6 (5.5%) (Table 26).

Table 27. Fish species most recent catch in tributary habitats site, Peam Ro, Prey Veng province

No.	Khmer Name	Scientific Name	Frequency	Percentage
1	ត្រីច្រកែង	Puntioplites proctozysron	18	16.67
2	ត្រីប្រា	Pangasius sp.	17	15.74
3	ត្រីលិញ	Thynnichthys Thynnoides	5	4.63
4	ត្រីឆ្ពិន	Hypsitarbus sp.	5	4.63
5	ត្រីអណ្តាតឆ្កែ	Cynoglossus sp.	4	3.70
6	ត្រីបណ្តូលអំពៅ	Clupeichthys sp.	4	3.70
7	ត្រីកញ្ឆុះ	Akysis sp.	4	3.70
8	ត្រីក្រាញ់	Anabas testudineus	4	3.70
9	ត្រីចង្វា	Rasbora sp.	3	2.78
10	ត្រីឆ្នាំង	Hemibagrus sp.	3	2.78
11	ត្រីក្តាំងហាយ	Belodontichthys truncatus	3	2.78
12	ត្រីរ៉ែក	Labeo Chrysophekadion	3	2.78
13	ត្រីប្រម៉ា	Boesemania microlepis	3	2.78
14	ត្រីឈ្លាត	Pangasius mekongensis	3	2.78
15	ត្រីក្រពុលចាយ	Cosmochilus harmandi	2	1.85
16	ត្រីឆកទុំ	Bagrichthys obscurus	2	1.85
17	ត្រីផ្គក់	Channa striata	2	1.85
18	ត្រីកែ	Pangasius conchophilus	2	1.85
19	ត្រីជ្រៀ	Gymnosstomus sp.	2	1.85
20	ត្រីក្រុស	Osteochilus sp.	2	1.85
21	ត្រីឆ្ពញ	Macrognathus sp.	2	1.85
22	ត្រីខ្ជង	Mastacembelus armatus	2	1.85
23	ត្រីខ្ចាន	Hampala sp.	2	1.85
24	ត្រីគ្រុំ	Osteochilas melanpleura	1	0.93
25	ត្រីអេស	Kryptoplerus sp.	1	0.93
26	ត្រីកាហែ	Barbonymus sp.	1	0.93
27	ត្រីខ្នងដង	Labiobarbus leptocheila	1	0.93
28	ត្រីកន្ត្រៃ	Pristolepis fasciata	1	0.93
29	ត្រីចង្វា	Oryzias sp.	1	0.93
30	ត្រីកញ្ជ្រុក	Yasuhikotakia sp.	1	0.93
31	ត្រីស្រែការភ្ពាម	Cyclocheilichthys sp.	1	0.93
32	ត្រីកំភ្លាញ	Trichohodus sp.	1	0.93
33	ត្រីជន្ទាសភ្នុក	Parachela ouygastoides	1	0.93
34	ត្រីផ្គោង	Xenentodon cancila	1	0.93

Fish species are most recent catch catch in Tributary, Peam Ro, Prey Veng Province founded 34 fish species. Frequency and percent distribution of the top 10 fish species: 1. Puntioplites proctozysron was 18 (16.7%), 2. Pangasius sp. was 17 (15.7%), 3. Thynnichthys Thynnoides was 5 (4.6%), 4. Hypsitarbus sp. was 5 (4.6%), 5. Cynoglossus sp. was 4 (3.7%), 6. Clupeichthys sp. was 4 (3.7%), 7. Akysis sp. was 4

(3.7%), 8. Anabas testudineus was 4 (3.7%), 9. Rasbora sp. was 3 (2.8%), and 10. Hemibagrus sp. was 3 (2.8%) (Table 27).

Table 28. Fish species most recent catch in flooded forest, Tboung Khmom

No.	Khmer Name	Scientific Name	Frequency	Percentage
1	ត្រីម៉ៀល	Gymnosstomus sp.	16	8.42
2	ត្រីកញ្ឆុះ	Akysis sp.	14	7.37
3	ត្រីច្រកែង	Puntioplites proctozysron	11	5.79
4	ត្រីកន្ត្រៃប់	Pristolepis fasciata	10	5.26
5	ត្រីឆ្នាំង	Hemibagrus sp.	9	4.74
6	ត្រីកាហែ	Barbonymus sp.	9	4.74
7	ត្រីក្រុស	Osteochilus sp.	9	4.74
8	ត្រីក្រាញ់	Anabas testudineus	9	4.74
9	ត្រីស្លឹកឬស្សី	paralaubuca barroni	8	4.21
10	ត្រីប្រា	Pangasius sp.	8	4.21
11	ត្រីអាចម៍កុក	Labiobarbus siamensis	7	3.68
12	ត្រីជន្ទាសភ្នុក	Parachela ouygastoides	7	3.68
13	ត្រីឆ្ពិន	Hypsitarbus sp.	6	3.16
14	ត្រីរ៉ែក	Labeo Chrysophekadion	6	3.16
15	ត្រីកញ្ជ្រុក	Yasuhikotakia sp.	6	3.16
16	ត្រីក្តាំងហាយ	Belodontichthys truncatus	5	2.63
17	ត្រីខ្នងដំង	Labiobarbus leptocheila	5	2.63
18	ត្រីស្រការក្តាម	Cyclocheilichthys sp.	5	2.63
19	ត្រីរោ	Pangasius larnaudii	5	2.63
20	ត្រីលិញ	Thynnichthys Thynnoides	4	2.11
21	ត្រីគ្រុំ	Osteochilas melanpleura	4	2.11
22	ត្រីក្រឡង់/ត្រីព្រួល	Cirrhinus microlepsis	3	1.58
23	ត្រីចង្វា	Rasbora sp.	2	1.05
24	ត្រីដំរី	Oxyeleotris	2	1.05
25	ត្រីឈ្វាត	Pangasius mekongensis	2	1.05
26	ត្រីបណ្តូលអំពៅ	Clupeichthys sp.	2	1.05
27	ត្រីកំភ្លាញ	Trichohodus sp.	2	1.05
28	ត្រីកញ្ចាញ់ច្រាស	Parambassis sp.	2	1.05
29	ត្រីលលកស	Osteochilus schlegeli	2	1.05
30	ត្រីណ្តាក	Chyclocheilichthys enoplos	1	0.53
31	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	1	0.53
32	ត្រីកេស	Kryptoplerus sp.	1	0.53
33	ត្រីក្រពុលចាយ	Cosmochilus harmandi	1	0.53
34	ត្រីផ្គក់	Channa striata	1	0.53
35	ត្រីអម្ពែង	Amblyceps sp.	1	0.53
36	ត្រីក្រឡង់	Cirrhinus microlepis	1	0.53

37	ត្រីធ្ងូញ	Macrognathus sp.	1	0.53
38	ត្រីកាហា / ត្រីគល់រាំង	Catlocarpio siamensis	1	0.53
39	ត្រីស្ពាត	Notopterus notopterus	1	0.53

Fish species are most recent catch catch in llooded forest, Tboung Khmom, Tboung khmom province founded 39 fish species Frequency and percent distribution of the top 10 fish species: 1. Gymnosstomus sp. was 16 (8.4%), 2. Akysis sp. was 14 (3.4%), 3. Puntioplites proctozysron was 11 (5.8%), 4. Pristolepis fasciata was 10 (5.3%), 5. Hemibagrus sp. was 9 (4.7%), 6. Barbonymus sp. was 9 (4.7%), 7. Osteochilus sp. was 9 (4.7%), 8. Anabas testudineus was 9 (4.7%), 9. paralaubuca barroni was 8 (4.2%), and 10. Pangasius sp. was 8 (4.2%) (Table 28).

Table 29. Fish species most recent catch in flooded rice field, Ou Roeung Ov, Tboung Khmom province

No.	Khmer Name	**Scientific Name**	**Frequency**	Percentage
1	ត្រីម៉ៃល	Gymnosstomus sp.	24	12.44
2	ត្រីអាចម័កុក	Labiobarbus siamensis	22	11.40
3	ត្រីកញ្ឆុះ	Akysis sp.	21	10.88
4	ត្រីច្រកែង	Puntioplites proctozysron	16	8.29
5	ត្រីឆ្នាំង	Hemibagrus sp.	9	4.66
6	ត្រីក្រាញ់	Anabas testudineus	9	4.66
7	ត្រីឆ្កិន	Hypsitarbus sp.	8	4.15
8	ត្រីស្រការក្តាម	Cyclocheilichthys sp.	8	4.15
9	ត្រីស្លឹកឬស្សី	paralaubuca barroni	7	3.63
10	ត្រីរ៉ែក	Labeo Chrysophekadion	7	3.63
11	ត្រីកន្ត្រៃ	Pristolepis fasciata	7	3.63
12	ត្រីក្រុស	Osteochilus sp.	6	3.11
13	ត្រីឆ្ពាក	Chyclocheilichthys enoplos	5	2.59
14	ត្រីកញ្ជក	Yasuhikotakia sp.	5	2.59
15	ត្រីកាហែ	Barbonymus sp.	4	2.07
16	ត្រីធ្ងូញ	Macrognathus sp.	4	2.07
17	ត្រីកំភ្លាញ	Trichohodus sp.	4	2.07
18	ត្រីលិញ	Thynnichthys Thynnoides	2	1.04
19	ត្រីគ្រុំ	Osteochilas melanpleura	2	1.04
20	ត្រីអណ្តែង	Amblyceps sp.	2	1.04
21	ត្រីចង្វា	Oryzias sp.	2	1.04
22	ត្រីកាហា / ត្រីគល់រាំង	Catlocarpio siamensis	2	1.04
23	ត្រីស្ពាត	Notopterus notopterus	2	1.04
24	ត្រីទីឡាព្យា	Oreochromis sp.	1	0.52
25	ត្រីចង្វា	Rasbora sp.	1	0.52
26	ត្រីក្តាំងហាយ	Belodontichthys truncatus	1	0.52
27	ត្រីដំរី	Oxyeleotris	1	0.52

28	ត្រីក្រពុលចាយ	Cosmochilus harmandi	1	0.52
29	ត្រីខ្នងដង	Labiobarbus leptocheila	1	0.52
30	ត្រីផ្តក់	Channa striata	1	0.52
31	ត្រីប្រា	Pangasius sp.	1	0.52
32	ត្រីបណ្តូលអំពៅ	Clupeichthys sp.	1	0.52
33	ត្រីប៉ាសេអ៊ី	Mekongina erythrospila	1	0.52
34	ត្រីត្រឌឹន	Ompok eugeneiatus	1	0.52
35	ត្រីខ្ជិង	Mastacembelus armatus	1	0.52
36	ត្រីកន្ទ្រងប្រេង	Parambassis wolffii	1	0.52
37	ត្រីខ្ចាន	Hampala sp.	1	0.52
38	ត្រីជន្លាសត្តុក	Parachela ouygastoides	1	0.52

Fish species are most recent catches in flooded rice field, Ou Roeung Ov, Tboung Khmom province founded 38 fish species. Frequency and percent distribution of the top 10 fish species: 1. Gymnosstomus sp. was 24 (12.4%), 2. Labiobarbus siamensis was 22 (11.4%), 3. Akysis sp. was 21 (10.9%), 4. Puntioplites proctozysron was 16 (8.3%), 5. Hemibagrus sp. was 9 (4.7%), 6. Anabas testudineus was 9 (4.7%), 7. Hypsitarbus sp. was 8 (4.15%), 8. Cyclocheilichthys sp. was 8 (4.15%), 9. paralaubuca barroni was 7 (3.6%), and 10. Labeo Chrysophekadion was 7 (3.6%) (Table 29).

Table 30. Fish species most recent catch in flooded rice field, Chhoeung Prey, Kampong Chham province

No.	Khmer Name	Scientific Name	Frequency	%
1	ត្រីម៉ៀល	Gymnosstomus sp.	20	11.70
2	ត្រីកញ្ឆុះ	Akysis sp.	18	10.53
3	ត្រីជន្លាសត្តុក	Parachela ouygastoides	15	8.77
4	ត្រីច្រអែង	Puntioplites proctozysron	11	6.43
5	ត្រីឆ្លុញ	Macrognathus sp.	10	5.85
6	ត្រីឆ្នាំង	Hemibagrus sp.	9	5.26
7	ត្រីស្លឹកឬស្សី	paralaubuca barroni	8	4.68
8	ត្រីអ្អែក	Labeo Chrysophekadion	7	4.09
9	ត្រីក្រុស	Osteochilus sp.	7	4.09
10	ត្រីក្រាញ់	Anabas testudineus	7	4.09
11	ត្រីពោ	Pangasius larnaudii	7	4.09
12	ត្រីឆ្ពិន	Hypsitarbus sp.	6	3.51
13	ត្រីផ្តក់	Channa striata	5	2.92
14	ត្រីកន្ត្រៃ	Pristolepis fasciata	5	2.92
15	ត្រីកាហ៊ែ	Barbonymus sp.	4	2.34
16	ត្រីឈ្លាត	Pangasius mekongensis	4	2.34
17	ត្រីកំភ្លាញ	Trichohodus sp.	4	2.34
18	ត្រីចង្វា	Rasbora sp.	2	1.17

19	ត្រីក្រពុលចាយ	Cosmochilus harmandi	2	1.17
20	ត្រីឆកមុំ	Bagrichthys obscurus	2	1.17
21	ត្រីប្រា	Pangasius sp.	2	1.17
22	ត្រីបណ្តូលអំពៅ	Clupeichthys sp.	2	1.17
23	ត្រីកាហា / ត្រីគល់រាំង	Catlocarpio siamensis	2	1.17
24	ត្រីស្ពាត	Notopterus notopterus	2	1.17
25	ត្រីកញ្ចាញ់ត្រាស	Parambassis sp.	2	1.17
26	ត្រីគ្រុំ	Osteochilas melanpleura	1	0.58
27	ត្រីក្តាំងហាយ	Belodontichthys truncatus	1	0.58
28	ត្រីខ្នងដង	Labiobarbus leptocheila	1	0.58
29	ត្រីត្រសក់	Probarbus sp.	1	0.58
30	ត្រីជញ្ជូញមាន់	Coilia lindmani	1	0.58
31	ត្រីចង្ហា	Oryzias sp.	1	0.58
32	ត្រីស្រែការក្តាម	Cyclocheilichthys sp.	1	0.58
33	ត្រីផ្ទោង	Xenentodon cancila	1	0.58

Fish species are most recent catches in flooded rice field, Chhoeung Prey, Kampong Chham province founded 33 fish species. Frequency and percent distribution of the top 10 fish species: 1. Gymnosstomus sp. was 20 (11.7%), 2. Akysis sp. was 18 (10.5%), 3. Parachela ouygastoides was 15 (8.77%), 4. Puntioplites proctozysron was 11 (6.43%), 5. Macrognathus sp. was 10 (5.85%), 6. Hemibagrus sp. was 9 (5.25%), 7. paralaubuca barroni was 8 (4.68%), 8. Labeo Chrysophekadion was 7 (4.09%), 9. Osteochilus sp. was 7 (4.09%), and 10. Anabas testudineus was 7 (4.09%) (Table 30).

3.6 Disposal of catch caught in last 12 months in dry and wet seasons

Table 31. The disposal of catch caught in last 12 months by consumed, sold, processing, given to relative

Characteristics	Average Consumption in wet season (kg)	Average Consumption in dry season (kg)	Average sold in wet season (kg)	Average sold in dry season (kg)	Average processed in wet season (kg)	Average processed in dry season (kg)	Average given in wet season (kg)	Average given in dry season (kg)
All fishers	126.05	116.51	1044.92	992.38	25.55	34.02	27.12	26.34
Sites								
Mainstream	100.01	96.49	665.97	1503.91	28.00	48.46	19.21	16.28
Tributary, Peam Ro	98.83	119.33	986.73	485.13	29.74	42.00	41.50	19.33
Flooded	139.02	110.73	1009.13	910.19	23.72	17.62	22.60	32.57

forest, Tboung Kmum								
Flooded rice field, O Roeung Ouv	122.40	121.95	1300.85	1181.73	21.00	20.97	28.84	33.41
Flooded rice field, Chhoeung Prey	164.71	144.14	1236.94	600.73	28.64	23.67	29.54	30.57

Table 31 shows, the average fish consumption in wet and dry season found at about 126kg/fisher and 116.5kg/fisher, respectively. The average fish sold in wet and dry season found at about 1044.9kg/fisher and 992.4kg/fisher, respectively. The average fish processed in wet and dry season found at about 25.5 kg/fisher and 34kg/fisher, respectively. The average fish donated in wet and dry season found at about 271kg/fisher and 26.3kg/fisher, respectively.

3.7 Fisheries trend compared to last 5 years in term of abundance biomass and fish length

Table 32. Fisheries trend in last 5 year in term of abundance biomass

Characteristics	Abundance Biomass	Frequency	%
All fishers	No change	1	0.57
	Increase	18	10.29
	Decrease	156	89.14
Sites			
Mainstream, Muk Kampul	Decrease	35	100.00
Tributary, Peam Ro	Decrease	35	100.00
Flooded forest, Tboung Khmom	Increase	7	20.00
	Decrease	28	80.00
Flooded rice field, Ou Roeung Ov	Increase	8	22.86
	Decrease	27	77.14
Flooded rice field, Chhoeung Prey	No change	1	2.86
	Increase	3	8.57
	Decrease	31	88.57

Fisheries trend in the last 5 years in term of fish abundance biomass, more than two-third (89.1%) founded fish biomass have decreased and less than 1% said fish biomass has been no change (Table 32). Across the studied sites, mainstream and tributary sites found that fish biomass have decreased 100% in the last 5 yaers. While other sites, Tributary, Peam Ro; flooded forest, Tboung Khmom Flooded rice field, O Roeung Ouv; and Flooded rice field, Chhoeung Prey fish biomass have decreased 80%, 77.1% and 88.6%, respectively.

Table 33. Reasons for changes in term of abundance biomass by all individuals

.No.	Characteristics	Frequency	%
1	Using illegal fishing gear	60	23.26
2	Electric-Fishing Gear	56	21.71
3	Use fyke net for catching fish	30	11.63
4	Losing flooded forest	29	11.24
5	Too many fishermen	22	8.53
6	Changing of water regime	8	3.10
7	Abolition of Fishing Lots	6	2.33
8	Illegal fishing crackdown	6	2.33
9	Availability of flooded forest	4	1.55
10	Poisoned agricultural Using	4	1.55
11	Catch more than previous time	4	1.55
12	Climate Change	4	1.55
13	Worker in Thailand and Korea	3	1.16
14	Using modern fishing gear	3	1.16
15	Losing natural feeds	2	0.78
16	Water receded quickly	2	0.78
17	Filling up lake	2	0.78
18	Fishermen became less than before	2	0.78
19	Increasing fish larvae	2	0.78
20	Dam/dyke construction	2	0.78
21	Catching larvae/fingerling	1	0.39
22	Cutting down of flooded forests for agriculture	1	0.39
23	Not changing	1	0.39
24	Extinction of big fish species	1	0.39
25	Fish migrating from Srung Treng province	1	0.39
26	Impacts on water flow	1	0.39
27	Using Yang Kaiv for catching fish	1	0.39

Reasons for changing fish biomass trend during last 5 years found that illegall fishing gears were the main factors, accounting for nearly one-fourth (23.3%), followed by electric-fishing gear with 21.7%. While fyke net using and losing flooded forest were similar percentages at around 11.6% and 11.2%, respectively (Table 33).

. Table 34. Reasons for change in term of abundance biomass by sites

Sites	No	Characteristics	Frequency	%
Mainstream, Muk Kampul	1	Electric-Fishing Gear	11	27.5
	2	Using illegal fishing gear	6	15
	3	Use fyke net for catching fish	4	10
	4	Too many fishermen	4	10
	5	Changing of water regime	4	10

	6	Climate Change	3	7.5
	7	Losing flooded forest	2	5
	8	Filling up lake	1	2.5
	9	Cutting down of flooded forests for agriculture	1	2.5
	10	Impacts on water flow	1	2.5
	11	Using modern fishing gear	1	2.5
	12	Dam/dyke construction	1	2.5
	13	Using Yang Kaiv for catching fish	1	2.5
Tributary, Peam Ro	1	Using illegal fishing gear	20	32.26
	2	Electric-Fishing Gear	15	24.19
	3	Losing flooded forest	9	14.52
	4	Too many fishermen	8	12.90
	5	Use fyke net for catching fish	7	11.29
	6	Water receded quickly	1	1.61
	7	Changing of water regime	1	1.61
	8	Climate Change	1	1.61
Flooded forest, Tboung Khmom	1	Using illegal fishing gear	14	26.92
	2	Losing flooded forest	12	23.08
	3	Electric-Fishing Gear	9	17.31
	4	Use fyke net for catching fish	7	13.46
	5	Catch more than previous time	3	5.77
	6	Losing natural feeds	2	3.85
	7	Too many fishermen	2	3.85
	8	Water receded quickly	1	1.92
	9	Not changing	1	1.92
	10	Changing of water regime	1	1.92
Flooded rice field, Ou Roeung Ov	1	Illegal fishing	6	15
	2	Electric-Fishing Gear	5	12.5
	3	Abolition of Fishing Lots	5	12.5
	4	Use fyke net for catching fish	3	7.5
	5	Worker in Thailand and Korea	3	7.5
	6	Too many fishermen	2	5
	7	Availability of flooded forest	2	5
	8	Fishermen became less than before	2	5
	9	Using illegal fishing gear	2	5
	10	Changing of water regime	2	5
	11	Losing flooded forest	1	2.5
	12	Filling up lake	1	2.5
	13	Catching larvae/fingerling	1	2.5
	14	Increasing fish larvae	1	2.5
	15	Catch more than previous time	1	2.5

	16	Extinction of big fish species	1	2.5
	17	Fish migrating from Srung Treng province	1	2.5
	18	Dam/dyke construction	1	2.5
Flooded rice field, Chhoeung Prey	1	Using illegal fishing gear	18	28.13
	2	Electric-Fishing Gear	16	25.00
	3	Use fyke net for catching fish	9	14.06
	4	Too many fishermen	6	9.38
	5	Losing flooded forest	5	7.81
	6	Poisoned agricultural Using	4	6.25
	7	Availability of flooded forest	2	3.13
	8	Using modern fishing gear	2	3.13
	9	Abolition of Fishing Lots	1	1.56
	10	Increasing fish larvae	1	1.56

In mainstream site, Muk Kampul, electric-fishing gear and illegal-fishing gear, were the two main reasons for changing fish biomass in the last 5 years, accounting for 27.5% and 15%, respectively. While fyke net fishing gear, too many fishermen and changing water regime were the third largest factors wich have resulted in changing fish biomass in mainstream. In tributary, Peam Ro, illegal fishing gears, electric-fishing gear, and losing flooded forest were the main three reasons for fish biomass changing were 32.2%, 24.2%, and 14.5%, respectively. In flooded forest, Tboung Khmom, illegal fishing gear, losing flooded forest, and electric-fishing gear were the key factors for changing fish biomass, founded at 26.9%, 23%, and 17.3%, respectively. In flooded rice field, Ou Roeung Ov, illegal fishing gears, electric-fishing Gear, and abolition of Fishing Lots were the three main factors which have degraded fish biomass were at 15%, 12.5%, and 12.5%, respectively. In flooded rice field, Chhoeung Prey, illegal fishing gears, electric-fishing gear, and fyke net fishing gear were the main reasons for changing fish biomass, accounting for 28.1%, 25%, and 14%, respectively (Table 34).

Table 35. Fisheries trend in last 5 year in term of fish length

Characteristics	Fish Length	Frequency	%
All fishers	No change	34	19.43
	Increase	14	8.00
	Decrease	127	72.57
Sites			
Mainstream, Muk Kampul	No change	10	28.57
	Decrease	25	71.43
Tributary, Peam Ro	No change	2	5.71
	Decrease	33	94.29
Flooded forest, Tboung Khmom	No change	6	17.14
	Decrease	29	82.86
Flooded rice field, Ou Roeung Ov	No change	8	22.86
	Increase	14	40.00

	Decrease	13	37.14
Flooded rice field, Chhoeung Prey	No change	8	22.86
	Decrease	27	77.14

Fisheries trend in the last 5 year in term of fish length, about 72.5% founded fish length have decreased and less than 19% said fish biomass has been no change (table 35). Across the studied sites, mainstream at Muk Kampul; tributary at Peam Ro; flooded forest at Tboung Khmom; flooded rice field at Ou Roeung Ov; and flooded rice field at Chhoeung respondents answered that fish length have decreased at 71.4%, 94.3%, 82.8%, 37.1% and 77.2%, respectively. While fish length have increased in the last 5 year found only in flooded rice field at O Roeung Ouv was at 40%.

Table 36. Reasons for change in term of fish length by all individuals

No	LenthReasion	Frequency	%
1	Losing natural feeds	28	14.29
2	Losing flooded forest	25	12.76
3	Too many fishermen	25	12.76
4	Using illegal fishing gears	19	9.69
5	Illegal catching larvae/fingerling	18	9.18
6	Electric-Fishing Gear	14	7.14
7	Use fyke net for catching fish	11	5.61
8	Water receded quickly	7	3.57
9	Availability of natural feeds	6	3.06
10	Using electro-fishing	6	3.06
11	Extinction of big fish species	5	2.55
12	Easy way to get out from lake	4	2.04
13	Abolition of Fishing Lots	3	1.53
14	Catch more than previous time	3	1.53
15	Not changing	3	1.53
16	Changing of water regime	3	1.53
17	Availability of flooded forest	2	1.02
18	Water increase not exactly season	2	1.02
19	Impacts on water flow	2	1.02
20	Filling up lake	1	0.51
21	Fishermen became less than before	1	0.51
22	Fishing everywhere	1	0.51
23	Poisoned agricultural Using	1	0.51
24	Increasing fish larvae	1	0.51
25	Illegal fishing crackdown	1	0.51
26	Using modern fishing gear	1	0.51
27	Dam/dyke construction	1	0.51
28	Translucent water	1	0.51
29	Climate Change	1	0.51

Reasons for changing fish length trend in last 5 years found that losing natural feeds were the main factors, accounting for at 14.3%. Followed by losing flooded forest and too many fishermen were the same amount with 12.7%. While illegal fishing gears and illegal illegal catching larvae/fingerling were similar percentages at around 9.7% and 9.2%, respectively (Table 36).

Table 37. Reasons for change in term of fish length by sites

Sites	No	LenthReason	Frequency	%
Mainstream , Muk Kampul	1	Losing natural feeds	7	21.21
	2	Electric-Fishing Gear	5	15.15
	3	Too many fishermen	4	12.12
	4	Easy way to get out from lake	4	12.12
	5	Losing flooded forest	3	9.09
	6	Use fyke net for catching fish	2	6.06
	7	Water receded quickly	2	6.06
	8	Using electro-fishing	2	6.06
	9	Impacts on water flow	2	6.06
	10	Filling up lake	1	3.03
	11	Climate Change	1	3.03
Tributary, Peam Ro	1	Too many fishermen	7	17.07
	2	Illegal catching larvae/fingerling	7	17.07
	3	Losing flooded forest	6	14.63
	4	Losing natural feeds	5	12.20
	5	Using electro-fishing	4	9.76
	6	Electric-Fishing Gear	3	7.32
	7	Use fyke net for catching fish	2	4.88
	8	Using illegal fishing gear	2	4.88
	9	Water increase not exactly season	2	4.88
	10	Water receded quickly	1	2.44
	11	Dam/dyke construction	1	2.44
	12	Translucent water	1	2.44
Flooded forest, Tboung Khmom	1	Using illegal fishing gears	9	21.95
	2	Losing flooded forest	8	19.51
	3	Losing natural feeds	5	12.20
	4	Electric-Fishing Gear	4	9.76
	5	Use fyke net for catching fish	4	9.76
	6	Too many fishermen	4	9.76
	7	Water receded quickly	2	4.88
	8	Catch more than previous time	2	4.88
	9	Catching larvae/fingerling	1	2.44
	10	Not changing	1	2.44

	11	Extinction of big fish species	1	2.44
Flooded rice field, O Roeung Ouv	1	Losing natural feeds	5	13.51
	2	Availability of natural feeds	5	13.51
	3	Too many fishermen	4	10.81
	4	Losing flooded forest	3	8.11
	5	Catching larvae/fingerling	3	8.11
	6	Abolition of Fishing Lots	3	8.11
	7	Availability of flooded forest	2	5.41
	8	Not changing	2	5.41
	9	Changing of water regime	2	5.41
	10	Electric-Fishing Gear	1	2.70
	11	Use fyke net for catching fish	1	2.70
	12	Water receded quickly	1	2.70
	13	Fishermen became less than before	1	2.70
	14	Fishing everywhere	1	2.70
	15	Illegal fishing crackdown	1	2.70
	16	Catch more than previous time	1	2.70
	17	Extinction of big fish species	1	2.70
Flooded rice field, Chhoeung Prey	1	Using illegal fishing gear	8	18.18
	2	Illegal catching larvae/fingerling	7	15.91
	3	Losing natural feeds	6	13.64
	4	Too many fishermen	6	13.64
	5	Losing flooded forest	5	11.36
	6	Extinction of big fish species	3	6.82
	7	Use fyke net for catching fish	2	4.55
	8	Electric-Fishing Gear	1	2.27
	9	Water receded quickly	1	2.27
	10	Availability of natural feeds	1	2.27
	11	Poisoned agricultural Using	1	2.27
	12	Increasing fish larvae	1	2.27
	13	Changing of water regime	1	2.27
	14	Using modern fishing gear	1	2.27

In mainstream site, Muk Kampul, losing natural feeds and electric-fishing gear, were the two main reasons for changing fish biomass in the last 5 years, accounting for 21.2% and 15.1%, respectively. While too many fishermen and easy way to get out from lake were the third largest factors wich have resulted in changing fish length in mainstream, accounting for the same percentage at 12.2%. In tributary, Peam Ro, illegal fishing gears and illegal catching larvae/fingerling were the main three reasons for fish length changing was the same amount at 17%. Losing flooded forest and losing natural feeds were the second and third main factors for changing fish length, accounting for 14.6%, and 12.2%, respectively. In flooded forest, Tboung Khmom, too many fishermen and illegal fishing gear, losing flooded forest, and

electric-fishing gear were the three key factors for changing fish length, founded at 21.9%, 19.5%, and 12.2%, respectively. In flooded rice field, Ou Roeung Ov, losing natural feeds and availability of natural feeds were the two main factors which have changing fish length were the same percentage at 15%, 12.5%, respectively. Followed by too many fishermen was at 10.8%. In flooded rice field, Chhoeung Prey, illegal fishing gears, illegal catching larvae/fingerling, and losing natural feeds were the main reasons for changing fish length, accounting for 18.1%, 15.9%, and 13.6%, respectively (Table 37).

3.8 Species are no longer caught

Table 38. Fish species are no longer caught by all sites and all individuals

No.	Khmer Name	Scientific Name	Frequency	%
1	ត្រីកាហោ / ត្រីគល់រាំង	Catlocarpio siamensis	30	11.811
2	ត្រីព្រលូង	Leptobarbus hoeveni	21	8.268
3	ត្រីក្រឡង់/ត្រីព្រួល	Cirrhinus microlepsis	20	7.874
4	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	18	7.087
5	ត្រីក្បាក	Tenualosa thibaudeaui	18	7.087
6	ត្រីកាហែ	Barbonymus sp.	17	6.693
7	ត្រីឆ្ពោក	Chyclocheilichthys enoplos	16	6.299
8	ត្រីលិញ	Thynnichthys Thynnoides	14	5.512
9	ត្រីក្រាយ	Chitala ornate	11	4.331
10	ត្រីប៉ាសេអ៊ី	Mekongina erythrospila	11	4.331
11	ត្រីបេកា	Scomberomorus sinensis	6	2.362
12	ត្រីកន្ទ្រងប្រេង	Parambassis wolffii	6	2.362
13	ត្រីដងខ្នែង	Macrochirichthys macrochirus	6	2.362
14	ត្រីអៀប/ត្រីឆ្ពោ	Channa micropeltes	6	2.362
15	ត្រីរាជ	Pangasianodon gigas	5	1.969
16	ត្រីខ្ជា	Datnioides polota	4	1.575
17	ត្រីត្រសក់	Probarbus sp.	4	1.575
18	ត្រីខ្ជិង	Mastacembelus armatus	4	1.575
19	ត្រីលលកស	Osteochilus schlegeli	3	1.181
20	ត្រីស្តក់	Wallago micropogon	3	1.181
21	ត្រីកំព្រាម	Polynemus sp.	3	1.181
22	ត្រីទ្រនេល	Hemibagrus filamentus	3	1.181
23	ត្រីស្លឹកឬស្សី	paralaubuca barroni	2	0.787
24	ត្រីក្តាំងហាយ	Belodontichthys truncatus	2	0.787
25	ត្រីឆ្នា	Lycothrissa crocodilus	2	0.787
26	ត្រីផ្គក់	Channa striata	2	0.787
27	ត្រីអណ្តែង	Amblyceps sp.	2	0.787
28	ត្រីកាបស	Hypophthalmichthys molitrix	2	0.787

29	ត្រីឆ្នុង(ម៉ៀលថ្ម)	Babichthys laevis	2	0.787
30	ត្រីគ្រុំ	Osteochilas melanpleura	1	0.394
31	ត្រីច្រកែង	Puntioplites proctozysron	1	0.394
32	ត្រីឆ្កិន	Hypsitarbus sp.	1	0.394
33	ត្រីកេស	Kryptoplerus sp.	1	0.394
34	ត្រីទីឡាព្យា	Oreochromis sp.	1	0.394
35	ត្រីប្រា	Pangasius sp.	1	0.394
36	ត្រីបុងឡាវ	Panagasius krempfi	1	0.394
37	ត្រីត្រឌឹន	Ompok eugeneiatus	1	0.394
38	ត្រីពោ	Pangasius larnaudii	1	0.394
39	ត្រីខ្លាន	Hampala sp.	1	0.394
40	ត្រីខ្សាន	Brachgobius sp.	1	0.394

Fish species are no longer caught by all sites and all individuals founded 40 fish species. Frequency and percent distribution of the top 10 fish species: 1. Catlocarpio siamensis was 30 (11.81%), 2. Leptobarbus hoeveni was 21 (8.27%), 3. Cirrhinus microlepsis was 20 (7.87%), 4. Wallago attu was 18 (7.09%), 5. Tenualosa thibaudeaui was 18 (7.09%), 6. Barbonymus sp. was 17 (6.69%), 7. Chyclocheilichthys enoplos was 16 (6.3%), 8. Thynnichthys Thynnoides was 14 (5.51%), 9. Chitala ornate was 11 (4.33%), and 10. Mekongina erythrospila was 11 (4.33%) (Table 38).

Table 39. Fish species are no longer caught in mainstream site, Muk Kampul, Kandal Province

No.	Site	Khmer Name	Scientific Name	Frequency	%
1	1	ត្រីក្បាក	Tenualosa thibaudeaui	13	24.53
2	1	ត្រីក្រឡង់/ត្រីព្រួល	Cirrhinus microlepsis	9	16.98
3	1	ត្រីកាឃោ / ត្រីគល់រាំង	Catlocarpio siamensis	6	11.32
4	1	ត្រីដងខ្នែង	Macrochirichthys macrochirus	6	11.32
5	1	ត្រីបេកា	Scomberomorus sinensis	5	9.43
6	1	ត្រីឌា	Datnioides polota	2	3.77
7	1	ត្រីរាជ	Pangasianodon gigas	2	3.77
8	1	ត្រីលលកស	Osteochilus schlegeli	2	3.77
9	1	ត្រីឆ្ពាក	Chyclocheilichthys enoplos	1	1.89
10	1	ត្រីច្រកែង	Puntioplites proctozysron	1	1.89
11	1	ត្រីកាប៉ោ	Barbonymus sp.	1	1.89
12	1	ត្រីឆ្មា	Lycothrissa crocodilus	1	1.89
13	1	ត្រីត្រសក់	Probarbus sp.	1	1.89
14	1	ត្រីបុងឡាវ	Panagasius krempfi	1	1.89
15	1	ត្រីឆ្នុង(ម៉ៀលថ្ម)	Babichthys laevis	1	1.89
16	1	ត្រីព្រលូង	Leptobarbus hoeveni	1	1.89

Fish species are no longer caught in mainstream site, Muk Kampul, Kandal Province founded 16 fish species. Frequency and percent distribution of the top 5 fish species: 1. Tenualosa thibaudeaui 13 (24.5%), 2. Cirrhinus microlepsis was 9(17%), 3. Catlocarpio siamensis was 6 (11.3%), 4. Macrochirichthys macrochirus was 6 (11.3%), and 5. Scomberomorus sinensis was 5 (9.4%) (Table 39).

Table 40. Fish species are no longer caught in tributary habitats site, Peam Ro, Prey Veng province

No.	Khmer Name	Scientific Name	Frequency	%
1	ត្រីកាហែ	Barbonymus sp.	13	20.31
2	ត្រីកាហា / ត្រីគល់រាំង	Catlocarpio siamensis	11	17.19
3	ត្រីក្រាយ	Chitala ornate	8	12.50
4	ត្រីកន្ទ្រែងប្រេង	Parambassis wolffii	6	9.38
5	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	5	7.81
6	ត្រីព្រលួង	Leptobarbus hoeveni	4	6.25
7	ត្រីរាជ	Pangasianodon gigas	3	4.69
8	ត្រីស្នក់	Wallago micropogon	3	4.69
9	ត្រីទ្រនេល	Hemibagrus filamentus	3	4.69
10	ត្រីក្រឡង់/ត្រីព្រួល	Cirrhinus microlepsis	2	3.13
11	ត្រីរៀប/ត្រីឆ្ពៅ	Channa micropeltes	2	3.13
12	ត្រីអណ្តែង	Amblyceps sp.	1	1.56
13	ត្រីត្រឪន	Ompok eugeneiatus	1	1.56
14	ត្រីពោ	Pangasius larnaudii	1	1.56
15	ត្រីលលកស	Osteochilus schlegeli	1	1.56

Fish species are no longer caught in tributary habitats site, Peam Ro, Prey Veng province founded 15 fish species. Frequency and percent distribution of the top 5 fish species: 1. Barbonymus sp. was 13 (20.3%), 2. Catlocarpio siamensis was 11(17.2%), 3. Chitala ornate was 8 (12.5%), 4. Parambassis wolffii was 6 (9.4%), and 5. Wallago attu was 5 (7.8%) (Table 40).

Table 41. Fish species are no longer caught in flooded forest, Tboung Khmom

No.	Khmer Name	**Scientific Name**	Frequency	%
1	ត្រីប៉ាសេអ៊ី	Mekongina erythrospila	8	18.18
2	ត្រីឆ្ពោក	Chyclocheilichthys enoplos	7	15.91
3	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	7	15.91
4	ត្រីកាហា / ត្រីគល់រាំង	Catlocarpio siamensis	4	9.09
5	ត្រីព្រលួង	Leptobarbus hoeveni	4	9.09
6	ត្រីក្រឡង់/ត្រីព្រួល	Cirrhinus microlepsis	3	6.82
7	ត្រីក្រាយ	Chitala ornate	3	6.82
8	ត្រីឆ្ពិន	Hypsitarbus sp.	1	2.27

9	ត្រីប្រា	Pangasius sp.	1	2.27
10	ត្រីត្រសក់	Probarbus sp.	1	2.27
11	ត្រីអណ្តែង	Amblyceps sp.	1	2.27
12	ត្រីក្បាក	Tenualosa thibaudeaui	1	2.27
13	ត្រីខ្ជិង	Mastacembelus armatus	1	2.27
14	ត្រីឆ្ពុង(ជ្រៀលថ្ម)	Babichthys laevis	1	2.27
15	ត្រីខ្យាន	Brachgobius sp.	1	2.27

Fish species are no longer caught in flooded forest, Tboung Khmom founded 15 fish species. Frequency and percent distribution of the top 5 fish species: 1. Mekongina erythrospila was 8 (18.2%), 2. Chyclocheilichthys enoplos was 7 (15.9%), 3. Wallago attu was 7 (15.9%), 4. Catlocarpio siamensis was 4 (9.1%), and 5. Leptobarbus hoeveni was 4 (9.1%), (Table 41).

Table 42. Fish species are no longer caught in flooded rice field, O Roeung Ouv, Tboung Kmum province

No.	Khmer Name	Scientific Name	Frequency	%
1	ត្រីព្រលុង	Leptobarbus hoeveni	7	24.14
2	ត្រីកាហា / ត្រីគល់រាំង	Catlocarpio siamensis	6	20.69
3	ត្រីប៉ាសេអ៊ី	Mekongina erythrospila	3	10.34
4	ត្រីកំព្រាម	Polynemus sp.	3	10.34
5	ត្រីក្តាំងហាយ	Belodontichthys truncatus	2	6.90
6	ត្រីកាបស	Hypophthalmichthys molitrix	2	6.90
7	ត្រីលិញ	Thynnichthys Thynnoides	1	3.45
8	ត្រីឆ្តោក	Chyclocheilichthys enoplos	1	3.45
9	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	1	3.45
10	ត្រីទីឡាព្យា	Oreochromis sp.	1	3.45
11	ត្រីកាប៉ោ	Barbonymus sp.	1	3.45
12	ត្រីខ្ជិង	Mastacembelus armatus	1	3.45

Fish species are no longer caught in flooded rice field, Ou Roeung Ov, Tboung Khmom founded 12 fish species. Frequency and percent distribution of the top 5 fish species: 1. Leptobarbus hoeveni was 7 (24.1%), 2. Catlocarpio siamensis was 6 (20.7%), 3. Mekongina erythrospila was 3 (10.3%), 4. Polynemus sp. was 3 (10.3%), and 5. Belodontichthys truncates was 2 (6.9%) (Table 42).

Table 43. Fish species are no longer caught in flooded rice field, Chhoeung Prey, Kampong Chham province

No.	Khmer Name	Scientific Name	Frequency	%
1	ត្រីលិញ	Thynnichthys Thynnoides	13	20.31
2	ត្រីឆ្ពាក	Chyclocheilichthys enoplos	7	10.94
3	ត្រីក្រឡង់/ត្រីព្រួល	Cirrhinus microlepsis	6	9.38
4	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	5	7.81
5	ត្រីព្រលុង	Leptobarbus hoeveni	5	7.81
6	ត្រីក្បាក	Tenualosa thibaudeaui	4	6.25
7	ត្រីអៀប/ត្រីឆ្ពា	Channa micropeltes	4	6.25
8	ត្រីការហា / ត្រីគល់រាំង	Catlocarpio siamensis	3	4.69
9	ត្រីស្លឹកឬស្សី	paralaubuca barroni	2	3.13
10	ត្រីកាហែ	Barbonymus sp.	2	3.13
11	ត្រីឌា	Datnioides polota	2	3.13
12	ត្រីផ្គក់	Channa striata	2	3.13
13	ត្រីត្រសក់	Probarbus sp.	2	3.13
14	ត្រីខ្ជិង	Mastacembelus armatus	2	3.13
15	ត្រីគ្រុំ	Osteochilas melanpleura	1	1.56
16	ត្រីកេស	Kryptoplerus sp.	1	1.56
17	ត្រីឆ្នា	Lycothrissa crocodilus	1	1.56
18	ត្រីបកា	Scomberomorus sinensis	1	1.56
19	ត្រីខ្ទាខ	Hampala sp.	1	1.56

Fish species are no longer caught in flooded rice field, Chhoeung Prey, Kampong Chham province in flooded rice field, O Roeung Ouv, Tboung Kmum founded 12 fish species. Frequency and percent distribution of the top 5 fish species: 1. Thynnichthys Thynnoides was 1 (20.3%), 2. Chyclocheilichthys enoplos was 7 (10.9%), 3. Cirrhinus microlepsis was 6 (9.4%), 4. Wallago attu was 5 (7.8%), and 5. Leptobarbus hoeveni was 5 (7.8%) (Table 43).

Table 44. Reasons for no longer caught in term of illegal fishing activities, too many people participating in fishing, dam/dyke development, and others by all individuals

All Respondents	Characteristics	Frequency	%
Illegal fishing gears	No	30	20.98
	Yes	113	79.02
Too many people participating in fishing	No	78	54.55
	Yes	65	45.45
Dam/dyke development	No	85	59.44
	Yes	58	40.56
Others	Losing fish habitat, Lack of feeds, Water flow changing	24	13.71

Table 44 shows fish species have no longer caught in term of illegal fishing gears was nearly 4/5 (79%), too many people participating in fishing at 45.4%, and dam/dyke development at 40.5%, and others factors such as losing fish habitat, lack of feeds, water flow changing were at 13.7% .

Table 45. Reasons for no longer caught in term of illegal fishing activities by sites

Site	Illegal fishing	Frequency	%
Mainstream, Kuk Kampul	No	12	34.29
	Yes	23	65.71
Tributary, Peam Ro	No	5	15.15
	Yes	28	84.85
Flooded forest, Tboung Khmom	No	1	4.76
	Yes	20	95.24
Flooded rice field, Ou Roeung Ov	No	5	25.00
	Yes	15	75.00
Flooded rice field, Choeung Prey	No	7	20.59
	Yes	27	79.41

Across the studied sites, fish species have no longer caught in term of illegal fishing gears found that flooded forest site, Tboung Khmom was the highest percentage at 95.2%, followed by tributary site, Peam Rao was at 84.8%, and mainstream site, Kuk Kampul was the lowest at 65.7% (Table 45).

Table 46. Reasons for no longer caught in term of too many people participating in fishing by sites

Site	Many fisheremn	Frequency	%
Mainstream, Kuk Kampul	No	21	60.00
	Yes	14	40.00
Tributary, Peam Ro	No	10	30.30
	Yes	23	69.70
Flooded forest, Tboung Khmom	No	11	52.38
	Yes	10	47.62
Flooded rice field, Ou Roeung Ov	No	10	50.00
	Yes	10	50.00
Flooded rice field, Choeung Prey	No	26	76.47
	Yes	8	23.53

Across the studied sites, fish species have no longer caught in term of too many people participating in fishing found that Tributary site, Peam Ro was the highest percentage at 69.7%, followed by flooded rice field site, Ou Roeung Ov was at 50%, and flooded rice field site, Choeung Prey was the lowest at 23.57% (Table 46).

Table 47. Reasons for no longer caught in term of dam/dyke development fishers by sites

Sites	Dam/dyke Development	Frequency	%
Mainstream, Kuk Kampul	No	16	45.71
	Yes	19	54.29
Tributary, Peam Ro	No	21	63.64
	Yes	12	36.36
Flooded forest, Tboung Kmum	No	11	52.38
	Yes	10	47.62
Flooded rice field, O Roeung Ouv	No	10	50.00
	Yes	10	50.00
Flooded rice field, Choeung Prey	No	27	79.41
	Yes	7	20.59

Among the studied sites, fish species have no longer caught in term of dam/dyke development found that mainstream site, Kuk Kampul was the highest percentage at 54.3%, followed by flooded rice field site, Ou Roeung Ov was at 50%, and flooded rice field site, Choeung Prey was the lowest at 20.6% (Table 47).

Table 48. Reasons for no longer caught in term of other factors by sites

Site	Other factors	Frequency	%
All Respondents	Losing fish habitat, Lack of feed, Water flow changing	24	13.71
Mainstream, Kuk Kampul	Losing fish habitat, Lack of feed, Water flow changing	4	11.43
Tributary, Peam Ro	Losing fish habitat, Lack of feed, Water flow changing	1	2.86
Flooded forest, Tboung Khmom	Losing fish habitat, Lack of feed, Water flow changing	6	17.14
Flooded rice field, Ou Roeung Ov	Losing fish habitat, Lack of feed, Water flow changing	4	11.43
Flooded rice field, Choeung Prey	Losing fish habitat, Lack of feed, Water flow changing	9	25.71

The study founded that other factors such as losing fish habitat, lack of feed, and water flow changing have influenced in losing fish species which resulting in having fish species no longer caught, of which all respondents awswered 13.7%. Among the studied sites, flooded rice field site, Choeung Prey was the highest at 25.7%, followed by flooded forest site, Tboung Khmom was at 17.1% and tributary site, Peam Ro was the lowest amount at only 2.8% (Table 48).

3.9 Species are rare in Catch

Table 49. Fish species are rare in catches by all sites and all individuals.

No	Khmer Name	Scientific Name	Frequency	%
1	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	22	10.28
2	ត្រីឆ្ពាក	Chyclocheilichthys enoplos	15	7.01
3	ត្រីក្រឡង់/ត្រីព្រួល	Cirrhinus microlepsis	12	5.61
4	ត្រីត្រសក់	Probarbus sp.	12	5.61
5	ត្រីលិញ	Thynnichthys Thynnoides	11	5.14
6	ត្រីកេស	Kryptoplerus sp.	11	5.14
7	ត្រីកាហែ	Barbonymus sp.	10	4.67
8	ត្រីខ្ជង	Mastacembelus armatus	10	4.67
9	ត្រីព្រលូង	Leptobarbus hoeveni	10	4.67
10	ត្រីក្រាយ	Chitala ornate	7	3.27
11	ត្រីឫក	Tenualosa thibaudeaui	7	3.27
12	ត្រីគ្រុំ	Osteochilas melanpleura	6	2.80
13	ត្រីបេកា	Scomberomorus sinensis	6	2.80
14	ត្រីកាឈោ / ត្រីឥណ្ឌាំង	Catlocarpio siamensis	6	2.80
15	ត្រីខ្ជា	Datnioides polota	5	2.34
16	ត្រីប្រា	Pangasius sp.	5	2.34
17	ត្រីផ្គក់	Channa striata	4	1.87
18	ត្រីបុងឡាវ	Panagasius krempfi	4	1.87
19	ត្រីកាបស	Hypophthalmichthys molitrix	4	1.87
20	ត្រីគ្លិន	Hypsitarbus sp.	3	1.40
21	ត្រីក្តាំងហាយ	Belodontichthys truncatus	3	1.40
22	ត្រីដំរី	Oxyeleotris	3	1.40
23	ត្រីកែ	Pangasius conchophilus	3	1.40
24	ត្រីប៉ាសេអ៊ី	Mekongina erythrospila	3	1.40
25	ត្រីច្រកែង	Puntioplites proctozysron	2	0.93
26	ត្រីឆ្នាំង	Hemibagrus sp.	2	0.93
27	ត្រីអាចម៍កុក	Labiobarbus siamensis	2	0.93
28	ត្រីកញ្ឆុះ	Akysis sp.	2	0.93
29	ត្រីកំភ្លាញ	Trichohodus sp.	2	0.93
30	ត្រីខ្ទាន	Hampala sp.	2	0.93
31	ត្រីជន្ទាសភ្នុក	Parachela ouygastoides	2	0.93
32	ត្រីក្អែក	Labeo Chrysophekadion	1	0.47
33	ត្រីកំបុតច្រមុះ	Amblyrhynchichthys micracanthus	1	0.47
34	ត្រីឈ្វាត	Pangasius mekongensis	1	0.47
35	ត្រីជញ្ជូញមាន់	Coilia lindmani	1	0.47
36	ត្រីរាជ	Pangasianodon gigas	1	0.47
37	ត្រីអណ្តែង	Amblyceps sp.	1	0.47
38	ត្រីក្រឡង់	Cirrhinus microlepis	1	0.47

39	ត្រីកន្ត្រប់	Pristolepis fasciata	1	0.47
40	ត្រីឆ្កាចារ	Cirrhinus jullieni	1	0.47
41	ត្រីស្រការក្តាម	Cyclocheilichthys sp.	1	0.47
42	ត្រីស្លាត	Notopterus notopterus	1	0.47
43	ត្រីអោ	Pangasius larnaudii	1	0.47
44	ត្រីលលកស	Osteochilus schlegeli	1	0.47
45	ត្រីឆ្ពុង(ម៉ៀលថ្ម)	Babichthys laevis	1	0.47
46	ត្រីស្ទក់	Wallago micropogon	1	0.47
47	ត្រីផ្ងោង	Xenentodon cancila	1	0.47
48	ត្រីកំព្រាម	Polynemus sp.	1	0.47
49	ត្រីទ្រនេល	Hemibagrus filamentus	1	0.47

Fish species are rare in catch by all sites and all individuals founded 49 fish species. Frequency and percent distribution of the top 10 fish species: 1. Wallago attu was 22 (10.3%), 2. Chyclocheilichthys enoplos was 15 (7%), 3. Cirrhinus microlepsis was 12 (5.6%), 4. Probarbus sp. was 12 (5.6%), 5. Thynnichthys Thynnoides was 11(5.1%), 6. Kryptoplerus sp. was 11 (5.1%), 7. Barbonymus sp. was 10 (4.7%), 8. Mastacembelus armatus was 10 (4.7%), 9. Leptobarbus hoeveni was 10 (4.7%), and 10. Chitala ornate was 7 (3, 3%) (Table 49).

Table 50. Fish species are rare in catches in mainstream, Muk Kampul, Kandal Province

No	Khmer Name	Scientific Name	Frequency	%
1	ត្រីក្រឡង់/ត្រីព្រួល	Cirrhinus microlepsis	8	16
2	ត្រីបេកា	Scomberomorus sinensis	6	12
3	ត្រីកាឡោ / ត្រីគល់រាំង	Catlocarpio siamensis	5	10
4	ត្រីឆ្កោក	Chyclocheilichthys enoplos	4	8
5	ត្រីឆ្លាក	Tenualosa thibaudeaui	4	8
6	ត្រីបុងឡាវ	Panagasius krempfi	3	6
7	ត្រីព្រលូង	Leptobarbus hoeveni	3	6
8	ត្រីកាប៉ោ	Barbonymus sp.	2	4
9	ត្រីអាចម៍កុក	Labiobarbus siamensis	2	4
10	ត្រីគ្រុំ	Osteochilas melanpleura	1	2
11	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	1	2
12	ត្រីក្តាំងហាយ	Belodontichthys truncatus	1	2
13	ត្រីរ៉ែក	Labeo Chrysophekadion	1	2
14	ត្រីខ្ជា	Datnioides polota	1	2
15	ត្រីផ្ទក់	Channa striata	1	2
16	ត្រីប្រា	Pangasius sp.	1	2
17	ត្រីត្រសក់	Probarbus sp.	1	2
18	ត្រីរាជ	Pangasianodon gigas	1	2

19	ត្រីកន្ត្រៃប់	Pristolepis fasciata	1	2
20	ត្រីលលកស	Osteochilus schlegeli	1	2
21	ត្រីឆ្ពុង(ជ្រៀលថ្ម)	Babichthys laevis	1	2
22	ត្រីឆ្ពោង	Xenentodon cancila	1	2

Fish species are rare in catch in catches in mainstream, Muk Kampul, Kandal Province founded 22 fish species. Frequency and percent distribution of the top 5 fish species: 1. Cirrhinus microlepsis was 8 (16%), 2. Scomberomorus sinensis was 6(12%), 3. Catlocarpio siamensis was 5 (10%), 4. Chyclocheilichthys enoplos was 4 (8%), and 5. Tenualosa thibaudeaui was 4 (8%) (Table 50).

Table 51. Fish species are rare in catches in tributary habitats site, Peam Ro, Prey Veng province

No	Khmer Name	Scientific Name	Frequency	%
1	ត្រីកាហែ	Barbonymus sp.	6	11.90
2	ត្រីឆ្លាក	Chyclocheilichthys enoplos	5	9.52
3	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	4	9.52
4	ត្រីរកស	Kryptoplerus sp.	4	7.14
5	ត្រីក្រាយ	Chitala ornate	3	4.76
6	ត្រីលិញ	Thynnichthys Thynnoides	2	4.76
7	ត្រីឆ្នាំង	Hemibagrus sp.	2	4.76
8	ត្រីព្រលួង	Leptobarbus hoeveni	2	2.38
9	ត្រីគ្រុំ	Osteochilas melanpleura	1	2.38
10	ត្រីក្រឡង់/ត្រីព្រួល	Cirrhinus microlepsis	1	2.38
11	ត្រីដំរី	Oxyeleotris	1	2.38
12	ត្រីខ្ជា	Datnioides polota	1	2.38
13	ត្រីរ៉ែក	Pangasius conchophilus	1	2.38
14	ត្រីកំបុតច្រមុះ	Amblyrhynchichthys micracanthus	1	2.38
15	ត្រីប្រា	Pangasius sp.	1	2.38
16	ត្រីត្រសក់	Probarbus sp.	1	2.38
17	ត្រីបុងឡាវ	Panagasius krempfi	1	2.38
18	ត្រីកាបស	Hypophthalmichthys molitrix	1	2.38
19	ត្រីក្បាក	Tenualosa thibaudeaui	1	2.38
20	ត្រីស្ងួត	Notopterus notopterus	1	2.38
21	ត្រីឆោ	Pangasius larnaudii	1	2.38
22	ត្រីទ្រនេល	Hemibagrus filamentus	1	100.00

Fish species are rare in catch in tributary habitats site, Peam Ro, Prey Veng province founded 22 fish species. Frequency and percent distribution of the top 5 fish species: 1. Barbonymus sp. was 6(11.9%), 2.

Chyclocheilichthys enoplos was 5 (9.5%), 3. Wallago attu was 4 (9.5%), 4. Kryptoplerus sp. was 4 (9.5%), and 5. Chitala ornate was 3(4.8%) (Table 51).

Table 52. Fish species are rare in catches in flooded forest, Tboung Khmom

No	Khmer Name	**Scientific Name**	Frequency	%
1	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	7	19.44
2	ត្រីក្រាយ	Chitala ornate	4	11.11
3	ត្រីអ្ខិន	Hypsitarbus sp.	3	8.33
4	ត្រីប្រា	Pangasius sp.	3	8.33
5	ត្រីខ្ជង	Mastacembelus armatus	3	8.33
6	ត្រីព្រលុង	Leptobarbus hoeveni	3	8.33
7	ត្រីលិញ	Thynnichthys Thynnoides	2	5.56
8	ត្រីព្រុំ	Osteochilas melanpleura	1	2.78
9	ត្រីឆ្ពាក	Chyclocheilichthys enoplos	1	2.78
10	ត្រីច្រកែង	Puntioplites proctozysron	1	2.78
11	ត្រីច្រកែង	Puntioplites proctozysron	1	2.78
12	ត្រីកាហែ	Barbonymus sp.	1	2.78
13	ត្រីផ្ទក់	Channa striata	1	2.78
14	ត្រីកែ	Pangasius conchophilus	1	2.78
15	ត្រីត្រសក់	Probarbus sp.	1	2.78
16	ត្រីអណ្តែង	Amblyceps sp.	1	2.78
17	ត្រីប៉ាសេអ៊ី	Mekongina erythrospila	1	2.78
18	ត្រីស្នក់	Wallago micropogon	1	2.78

Fish species are rare in catch in flooded forest, Tboung Khmom founded 18 fish species. Frequency and percent distribution of the top 5 fish species: 1. Wallago attu was 7 (19.4%), 2. Chitala ornate was 4 (11.1%), 3. Hypsitarbus sp. was 4(11.1%), 4. Pangasius sp. was 4(11.1%), and 5. Mastacembelus armatus was 4(11.1%) (Table 52).

Table 53. Fish species are rare in catches in flooded rice field, Ou Roeung Ov, Tboung Khmom province

No	Khmer Name	**Scientific Name**	Frequency	%
1	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	6	15
2	ត្រីខ្ជង	Mastacembelus armatus	6	15
3	ត្រីត្រសក់	Probarbus sp.	5	12.5
4	ត្រីឆ្ពាក	Chyclocheilichthys enoplos	4	10
5	ត្រីច្រកែង	Puntioplites proctozysron	3	7.5
6	ត្រីក្តាំងហាយ	Belodontichthys truncatus	2	5
7	ត្រីកាបស	Hypophthalmichthys molitrix	2	5
8	ត្រីប៉ាសេអ៊ី	Mekongina erythrospila	2	5

9	ត្រីព្រលួង	Leptobarbus hoeveni	2	5
10	ត្រីខ្ជា	Datnioides polota	1	2.5
11	ត្រីរ៉ែក	Pangasius conchophilus	1	2.5
12	ត្រីឈ្លាត	Pangasius mekongensis	1	2.5
13	ត្រីជញ្ជូញមាន់	Coilia lindmani	1	2.5
14	ត្រីកញ្ឆុះ	Akysis sp.	1	2.5
15	ត្រីផ្កាចារ	Cirrhinus jullieni	1	2.5
16	ត្រីស្រែការក្តាម	Cyclocheilichthys sp.	1	2.5
17	ត្រីកំភ្លាញ	Trichohodus sp.	1	2.5

Fish species are rare in catch in catches in flooded rice field, Ou Roeung Ov, Tboung Khmom province founded 17 fish species. Frequency and percent distribution of the top 5 fish species: 1. Wallago attu was 6 (15%), 2. Mastacembelus armatus was 6 (15%), 3. Probarbus sp. was 5 (12.5%), 4. Chyclocheilichthys enoplos was 4(10%), and 5. Puntioplites proctozysron was 3(7.5 (Table 53).

Table 54. Fish species are rare in catches in flooded rice field, Chhoeung Prey, Kampong Chham province

No	Khmer Name	Scientific Name	Frequency	%
1	ត្រីលិញ	Thynnichthys Thynnoides	7	15.22
2	ត្រីក្រពត់ / ត្រីសណ្តាយ	Wallago attu	4	8.70
3	ត្រីត្រសក់	Probarbus sp.	4	8.70
4	ត្រីគ្រុំ	Osteochilas melanpleura	3	6.52
5	ត្រីច្រកែង	Puntioplites proctozysron	3	6.52
6	ត្រីក្រឡង់/ត្រីព្រួល	Cirrhinus microlepsis	3	6.52
7	ត្រីអំរី	Oxyeleotris	2	4.35
8	ត្រីខ្ជា	Datnioides polota	2	4.35
9	ត្រីផ្គក់	Channa striata	2	4.35
10	ត្រីក្បាក	Tenualosa thibaudeaui	2	4.35
11	ត្រីខ្ចាន	Hampala sp.	2	4.35
12	ត្រីជន្ទាសភ្នុក	Parachela ouygastoides	2	4.35
13	ត្រីឆ្ពាក	Chyclocheilichthys enoplos	1	2.17
14	ត្រីច្រកែង	Puntioplites proctozysron	1	2.17
15	ត្រីកាហែ	Barbonymus sp.	1	2.17
16	ត្រីក្រឡង់	Cirrhinus microlepis	1	2.17
17	ត្រីកញ្ឆុះ	Akysis sp.	1	2.17
18	ត្រីកាបស	Hypophthalmichthys molitrix	1	2.17
19	ត្រីការហា / ត្រីគល់រាំង	Catlocarpio siamensis	1	2.17
20	ត្រីកំភ្លាញ	Trichohodus sp.	1	2.17
21	ត្រីខ្ជិង	Mastacembelus armatus	1	2.17
22	ត្រីកំព្រាម	Polynemus sp.	1	2.17

Fish species are rare in catch in flooded rice field, Chhoeung Prey, Kampong Chham province founded 22 fish species Frequency and percent distribution of the top 5 fish species: 1. Thynnichthys Thynnoides was 7 (15.2%), 2. Wallago attu was 4 (8.7%), 3. Probarbus sp. was 4 (8.7%), 4. Osteochilas melanpleura was 3 (6.5%), and 5. Puntioplites proctozysron was 3 (6.5%) (Table 54).

Table 55. Reasons for rare in catches in term of illegal fishing gears, too many people participating in fishing, dam/dyke development, and others by all individuals

All	Characteristic	Frequency	%
Illegal fishing gears	No	39	26.00
	Yes	111	74.00
Too many people participating in fishing	No	88	58.67
	Yes	62	41.33
Dam/dyke development	No	90	60.00
	Yes	60	40.00
Others	Losing fish habitat	25	14.29

Table 55 shows fish species are rare in fish catch in term of illegal fishing gears was 74%, too many people participating in fishing at 41.3%, and dam/dyke development at 40%, and losing fish habitats were 14.3%.

Table 56. Reasons for rare in catches in term of illegal fishing gears by sites

Sites	**Illegal fishing gears**	**Frequency**	%
Mainstream, Kuk Kampul	No	11	32.35
	Yes	23	67.65
Tributary, Peam Ro	No	11	33.33
	Yes	22	66.67
Flooded forest, Tboung Kmum	No	2	9.09
	Yes	20	90.91
Flooded rice field, O Roeung Ouv	No	8	30.77
	Yes	18	69.23
Flooded rice field, Choeung Prey	No	7	20.00
	Yes	28	80.00

Across the studied sites, fish species are rare in catch in term of illegal fishing gears found that flooded forest site, Tboung Khmom was the highest percentage at 90.9%, followed by flooded rice field site, Choeung Prey was at 80%, and tributary site, Peam Ro was the lowest at 66.6% (Table 56).

Table 57. Reasons for rare in catches in term of too many people participating in fishing by sites

Sites	**Many fishermen**	**Frequency**	%

Mainstream, Kuk Kampul	No	21	61.76
	Yes	13	38.24
Tributary, Peam Ro	No	12	36.36
	Yes	21	63.64
Flooded forest, Tboung Kmum	No	18	81.82
	Yes	4	18.18
Flooded rice field, O Roeung Ouv	No	15	57.69
	Yes	11	42.31
Flooded rice field, Choeung Prey	No	22	62.86
	Yes	13	37.14

Across the studied sites, fish species are rare in catches in term of too many people participating in fishing found that tributary site, Peam Ro was the highest percentage at 63.6%, followed by flooded rice field site, Ou Roeung Ov was at 42.3%, and flooded forest site, Tboung Khmom was the lowest at 18.2% (Table 57).

Table 58. Reasons for rare in catches in term of dam/dyke development by sites

Sites	**dam/dyke development**	**Frequency**	**%**
Mainstream, Kuk Kampul	No	16	47.06
	Yes	18	52.94
Tributary, Peam Ro	No	25	75.76
	Yes	8	24.24
Flooded forest, Tboung Khmom	No	14	63.64
	Yes	8	36.36
Flooded rice field, Ou Roeung Ov	No	15	57.69
	Yes	11	42.31
Flooded rice field, Choeung Prey	No	20	57.14
	Yes	15	42.86

Across the studied sites, fish species are rare in catches in term of dam/dyke development found that mainstream site, Kuk Kampul was the highest percentage at 52.9%, followed by flooded rice field site, Choeung Prey and flooded rice field site, Choeung Prey were similar amount at 42.8% and 42.3%, respectively. While tributary site, Peam Ro was the lowest at 24.2% (Table 58).

Table 59. Reasons for rare in catches in term of other factors by sites

Sites	**Others**	**Frequency**	%
Mainstream, Kuk Kampul	Losing fish habitat	4	11.43
Tributary, Peam Ro	Losing fish habitat	2	5.71
Flooded forest, Tboung Kmum	Losing fish habitat	8	22.86
Flooded rice field, O Roeung Ouv	Losing fish habitat	2	5.71
Flooded rice field, Choeung Prey	Losing fish habitat	9	25.71

The study founded that losing fish habitats have influenced in losing fish species which resulting in being rare in catches. Among the studied sites, flooded rice field site, Choeung Prey was the highest at 25.7%, followed by flooded forest site, Tboung Khmom was at 22.8%. While tributary site, Peam Ro was and flooded rice field site, O Roeung Ouv were the same amount as low as at 5.7 % (Table 59).

3.10 New Species are now caught

Table 60. New fish species are recently caught by all sites and all individuals

No.	Khmer Name	Scientific Name	Frequency	%
1	ត្រីទីឡាព្យា	Oreochromis sp.	26	34.21
2	ត្រីកាបស	Hypophthalmichthys molitrix	7	9.21
3	ត្រីអម្ពែង	Amblyceps sp.	5	6.58
4	ត្រីចាប	Piaractus brachypomus	4	5.26
5	ត្រីឆ្កោក	Chyclocheilichthys enoplos	3	3.95
6	ត្រីប្រម៉ា	Boesemania microlepis	3	3.95
7	ត្រីកញ្ឆុះ	Akysis sp.	3	3.95
8	ត្រីខ្ចាន	Hampala sp.	3	3.95
9	ត្រីលិញ	Thynnichthys Thynnoides	2	2.63
10	ត្រីឆ្នាំង	Hemibagrus sp.	2	2.63
11	ត្រីម៉ៀល	Gymnosstomus sp.	2	2.63
12	ត្រីកាហោ / ត្រីគល់អាំង	Catlocarpio siamensis	2	2.63
13	ត្រីកំភ្លាញ	Trichohodus sp.	2	2.63
14	ត្រីប៉ាសេអ៊ី	Mekongina erythrospila	2	2.63
15	ត្រីឆ្មុង(ម៉ៀលថ្ម)	Babichthys laevis	2	2.63
16	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	1	1.32
17	ត្រីច្រកែង	Puntioplites proctozysron	1	1.32
18	ត្រីកែ	Pangasius conchophilus	1	1.32
19	ត្រីប្រា	Pangasius sp.	1	1.32
20	ត្រីត្រសក់	Probarbus sp.	1	1.32
21	ត្រីក្បាក	Tenualosa thibaudeaui	1	1.32
22	ត្រីស្ពាត	Notopterus notopterus	1	1.32
23	ត្រីកំព្រាម	Polynemus sp.	1	1.32

New fish species are recently caught by all sites and all individuals founded 23 fish species Frequency and percent distribution of the top 10 fish species: 1. Oreochromis sp. was 26 (34.2%), 2. Hypophthalmichthys molitrix was 7 (9.2%), 3. Amblyceps sp. was 5 (6.6%), 4. Piaractus brachypomus was 4 (5.3%), 5. Chyclocheilichthys enoplos was 3 (3.9%), 6. Boesemania microlepis was 3 (3.9%), 7. Akysis sp. was 3(3.9%), 8. Hampala sp. was 3 (3.9%), 9. Thynnichthys Thynnoides was 2(2.6%), and 10. Hemibagrus sp. was 2 (2.6%) (Table 60).

Table 61. New fish species are recently caught in mainstream, Muk Kampul, Kandal Province

No	Khmer Name	Scientific Name	%
1	ត្រីកបស	Hypophthalmichthys molitrix	27.27
2	ត្រីលិញ	Thynnichthys Thynnoides	18.18
3	ត្រីម៉ៀល	Gymnosstomus sp.	18.18
4	ត្រីចាប	Piaractus brachypomus	18.18
5	ត្រីទីឡាព្យា	Oreochromis sp.	9.09
6	ត្រីការហា / ត្រីគល់រាំង	Catlocarpio siamensis	9.09

New fish species are recently caught in Main stream, Muk Kampul, Kandal province founded 6 fish species. Percent distribution of the top 3 fish species: 1. Hypophthalmichthys molitrix was (27.3%), 2.Thynnichthys Thynnoides was (18.2%), and 3. Gymnosstomus sp. was (18.2%) (Table 61).

Table 62. New fish species are recently caught in tributary habitats site, Peam Ro, Prey Veng province

No	Khmer Name	Scientific Name	Frequency	%
1	ត្រីអរ័ណ្ដង	Amblyceps sp.	5	25
2	ត្រីទីឡាព្យា	Oreochromis sp.	3	15
3	ត្រីកញ្ជុះ	Akysis sp.	3	15
4	ត្រីឆ្នាំង	Hemibagrus sp.	2	10
5	ត្រីខ្ទាន	Hampala sp.	2	10
6	ត្រីឆ្ពាក	Chyclocheilichthys enoplos	1	5
7	ត្រីរ៉ក	Pangasius conchophilus	1	5
8	ត្រីត្រសក់	Probarbus sp.	1	5
9	ត្រីស្លាត	Notopterus notopterus	1	5
10	ត្រីឆ្នុង(ម៉ៀលថ្ម)	Babichthys laevis	1	5

New fish species are recently caught in Tributary, Peam Ro, Prey Veng province founded 10 fish species Frequency and percent distribution of the top 3 fish species: 1. Amblyceps sp. Was 5 (25%), 2. Oreochromis sp. was 3(15%), and 3. Akysis sp. Was 3(15%) (Table 62).

Table 63. New fish species are recently caught in flooded forest, Tboung Khmom

No	Khmer Name	**Scientific Name**	Frequency	%
1	ត្រីទីឡាព្យា	Oreochromis sp.	9	50.00
2	ត្រីកបស	Hypophthalmichthys molitrix	4	22.22
3	ត្រីចាប	Piaractus brachypomus	2	11.11
4	ត្រីក្រពាត់ / ត្រីសណ្តាយ	Wallago attu	1	5.56
5	ត្រីច្រកែង	Puntioplites proctozysron	1	5.56
6	ត្រីអ្នង(អៀលចូ)	Babichthys laevis	1	5.56

New fish species are recently caught in flooded forest, Tboung Khmom, Tboung Khmom province founded 6 fish species Frequency and percent distribution of the top 3 fish species: 1. Oreochromis sp. was 9(50%), 2. Hypophthalmichthys molitrix was 4 (22.2%), and 3. Piaractus brachypomus was 2 (11.1%) (Table 63).

Table 64. New fish species are recently caught in flooded rice field, Ou Roeung Ov, Tboung Khmom province

No	Khmer Name	**Scientific Name**	Frequency	%
1	ត្រីទីឡាព្យា	Oreochromis sp.	9	40.91
2	ត្រីប្រម៉ា	Boesemania microlepis	3	13.64
3	ត្រីឆ្ពាក	Chyclocheilichthys enoplos	2	9.09
4	ត្រីកំភ្លាញ	Trichohodus sp.	2	9.09
5	ត្រីប៉ាសេអ៊ី	Mekongina erythrospila	2	9.09
6	ត្រីកាហា / ត្រីគល់រាំង	Catlocarpio siamensis	1	4.55
7	ត្រីឆ្នក	Tenualosa thibaudeaui	1	4.55
8	ត្រីខ្នុន	Hampala sp.	1	4.55
9	ត្រីកំព្រាម	Polynemus sp.	1	4.55

New fish species are recently caught in flooded rice field Ou Roeung Ov, Tboung Khmom founded 9 fish species. Frequency and percent distribution of the top 3 fish species: 1. Oreochromis sp. was 9 (40.9%), 2. Boesemania microlepis was 3 (13.6%), and 3. Chyclocheilichthys enoplos was 2 (9%), (Table 64).

Table 65. New fish species are recently caught in flooded rice field, Chhoeung Prey, Kampong Chham province

No	Khmer Name	**Scientific Name**	Frequency	%
1	ត្រីទីឡាព្យា	Oreochromis sp.	4	80
2	ត្រីប្រា	Pangasius sp.	1	20

New fish species are recently caught in flooded rice field Ou Roeung Ov, Tboung Khmom founded 2 fish species with frequency and percent distribution of the species: 1. Oreochromis sp. was 4 (80%), and 2. Pangasius sp. was 1 (20%) (Table 65).

Table 66. New fish species caught in term of introduction and escape to the wild, and habitat/food preferences, and availability by all individuals

Factors	Frequency	%
Introduction and escape to the wild		
No	96	80.67
Yes	23	19.33
Habitat/food preferences, and availability		
No	96	81.35
Yes	22	18.64
Others		
Increasing aquaculture	27	22.7

Table 66 shows new fish species recently caught in fish catches in term of introduction and escape to the wild was only 19.3%, habitat/food preferences, and availability was also low at 18.6%, and dam/dyke and increasing aquaculture development was at 22.7%.

Table 67. New fish species caught in term of introduction and escape to the wild; and habitat/food preferences, and availability by sites

Sites	Factors	Frequency	%
	Introduction and escape to the wild		
Mainstream, Kuk Kampul	No	34	97.14
	Yes	1	2.86
Tributary, Peam Ro	No	24	75.00
	Yes	8	25.00
Flooded forest, Tboung Khmom	No	5	71.43
	Yes	2	28.57
Flooded rice field, Ou Roeung Ov	No	4	25.00
	Yes	12	75.00
Flooded rice field, Choeung Prey	No	29	82.86
	Yes	6	17.14
	habitat/food preferences, and availability		
Mainstream, Kuk Kampul	No	32	91.43
	Yes	3	8.57
Tributary, Peam Ro	No	20	64.52
	Yes	11	35.48
Flooded forest, Tboung Khmom	No	6	85.71
	Yes	1	14.29

Flooded rice field, Ou Roeung Ov	No	9	56.25
	Yes	7	43.75
Flooded rice field, Choeung Prey	No	29	82.86
	Yes	6	17.14

Across the studied sites, new fish species recently caught in fish catches in term of introduction and escape to the wild found that flooded rice field site, Ou Roeung Ov was the highest percentage at 75%, followed by flooded forest site, Tboung Khmom was at 28.5%. While mainstream site, Kuk Kampul was the lowest at only 2.8%% (Table 67). In term of habitat/food preferences, and availability, the flooded rice field site, O Roeung Ouv was the highest at 43.7%. Followed by tributary site, Peam Ro aws at 35.4%. While mainstream site, Kuk Kampul was the lowest at only 8.5%%

3.11 Raise fish by aquaculture

Table 68. Raising aquaculture by all individuals

Raising Aquaculture	Frequency	%
No	143	91.67
Yes	13	8.33

Less than 1/10 (8.3%) of respondents have raised aquaculture among the 5 studied sites (Table 68).

Table 69. Raising aquaculture by sites

Site	Raising Aquaculture	Frequency	%
Mainstream, Kuk Kampul	No	35	100.0
	Yes	0	0.0
Tributary, Peam Ro	No	28	100.0
	Yes	0	0.0
flooded rice field site, Ou Roeung Ov,	No	28	90.3
	Yes	3	9.7
Flooded rice field, Ou Roeung Ov	No	25	86.2
	Yes	4	13.8
Flooded rice field, Choeung Prey	No	27	81.8
	Yes	6	18.2

Across the studied sites found only that flooded rice field site, Choeung Prey; flooded rice field site, Ou Roeung Ov; and Tributary site, Peam Ro have raised aquaculture at 18.2%; 13.8%; and 9.7%, respectively (Table 69).

4. Summary of Study Results

Five sites across the whole basin presumably representative habitats were selected for the study. 1) flooded forest habitat, Tonle Bit, Tbaung Khmom province; 2) flooded rice field habitat , Ou Roeang Ov, Tbaung Khmom province; 3) flooded rice field habitat, Cheung Prey, Kampong Cham province;4) Mekong mainstream habitat, Muk Kampul, Kandal province; and 5) Mekong tributary, Peam Ro, Prey Veng province. The total representative sample survey of 175 individuals were randomly selected within the 5 study sites of which 35 individuals were randomly selected in each study site. The survey objective aimed to understand the current status of both wild fisheries and aquaculture including other aquatic animals; and the information on type of common uses fishing gears in each habitat and season were also explored.

The average age of respondents was 42.4 years old with the average of household member's respondents was 5.4 persons/household. The average fishing experience's respondents was 17.6 years. More than half (50.6%) of the respondents was as full-time fishers, while nearly 49% as part-time fishers. Up to 92% of respondents used stationary gillnet as their fishing gear. Followed by hook long line was about one-fourth (24.6%). Nearly all respondents (97.1%) have fishing boats and only 2.8% of fisher has no fishing boats, of which nearly 80% of boats with engine and 20.6% of boats without engine.

The average fish catch per fisher per year of the top 10 fish species caught in last 12 months: 1) Gymnosstomus sp. was 666.5 kg/year (8.2%), 2) Labiobarbus siamensis was 382.5 kg/year (4.72%), 3) Channa striata was 314.5 kg/year (3.9%), 4) Puntioplites proctozysron was 304.87 kg/year (3.8%), 5) Cirrhinus microlepsis was 288.83 kg/year (3.6%), 6) Parachela ouygastoides was 278.67 kg/year (3.4%), 7) Puntius rhombeus was 247.00 kg/year (3.05%), 8) Hampala sp was 242.38 kg/year (2.99%), 9) Oryzias sp was 230.33kg/year (2.84%), and 10) Notopterus notopterus was 228.97 kg/year (2.82 %).

Other Aquatic Animals (OAAs) caught in last 12 months such as frog, rice field shrimp, crab, and water snake. The average frog catch in last 12 months was 91.8kg/person/year for all year round, while an average frog catch in dry season only 1 kg/person/year. The average shrimp catch in last 12 months was 139.8kg/person/year for all year round, and the average shrimp catch in flood season 153.4 kg per person/year and was only 5kg/person/year in dry season. The average crab catch in last 12 months in dry season was 1451 kg/person/year; 438.7kg/person/year for all year round; and 186.5kg/person/year in flood season. The average water snake catch in last 12 months for all year round was 1005.3kg/person/year; was 40.8kg/person/year in dry season; and 8.8 kg/person/year in flood season.

Fish species are most recent catch founded 57 fish species. Frequency and percent distribution of the recent catch of the top 10 fish species were of: 1) Gymnosstomus sp. was 72 (9.3%), 2) Puntioplites proctozysron was 68 (8.8%), 3) Akysis sp. was 57 (7.4%), 4) Pangasius sp. was 39 (5.1%), 5) Hemibagrus sp. was 36 (4.7%), 6) Labeo Chrysophekadion was 34 (4.4%), 7) Hypsitarbus sp. was 33 (4.3%), 8) Labiobarbus siamensis was 32 (4.2%), 9) Anabas testudineus was 29 (3.8%), and 10) Osteochilus sp. was 25 (3.2%).

The average fish consumption in wet and dry season found at around 126kg/fisher and 116.5kg/fisher, respectively. The average fish sold in wet and dry season found at around 1044.9kg/fisher and 992.4kg/fisher, respectively. The average fish processed in wet and dry season found at about 25.5 kg/fisher and 34kg/fisher, respectively. The average fish given in wet and dry season found at about 271kg/fisher and 26.3kg/fisher, respectively.

Fisheries trend in the last 5 years in term of fish abundance biomass, more than two-third (89.1%) of respondents answered fish biomass have decreased and less than 1% answered fish biomass has been no change. Reasons for changing fish biomass trend during last 5 years found that illegal fishing gears were the main factors, accounting for nearly one-fourth (23.3%). Followed by electric-fishing gear with 21.7%. While fyke net using and losing flooded forest were similar percentages at around 11.6% and 11.2%, respectively.

Fisheries trend in the last 5 years in term of fish length, about 72.5% of respondents answered fish length have decreased and less than 19% said fish biomass has been no change. Reasons for changing fish length trend in last 5 years found that losing natural feeds were the main factors, accounting for at 14.3%. Followed by losing flooded forest and too many fishermen were the same amount with 12.7%. While illegal fishing gears and illegal catching larvae/fingerling were similar percentages at around 9.7% and 9.2%, respectively.

Fish species are no longer caught founded 40 fish species. Frequency and percent distribution of the top 10 fish species of no longer caught fish species: 1) Catlocarpio siamensis was 30 (11.81%), 2) Leptobarbus hoeveni was 21 (8.27%), 3) Cirrhinus microlepsis was 20 (7.87%), 4) Wallago attu was 18 (7.09%), 5) Tenualosa thibaudeaui was 18 (7.09%), 6) Barbonymus sp. was 17 (6.69%), 7) Chyclocheilichthys enoplos was 16 (6.3%), 8) Thynnichthys Thynnoides was 14 (5.51%), 9) Chitala ornate was 11 (4.33%), and 10) Mekongina erythrospila was 11 (4.33%). Reasons for no longer caught in term of illegal fishing activities, too many people participating in fishing, dam/dyke development, and other factors. Fish species have no longer caught in term of illegal fishing gears was nearly 4/5 (79%), too many people participating in fishing at 45.4%, and dam/dyke development at 40.5%, and others factors such as losing fish habitat, lack of feeds, water flow changing were at 13.7% .

Fish species are rare in catch founded 49 fish species. Frequency and percent distribution of the top 10 species are rare in catch: 1) Wallago attu was 22 (10.3%), 2) Chyclocheilichthys enoplos was 15 (7%), 3) Cirrhinus microlepsis was 12 (5.6%), 4) Probarbus sp. was 12 (5.6%), 5) Thynnichthys Thynnoides was 11(5.1%), 6) Kryptoplerus sp. was 11 (5.1%), 7) Barbonymus sp. was 10 (4.7%), 8) Mastacembelus armatus was 10 (4.7%), 9) Leptobarbus hoeveni was 10 (4.7%), and 10) Chitala ornate was 7 (3, 3%). Reasons for rare in catches in term of illegal fishing gears, too many people participating in fishing, dam/dyke development, and other factors. Fish species are rare in fish catch in term of illegal fishing gears was 74%, too many people participating in fishing at 41.3%, and dam/dyke development at 40%, and losing fish habitats were 14.3%.

New fish species are recently caught founded 23 fish species Frequency and percent distribution of the top 10 of fish species are recently caught: 1) Oreochromis sp. was 26 (34.2%), 2) Hypophthalmichthys molitrix was 7 (9.2%), 3) Amblyceps sp. was 5 (6.6%), 4) Piaractus brachypomus was 4 (5.3%), 5) Chyclocheilichthys enoplos was 3 (3.9%), 6) Boesemania microlepis was 3 (3.9%), 7) Akysis sp. was 3(3.9%), 8) Hampala sp. was 3 (3.9%), 9) Thynnichthys Thynnoides was 2(2.6%), and 10) Hemibagrus sp. was 2 (2.6%).

New fish species caught in term of introduction and escape to the wild; habitat/food preferences, and availability; and other factors. Fish species recently caught in fish catch in term of introduction and escape to the wild was only 19.3%; habitat/food preferences, and availability was also low at 18.6%; and dam/dyke and increasing aquaculture development was at 22.7%.

Raising aquaculture was less than 1/10 (8.3%) of respondents have raised aquaculture among the 5 studied sites.

5. Annex questionnaire

QUESTIONNAIRE FOR FISHERS

Date:……/…..…/ 2014

1. Interviewer:…….
2. Address: House#/Village:……; Commune:……..
   District:…….……; Province:…….
3. Phone number:…….
4. Fisher's name:…….
5. Fisher's age:…….
6. Fisher household dependents…….
7. Fishing experience:…….. year
8. 8. Full time/ Part-time: ☐ Full time; ☐ Part-time.
9. Other fisher's occupations:……
10. List your gears used including boats and motors:

#	Gear type	Length (m)	Height (m)	Mesh-size	Habitat*	Motor	Operating in which month?	Fishing day/month
1								
2								
3								
4								

**: 1: Mainstream; 2: Tributary; 3: Flooded rice field; 4: Flooded forest; 5: Coastal*

11. List your top 10 species caught in last 12 months: For Mainstream and Tributary habitats:

#	Code	Local name (*Equip with a color atlas of fish*)	% of total catch (*estimated*)	Total weight/year (kg)	Which months do you catch the species?
1					
2					
3					
4					
5					
6					
7					
8					
9					

#	Code	Local name (*Equip with a color atlas of fish*)	% of total catch (*estimated*)	Total weight/year (kg)	Which months do you catch the species?
10					

12. List your top ten species caught in last 12 months : For Floodplain habitats:

#	Code	Local name (*Equip with a color atlas of fish*)	% of total catch (estimated)	Total weight/year (kg)	Which months do you catch the species?
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

13. List your top ten species caught in last 12 months: For Coastal habitats:

#	Code	Local name (*Equip with a color atlas of fish*)	% of total catch (estimated)	Total weight/year (kg)	Which months do you catch the species?
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

14. OAAs caught in last 12 months:

OAAs	Weight (kg)	Months caught?
Frogs		
Shrimps		
Crabs		

……..		
……..		

15. Most recent catch:……kg

Species name	Code	Species name	Code	Species name	Code

16. Disposal of catch caught in last 12 months:

#	Disposal of catch	Wet season		Dry season	
		kg	or %	kg	or %
1	consumed				
2	sold				
3	processing				
4	given to relative				
5	other:……..				

17. Fisheries trend compare to last five years:

☐ Increase; ☐ Decrease; ☐ No change (*in terms of abundance and b*iomass)

☐ Increase; ☐ Decrease; ☐ No change (*in terms of fish length*)

Reasons:…….

……

……

18. Which species are no longer caught? Why?

Species name: ……

☐ Illegal gears

☐ Too many people participating in fishing

☐ Dam/dyke construction

Others:……

……

……

19. Which species are rare in catches? Why?

Species name: ……

☐ Illegal gears

☐ Too many people participating in fishing

☐ Dam/dyke construction

Others:……

……

20. Which new species are now caught? Why?

Species name: ……

☐ Introduction and escape to the wild

☐ Habitat/food preference and availability

Others:……

……

……

21. Do you do raise fish by aquaculture? ☐ Yes ☐ No

If yes, provide the following information:

What species raised?:……

How much do you raise for each species in a year (kg/species)?:……..

Where do you get the starter fish from? ☐ From wild; ☐ Supplier.

What habitat type do you raise the fish in? ☐ Mainstream; ☐ Tributary;

☐ Flooded rice field; ☐ Flooded forest; ☐ Coastal.

22. Is your aquaculture dependent upon the flood season? ☐ Yes ☐ No

23. Disposal of aquaculture fish caught in last 12 months:

#	Disposal of catch	Wet season		Dry season	
		kg	or %	kg	or %
1	consumed				
2	sold				
3	processing				
4	given to relative				
5	other:……..				

Interviewer (Name and signature): Interviewee (Name and signature):

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