Overview of Fisheries Data Collection (Capture Fisheries) in Coastal and Inland Small-scale Fisheries in Cambodia

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I. Introduction

Cambodia has a high diversity of both freshwater and marine species. Fish species are complemented by a wide array of other aquatic animals including frogs, snails, and snakes and by aquatic plants. There are over 500 aquatic species recorded in the inland waters of Cambodia (Rainboth, 1996) of which around 200 species are regularly caught. The most commonly caught fish is the small river carp (*Cirrhinus Lobatus*). Fish are grouped into whitefish (trey sor) and blackfish (trey kmao). The whitefish consist of species of carp and catfish. They are involved in significant migrations and are commercially more important. Blackfish consist of species such as murrel and climbing perch. These are able to survive in swamps and wetlands all the year around and engage in only limited migrations.

The Mekong has a predominance of very small fish with short breeding cycles that make use of the annual floods. It also has some of the largest fish such as the giant freshwater stingray, the giant catfish and the giant river carp. There are also many other aquatic resources such as frogs, crocodiles, water-snakes, turtles, dolphins and snails. In January and February each year the migration of fish from the inundated forest surrounding the Great Lake, and from the lake itself into the Tonle Sap River, reaches its peak.

During the full-moon in these months masses of small fish migrate downstream and into the rivers. It is at this time that the majority of the fish catch in Cambodia is taken.

There are some 520 species of marine fish found in the coastal waters of Cambodia (Karenne Tun et al., 2004). Marine species can be divided into pelagic and demersal species. Main commercially-important pelagic species include mackerels, scads, anchovies, sardines, small tunas and pomfrets (FAO, 1994).Commercially important demersal species include threadfin breams, croackers, big-eyes, lizard fish, hairtails, flatfishes, snappers, groupers, sharks an conger eels. Shrimp, squid, cuttlefish, crabs, octopus, beche-de-mer, mantis shrimp and bivalves are also commercially important.

II. Type of Fisheries Information

2.1. Capture Fisheries

Major supplies of fish come from freshwater capture fisheries, freshwater aquaculture, marine capture fisheries, marine aquaculture and from imports. The majority of the fish supply in Cambodia is from freshwater capture fisheries. These make up around 79% of the total, with marine capture providing around 15% of the total. It is estimated that total production is between 300,000 and 500,000 tonnes per year (NaoThuok *et al.,* 2001) (see Table 1). However, a recent study of consumption of fish in the Lower Mekong basin might suggest an even higher annual catch (MRC, 2007).

Table 1: Estimates of Actual Fish Catch Ranges by Source.

Source of Catch	Annual Catch (tones) range in the year 2000-2011
- Large scale and Middle scale Fisheries	85,600-130,000
- Small-scale/Family Fisheries	115,000-180,000
- Rice field fisheries	45,000-135,000
Total inland fish catch	**245,600-445,000**
- Marine catches	36,000-91,000
- Aquaculture	14,000-72,000
Total all Sources	**295,600-608,000**

Source: Planning, Finance and International Cooperation Department, FiA(2011)

A. Freshwater capture fisheries

Fisheries statistics suggest that catches fluctuate from year to year, in ways that often closely reflect changes in the annual flooding patterns. Recent annual catch estimates from the freshwater fishery are shown in Table 2. It is likely that even these figures are an underestimate, given their creased population, more effective fishing gear and greater access to fish resource since the fishing lot reforms.

Table 2: Fisheries production 2007-2011 by fishing class and sub-sector (tonnes)

Fishing Type	2007	2008	2009	2010	2011
Inland Caught Fish	395,000	365,000	390,000	405,000	445,000
Marine Caught Fish	63,500	66,000	75,000	85,000	91,000
Aquaculture	35,260	40,000	50,000	60,000	72,000
Total Fish Production	**493,760**	**471,000**	**515,000**	**550,000**	**608,000**

Source: Planning, Finance and International Cooperation Department, FiA(2011)

Fishing activity in Cambodia is divided into three broad categories: commercial or large-scale fisheries, medium-scale fisheries and small-scale or family fisheries.

The large-scale fishery takes place in lots that are periodically auctioned. The lots are allocated to the highest bidder for a period of two years. The lots exist around the Great Lake, along the Tonle Sap River, and down the Mekong/Bassac rivers to the Vietnamese border. There are currently 162 lots and 63 Dai fisheries lots.

Medium-scale fisheries are operated under license and operate in those areas of the water outside of the lot system. The fishing gear of the middle-scale fisheries consists of seine nets, small river trawl nets, beach seines, gillnets, traps, cast-nets, scoop nets, hooks and line and brush parks (DoF, 2001).

Small-scale and rice-field fisheries tend to be open-access fisheries which do not require a license. They operate in floodplain areas during the closed season and in rice-fields during the wet season.

More and more of these small-scale fisheries are falling under the management regime of community fisheries. The gear used by small-scale fisheries is generally lower cost investment than those used by the medium-scale fishers. It is estimated that the catch is split between the different scales of fisheries as follows:

- Small-scale: 32 -41%
- Rice field: 16-25%
- Middle-scale: 23-30%
- Large-scale: 12-21%

Government Fisheries Reform:

1) First Fisheries Reform:

Between 2000-2001, the Royal Government of Cambodia has decided to reduce fishing lot areas around the Tonle Sap Great Lake for public access or public fishing household. The benefit of fisheries reform phase I, were the large reduction in industrial fishing, equitable distribution of economic growth, fewer conflicts and better resource management.

As result of the reform, 78 fishing lots around the Great Lake with total areas of 541,206 hectares or equals to 56.74 percents of the total fishing ground were abolished and transferred to local public access or so called community based fisheries management.

2) Second Fisheries Reform (Phase II):

Based on the result of 2011 on the suspending 35 fishing lots around the Tonle Sap Great lake, in 2012 the Royal Government has decided a Fisheries Reform Phase II in order to abolish 80 fishing lots, with total areas 412,654 hectares locates around the Tonle Sap Great Lake and in the Kandal, Prey Veng and Takeo provinces.

It is a new policy of the Royal Government of Cambodia to release fisheries domains for eliminating anarchic fishing activities, providing for public access and empowering fisheries resources to local

community, so called community based fisheries management. The abolished fishing areas has been served as fish conservation zone, 97,503 hectares or 23.63 percents and establishing community fisheries, 315,152 hectares or 76.37 percent.

In this regards, the annual total production of inland capture fisheries will significantly change, particularly for large scale fisheries while large scale (abolished fishing) areas have been converted and empowered local community fisheries.

B. Marine Capture fisheries

Marine landings have increased from 63,500 tonnes in 2007 to 91,000 tonnes in 2011(see Table 3). However, much of the catch in Cambodian waters does not enter the landing statistics as it is harvested by foreign vessels and shipped directly to Thailand and Vietnam.

There are about 40 coastal fishing villages (Long Korn, 2003) with an unknown number officer, but the coastal provinces have a combined population of around 1 million people. The Gulf of Thailand adjacent to the coast of Cambodia is relatively shallow with a mud/sand bottom that allows for trawler operations. These are restricted by law to waters deeper than 20m, although this law is, (according to local fishermen), broken on a regular basis.

Cambodian marine fisheries consist mainly of small and medium-scale operators; the large-scale operators tend to be foreign. Local boats use a variety of fishing gear including trawl nets, drag nets, purse seines, anchovy purse seines, gill nets, hooks and lines, and traps. In recent years the majority of boats along the coast have become motorized; non-motorized craft numbers fell from 3,312 in1996 to 227 craft in 1999 (DoF, 2001).

Generally speaking, coastal fishermen can fish all year round by changing their gear and targeting individual species, although it is often easier to fish during the dry season than the wet because of the greater frequency of storms and typhoons. The availability of different species also changes along the coast. e.g. the peak season for white shrimp in Kampot is from June until July, whereas in Koh Kong it is from July to August (Khy An, 2005).

Table 3: Marine production from 2007-20011 by provinces

Provinces	**2007**	**2008**	**2009**	**2010**	**2011**
Kampot	5,900	6,390	5,600	10,300	9,500
Preah Sihanuok	22,000	27,030	32,000	40,100	39,500
Koh Kong	35,600	32,580	37,400	34,600	42,000
Total	**63,500**	**66,000**	**75,000**	**85,000**	**91,000**

Source: Planning, Finance and International Cooperation Department, FiA(2011)

2.2. Catch species

a. Marine fishers can fish all year round and they may change fishing gears and target species to adapt weather condition in dry and wet season, and existing over 435 fish species.

Table 4: Marine species commonly catch in 3 coastal provinces:

English name	2007	2008	2009	2010	2011
- Crab	4,158	4,310	4,559	4,278	3,517
- Squid	3,409	2,930	3,115	4,716	5,235
- Shrimp	4,183	4,900	5,247	5,827	6,481
- Shortfinscad	3,531	4,415	3,656	2,416	1,669
- Waigieuseaperch	109	215	205	187	192
- Grouper	147	250	233	241	220
- Sharpjaw bonefish	794	1,120	1,162	1,282	1262
- Blood cockle	699	625	1,379	1,191	1,862
- Ki	52	1,430	1,732	1,823	1,850
- Trash fish	20020	20,970	23,357	28,758	32,222

(FiA Annual Report 2011)

b. Inland fisheries, many Mekong fish species make extensive longitudinal migrations between upland spawning grounds in Northern Cambodia/Lao and feeding grounds in the lowland floodplains. Anyways, the marine fish stock depletion is likely related to the fishermen using gear such as push nets and drag nets in sea grass areas, which depletes the stocks of juvenile fish and destroys the sea grass ecosystem. However, the current destruction of marine resources causes seriously to habitat and aquatic life.

A large proportion of fish-over 500 species in the Cambodia's Mekong River and 296 fish species in Tonle Sap Lake, and other aquatic animals including crabs, snails, frogs, snakes, turtles, and shrimps have been found in inland water (MRC, 2004).

Table 5: Top ten species commonly caught at Dai Fishery (stationary bag-net)

No.	Scientific name
1	*Henicorhynchus caudimaculatus*
2	*Paralaubuca riveroi*
3	*Dangila sp.*
4	*Osteochilus hasselti*
5	*Botiamodesta*
6	*Thynnichthys thynnoides*
7	*Belodontichthysdinema*
8	*Morulius chrysophekadion*

9	*Puntioplites proctozysron*
10	*Cyclocheilichthys enoplos*

(Source: Ngor. P. Bun 2011)

2.3. Fishing ground

A. Marine Fishing Ground

The Cambodia's coastal zone supports diversities of habitats, including mangrove forests coral reefs, sea grass beds and existing over 435 fish species. However, the current destruction of marine resources causes seriously to habitat and aquatic life. Marine fish stock depletion is likely related to the fishermen using gear such as push nets and drag nets in sea grass areas, which depletes the stocks of juvenile fish and destroys the sea grass ecosystem. The degradation of juvenile fish stocks has a direct impact both on the future inshore and offshore mature stocks. Also, the use of destructive fishing methods such as dynamite fish poisons or intoxicants are extremely destruction of aquatic resource such as coral-reef, see-grass, mangrove, as well as the breeding grounds of marine species.

B. Inland Fishing Ground

Based on hundreds of species, there are at least 150 types of fishing gears used in catching fish (MRC, 2004). Many gears and methods reflect the accumulated knowledge of generations of Cambodian fishers. The largest gears, such as dais and barrages, are rather non-selective and target fish which are migrating in large numbers. Most small traditional gears are specialized for fishing particular habitats in a particular way to catch a few target species, and the diversity of gears parallels the diversity of fish. The exploitation processes are extensively encompassed in floodplain, rivers, lakes and rice field fisheries. However, most large-scale/commercial fishers operate on the TS-GL and in downstream areas, only subsistence fishers are supported by the small-scale fisheries in the upstream portion of the Mekong River.

Inland fisheries in Cambodia are primarily dependant on the Mekong River system, and are located along the Mekong, Sekong, Basac and Tonle Sap rivers and tributaries, and the Tonle Sap Great Lake (TS-GL). Flooding is associated with the seasonal migration of fish between dry-season habitats and spawning grounds, and wet-season feeding grounds (floodplain forest). Many Mekong fish species make extensive longitudinal migrations between upland spawning grounds in Northern Cambodia/Lao and feeding grounds in the lowland floodplains. Numerous natural deep-water pools in upstream sections of the Mekong River have been recognized as extremely important to the ecology and life-cycles of both migratory and non-migratory fish species. At least 100 deep pools known in the Cambodian section of the river, which are used as spawning sites for many migratory species, larvae and juveniles, moving from downstream to floodplain areas in southern Cambodia and Vietnam and into the TS-GL. A large proportion of fish-over 500 species, and other aquatic animals including crabs, snails, frogs, snakes, turtles, and shrimps have been found in inland water.

The Tonle Sap Great Lake (TS-GL) is known as the 4th world largest lake after China, India, and Bangladesh. It is the fundamental sources of the natural fish stock in Cambodia. The depth of TS-GL varies from 1-2 meters in the dry season to 9-11 meters in the wet season and its surface area varies from 250,000-300,000 ha in the dry season to 900,000-1,400,000 ha in the wet season (Cambodia National Mekong Committee, 1998). The lake's flooded forest (640, 000 ha) and the surrounding floodplain (40, 000 km^2), are of great importance for diversity of fish species. At the beginning of the flooding, many fish species leave the lake and the larger ponds for the flooded forest to spawn. The young fish then move out into the floodplains to feed. The inflow of Mekong River floodwater brings with it large amounts of fry and fingerlings which also find shelter and food in the flooded forest and surrounding flood plains. At the end of the flooding, many fish follow the receding waters back to the lake and through the Tonle Sap River to the Mekong River. As abundant fish species, the annual fish catch in the Great Lake alone is approximately 235,000 tons, accounted for more than 60% of total fish catch in freshwater.

2.4. Fishing date

In general, fisheries management in Cambodia has classified into two types namely inland fisheries and marine fisheries. Article No. 16 of the Fisheries Law for inland fisheries, the closed season for middle-scale fishing is defined as follows:

- From 01 June to 30 September for the inland fishery domains located north of Tonle Chaktomok parallel (Latitude: 11° 33' 259"N).
- From 01 July to 31 October for the inland fishery domains located south of Tonle Chaktomok parallel (Latitude: 11° 33'259"N).

For the small-scale fisheries or so called family fishing, the activities can take place anywhere and anytime in main river system and its tributaries, lake, stream, reservoir, lowland, public pond and rice field.

3. Fishing Vessel

3.1 Type of fishing vessel

The number of marine fishing vessel is shown in Table 6. Based on the report from Fisheries Affairs Department in 2011 showed that, the number of non power boat has been decreased in number from 2007 up to present time. In contrast, the number of out-board and in-board fishing boat reported to be increased in number.

Table 6: Type of fishing vessel

year	No. of non power	No. of out-board	No. of in-board
2007	56,964	37,392	1,568
2008	58,075	42,375	2,045
2009	61,718	45,034	1,393

2010	61,722	44,522	2,882
2011	43,650	47,263	2,485

Source: Fisheries Affairs Department, Fisheries Administration, 2011

3.2 Engine Power

Based on the report from Fisheries Affair Department, FiA 2012 indicated that, the number of fishing boat using engine power and >33HP has been increased from year to year. It is noted that, for fishing boat with the engine power of <33HP, the permission or license issued at FiA cantonment level and for fishing boat with the engine power >33HP, the issuance of license has to be applied at FiA central level (FiA).

Table 7: Type of engine

year	<33HP	>33HP
2007	37,392	1,568
2008	42,375	2,045
2009	45,034	1,393
2010	44,522	2,882
2011	47,263	2,485

Source: Fisheries Affairs Department, Fisheries Administration, 2011

4. Fishing Gear

4.1 Type of fishing gear

A. Inland fishing gears

Based on the Proclamation (Prakas) No. 630 of Ministry of Agriculture, Forestry and Fishery date 24 November 2010 on using fishing gear in Marine and Inland fishery.

In total, there are about 150 types of fishing gears found to be practiced in inland fisheries domain, of which only 40 fishing gears are commonly used and are classified into 16 major categories, based on their principle of capture. The 16 major groups of the common fishing gears are as follows:

Table 8: 16 major group of fishing gear

No.	English Name	Khmer Name
1	Capture by hand	NesatDoydai Torte
2	Scoop devices	ObpakorDorng/ Dos
3	Wounding gear	ObpakorTveroyRobous
4	Hook & Line	Santouch

5	Traps	Antakh
6	Gillnets/Entangle nets	Mong
7	Surrounding/Seine nets	Oun
8	Dragged gears	ObpakorKavOs
9	Pushed nets	ObpakorChukRunh
10	Lift nets/Dip nets	Obpakor Leak
11	Covering devices	ObpakorKrongKrub
12	Bagnets	ObpakorThnokThnang
13	Anaesthetic methods	VitisasTverOySanlop
14	Fishing by pumping	NesatDoyBom Bach
15	Attracting devices	ObpakorTverOy Trey Kom
16	Fish scaring methods	ObpakorTverOy Trey Phahal

(Source: Fishing Gear of the Cambodian Mekong, 2006)

Though, there are a wide variety of fishing gears only 52 are stimulated in the Law on Fisheries of Cambodia (Table 9). Based on fishing gear catalogue established in 2006 showed that, the common fishing gears found to be practiced by small scale fishing activities or so called family fishing gears are 25 gears. Those gear types are commonly legally fish by villagers in all type of water bodies such as main river, stream, canal, lake, reservoir, pond and low land rice field.

Table 9: The commercial fishing gear commonly used in Inland areas:

No.	English Name	Khmer Name
1	Cast Net	Samnanh
2	Drift Gillnet	Mong Ban Det
3	Wedge-shaped Scoop Basket	Chnangdai
4	Plunge Basket or Cover Pot	Ang Rot
5	Common Single Hook Line	San Touch PhleMoi
6	Common fishing Rod	San Touch Bor Bok
7	Frog Gaff	Kong vaKangkeb
8	one-pronged Barbless Spear	Snor
9	Hand Held Scissors Push Net	ThnorngRunh
10	Hand Dragged Seine Net	OunOs Dai
11	Horizontal Cylinder Trap for Rice Fields	Tru
12	Brush Bundle Trap	KanSom
13	Bamboo Tube Trap for Eel	Lan On Tung
14	Paddy Gill Net	Mong Ray Sre

15	Three-pronged Barbed Spear	Chbok
16	Two Pronged Eel Fork	ChorngKrob
17	Trident Fish Fork	Som
18	Multi-pronged Eel Rake	Kang va trey treychlonh
19	Brush Bundle Basket	Chneang tram
20	Long Handle Circular Scoop Bag	ThnorngChrong
21	Encircling Seine Net	Ounhom
22	Surrounding/ Seine nets	Oun
23	SantouchBongKai	SantouchBongKai
24	Hook Long Line	Santouchronang
25	Long Handle Triangle Scoop Bag	Thnongmoul

(Source: Fishing Gear of the Cambodian Mekong, 2006)

B. Marine fishing gears

Marine capture fisheries in Cambodia are divided into two categories called middle-scale fisheries and small scale or artisanal fisheries. The coastal small-scale have capacity to inshore using all fishing gears In total, there are 56 of marine fishing gears, of which around 14 are most commonly used. According to the proclamation (Prakas) concerning the classification of marine fishing gears in Cambodia.

Table 10: The commercial fishing gears that always using in the coastal areas

No.	English Name	Khmer Name
1	Surrounding Net	Oun Os
2	Purse seine/Ring Net	Oun Hom
3	Anchovy Encircling Net	Chib Runh
4	Beach Seine Net	Mong Trey Chiem
5	Encircling Seine Net	Oun Hom Tam Chne
6	Gill Net	Mong Pak
7	Mackerel Gill Net	Mong Trey Kamong
8	Scomberomorus Gill Net	Mong Trey Beka
9	Shrimp Gill Net	Mong Bang Gear
10	Crab Gill Net	Mong Kdarm
11	Clupea Gill Net	Mong Trey Kabork
12	Traps	Lob

13	Horizontal Longlines	San Touch
14	Hooks and Lines	San Touch Ronang

(Source: The proclamation of fishing gear, 2011)

4.2 Number of fishing gear:

Based on the annual meeting report produced by Planning, Finance and International Cooperation Department, Fisheries Administration showed that, the total inland fishing gear by type reported from 19 inland provinces and 3 coastal provinces are:

A. Inland fishing gear:

The number of common fishing gears are: Gill net 4,611,124 meters, 48,151 cast nets, 56,706 traps, 101,136 vertical rice field cylinder trap,155,057 big bamboo vertical cylinder traps(SaiiYeun), 127,920 wedge-shaped scoop baskets, 10,332 long handle triangle scoop nets, 152,277 drop door traps 759,050 horizontal cylinder traps, 1,368 giant lift nets, 5,699 multi-pronged barbed spears, 6,924 one-pronged barbless spears, 2,099 two pronged eel forks, 171,051 bamboo tube traps, 5,369 wedge cone traps,4,082 snakehead wedge traps, 155,088 plunge baskets, 8,379 horizontal cylinder traps and 3,451,436 hooks.

B. Marine fishing gear:

In marine fisheries, there are 15 common fishing gears have been found to be practiced in the 03 coastal provinces namely Koh Kong, Kampong Som and Kampot The number of fishing gear and type are shown as followed:

1. Trawl: 2007 sets
2. Surrounding net: 5,100 sets
3. Scomberomorus gill net: 404,000 meters
4. Shrimp gill net: 276,700 meters
5. Crab gill net: 1,108,500 meters
6. Bluetail mullet net: 104,500 meters
7. Gill net: 325,600 meters
8. Indian mackerel net: 364,400 meters
9. Blood cockle motorized: 123 boats

10. Hooks and lines:109,200

11. Phoung Phang:108 sets

12. Traps (fish, crab, squid): 340,960 sets

5. Socio-economic

5.1. Fishermen education level

Based on socio-economic survey in 1998 showed that, literacy among the female household heads is lower than that of male household heads (Table 11). On the other hand, male-headed households have more members who can read or have completed a certain level of education.

Table 11: Level of education of male and female in Siem Reap province.

Level of education	Male	Female
No education	64	76
Can read only	220	76
Primary	47	6
Secondary	27	2

(Source: Socio-economic survey, 1998)

5.2. Religion

The predominant religion in Cambodia is Buddhism. The category of “others” Contains mainly the local religious system of the highland tribal groups and a few minority religious groups from other countries. The pattern of distribution of population by religion is more or less the same in 1998 and 2008.

Based on National Committee for Sub-national Democratic Committee (NCCD) district data-book report in 2009 found that, there are no indigenous people found in the province. With a total population of 947,371, Buddhism is the majority which is contributed 942,708 persons, about 99.50 percents and the second majority is belonged to Christianity, which is contributed 2,334 persons, follows by Islam 1,377 persons and the rest are other ethnic minority group.

Table 12: Population by Sex and By Religion

Religion	Sex		Total
	Male	Female	
Buddhism	450,731	491,977	942,708
Islam	691	686	1,377
Christianity	1,160	1,174	2,334
Other	500	453	953
Total	453,082	494,290	947,371

Source: NIS, 2008

5.3. Number of fishermen in eight selected provinces

Based on socio-economic survey in 1998 indicated that, about 5.65 million people (60% of total national population) live in these provinces; 4.19 million reside in 562 communes within 51 fishing districts. Households in about 328 (58%) communes in the fishing districts have a significant dependence on fishing and these are defined as fishing dependent communes, to be called fishing communes hereinafter.

Table 13: Number of fishermen in eight selected provinces

No. of Province	Population	Population of Fishing
Phnom Penh	833,872	295,189
Kandal	905,840	762,151
Kampong Cham	1,464,000	1,118,749
Kampong Chhnang	244,434	244,434
Siem Reap	637,451	476,026
Pursat	322,852	276,816
Battambang	694,854	580,005
Kampong Thom	546,791	438,279

(Source: Socio-economic survey, 1998)

5.4. Age ration of fishermen

Nearly 87% of the household heads belong to the working age group 16-61 years, While 11% are below 31 years old. Table also shows that the population in fishing communes consists of a relatively large number of young children, nearly 58% are below 21 years old, and 32% are below 10 years old.

Table 14: Age ration of fishermen

Age Group	Male	Female
16-20 years	12	1
21-30 years	523	54
31-40 years	1,229	206
41-50 years	1,182	275
51-60 years	743	205
>61 years	457	230

(Source: Socio-economic survey, 1998)

5.5. Number of fishery household

Up to present time, the total households who are depend directly and indirectly on fishing activities have not been identified. Therefore, the need of social economic survey the current status and number of households depends on fishing activities and other related to fisheries resource is necessary needed.

5.6. Size of fishing household

Based on the socio-economic survey conducted in 1998 in seven provinces showed that, the average size of sample household from the 7 provinces is between 5 to 6 members. It is noted that, there is no much significant difference in household size of the representative geography of the country.

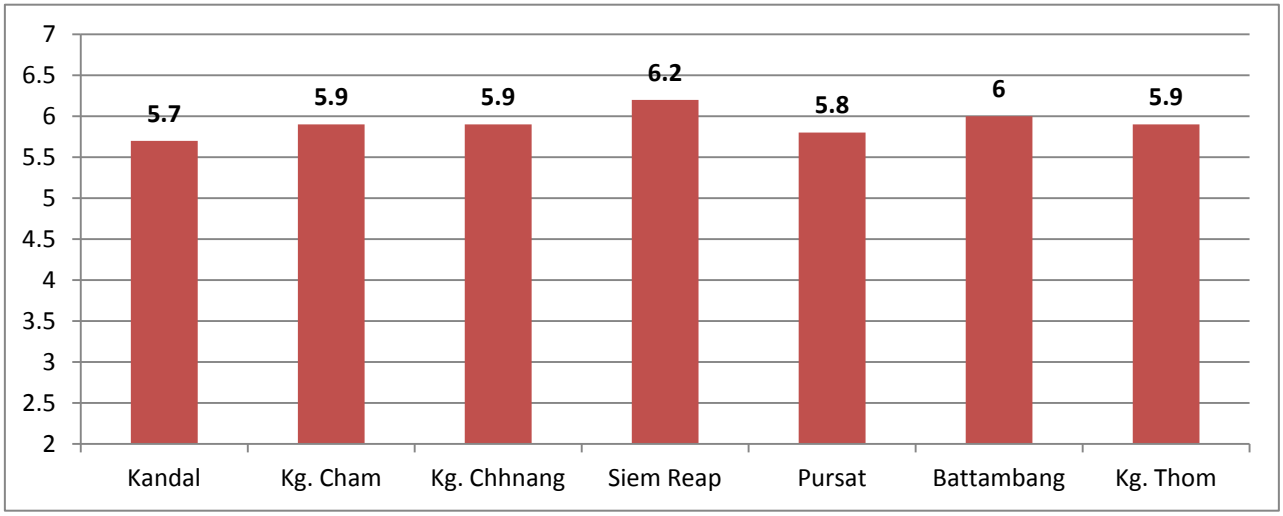

Figure 1: Size of fishing household in the seven target provinces (Source: Socio-economic survey, 1998)

5.7. Labors participating in fisheries

Based on socio-economic survey in 1998 in four provinces Kampong Chhnang, Kampong Cham, Kandal and Siem Reap showed that, an average size of family labor by sex by province. An average of family labor size is 3 in all sample provinces in total 695 of family labor by sex and provinces are not significantly in this survey sample size. Moreover, they have 191 (27.48%) labor of family in Kampong Chhnang province and 109 (15.68%) are male and 82 (11.82%) are female labor. Therefore, in Kampong Cham have 160 (23.02%), an average labor by male 87 (12.52%) and female 73 (10.50%).

Table 15: Average size of family labor by sex and province

Province	Male		Female		Total		Average size of hh.
	No.	(%)	No.	(%)	No.	(%)	
Kampong Chhnang	109	15.68	82	11.80	191	27.48	3
Kampong Cham	87	12.52	73	10.50	160	23.02	3
Kandal	97	13.96	76	10.94	173	24.89	3
Siem Reap	100	14.39	71	10.22	171	24.60	3
Total	**393**	**56.55**	**302**	**43.45**	**695**	**100.00**	**3**

(Source: Socio-economic survey, 1998)

An average size of family labor participated in fishing activities in four provinces Kampong Chhnang, Kampong Cham, Kandal and Siem Reap in Table 15 indicated the number of labor used in fishing activities. In generally, family labor was higher family size by province is 2.40. The number of people usually to fishing activities is ranged between 1- 11 persons in Siem Reap province. Contrarily, in average family size higher in Kampong Chhnang 2.63 and people use to fishing activities ranged only from 1-7 and other rest of provinces is no significantly by average of family labor participated in fishing activities in Table 6.5.

III. Methodology of Fisheries Data Collection

Cambodian fisheries statistic and information data collection are based on two mechanisms namely Administrative Information System and Scientific Survey.

3.1: Administrative Information System

In general, this system is commonly used to record official fisheries statistic and information whole out the country. Standardized form or log-book was produced by central FiA, Department of Planning, Finance and International Cooperation. Sub-national fisheries officers/FiA Cantonment officers who are responsible for fisheries statistic were trained by fisheries statistic officer from central level on how to collect data, data entry and report writing. At sub-national level, Division/Sangkat fisheries officers have been appointed to be data collector. Fisheries statistic and information data collection are collected on the monthly basic and the regular meeting is generally conducted monthly in order to check and clean on collected data before entering into database. Monthly report on fisheries statistic and information at all sub-national level/FiA Cantoments is generally sent to Department of Planning, Finance and International Cooperation, Fisheries Administration (FiA).

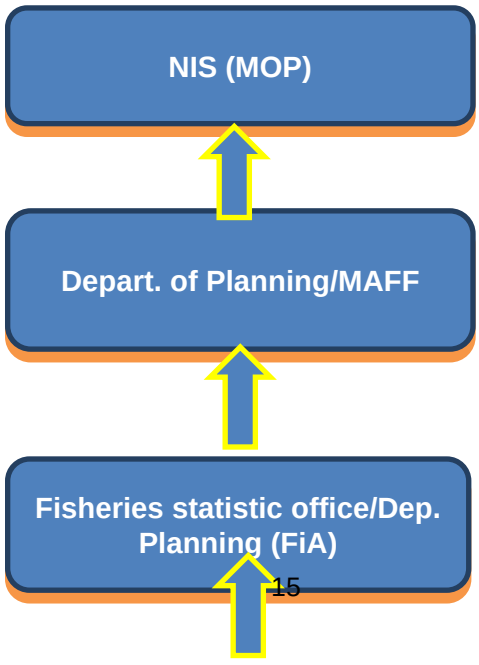

Figure 2: Mechanism for fisheries statistic and information data collection reporting and system

3.2. Scientific Survey/Research

This system is mainly based on scientific research which is conducted by fisheries officers of the fisheries administration and collaboration with international organizations. Catch monitoring or CPUE survey has been carried out since Mekong River Commission came to support in fisheries sector in 1997. Different types of fishing activities have been observed in order to monitor the fluctuation of annual catch trend from year to year. The survey has been focused on catch monitoring from mobile fishing gears in main water bodies (Mekong and Tonle Sap River) and yearly observation from Dai Fishery (stationary bag-net) in the Tonle Sap River, supported by the Mekong River Commission.

Standardized form or log-book was prepared through expertized consultation at regional and internal level, particularly experts from MRC in order to improve the method quality of data collection. Monthly catch record is mainly focused on species composition, leng-frequency, weight, species abundance

IV. Problem and Constraints

In Cambodia, the common problems in fisheries statistic and information data collection in general are:

- Small-scale fishing gears are highly diverse complexity of Ecosystem.
- No proper landing places catch by small-scale fishing gears land everywhere.
- Small-scale fishers are free to enter into fishing business difficult to control in terms number of fishers, fishing gear used and son.
- Small-scale fishing gears are not requested for registration, according to the Law on Fisheries in Cambodia.
- Cheap fishing gears, this makes it easy for people to cuter into fishing business especially in time of hardship. It is hard to define the number of common fishing gear due to the duration of using those gears is only for one year (i.e. floating net).
- Knowledge of fisheries officers at Cantonment level is still limited
- Lack of fisheries officer and financial support in collecting fisheries statistic and information

- Most of local fishers are illiterate, which is the main constraint in the process of data recording.
- Mobilization of fisher from one place to other places during peak season
- Some fishery products caught from marine large fishing boats sometimes sell their catch at the sea to neighboring countries (Thailand and Vietnam).
- The process of fishing boat registration and the cooperation between relevant agencies still weak and need to be improved and;
- Sometimes it is hard to get a good collaboration with fisher in the process of data collection, particularly for marine large fishing boat.

V. Available Information and Policy or Regulation Related Fisheries Information Gathering

According to the statement of the Royal Government of Cambodia on the National Fisheries Sector Policy, the vision for the Fisheries Sector is *"Management, conservation, and development of sustainable fisheries resources to contribute to ensuring people's food security and to socioeconomic development in order to enhance people's livelihoods and national's prosperity".* To achieve this vision, the Royal Government of Cambodia has formulated some critical policies including:

1- Management and development of fisheries

- Managing and utilizing sustainable fisheries resources to enhance food security and food safety and to contribute to poverty alleviation,

- Promoting and encouraging fishing activities in the Exclusive Economic Zone (EEZ), and in the international fishing grounds by strictly implementing the regional code of conduct for responsible fisheries and the laws of the Kingdom of Cambodia.

2- Management of community fisheries and family fisheries

- Encouraging the effective establishment of community fisheries in inland and coastal areas in order to enhance the management of sustainable fisheries resources by empowering local communities,

- Promoting sustainable livelihoods to fishermen in both socioeconomic and nutritional terms.

3- Management and development of aquaculture

- Encouraging the development of different kinds and scales of aquaculture, both inland and coastal, by implementing the "Regional Code of Conduct for Aquaculture",

- Extension of indigenous species of fauna and flora aquaculture, especially of species with a high economic export value,
- Carefully monitoring the import of exotic fauna and flora species that may have a negative impact on Cambodia's fisheries resources.

4- Management and development of fish processing

- Developing fish processing and packaging by encouraging large-scale investments and improving the fisheries infrastructure,
- Developing fish processing technologies and enlarging domestic markets by supporting small-scale investments to community fisheries and to fishermen,
- Promoting economic cooperation by collecting and disseminating fish marketing management information,
- Ensuring the quality and safety of fishery products.

5- Conservation of fisheries resources

- Reviewing and disseminating regulations for law enforcement and crackdown of all illegal fishing activities and preserving the inundated forest,
- Increasing awareness of people in fisheries communities and general fishermen to the importance of conservation of fisheries resources and ensuring maximum participation from local communities with respect to fisheries management and conservation,
- Protecting the important natural habitats and biodiversity,
- Ensuring wide coordination with all relevant sectors in order to reduce the potential negative impact on fisheries resources as a result of developments in these other sectors;
- Strengthening and increasing the conservation of sustainable fisheries resources through increased cooperation between stakeholders.

6. Development of fisheries institutions and their infrastructure

- Promotion human resource development within fisheries sector to ensure quality service within fisheries in order to improve socio-economic development;
- Providing training courses on fisheries and fisheries related laws to ensure awareness of all regulations and fisheries management processes;
- Encouraging and promoting fisheries research programs.

7. Budget and fisheries Infrastructure

- Promotion investment in fisheries sector and developing the fisheries infrastructure to increase the completive market position of the fisheries sector.
- Giving priority to using fisheries revenue through special financial procedures in order to achieve fisheries reforms, research conservation, development and surveillance.

VI. Way Forward to Develop Data Collection Information

1. Community based management could be a good approach to manage small-scale fishing gears and small-scale fishers because

- The most recent fisheries policy reforms in Cambodia are more focusing on fisheries co-management. All commercial sale fishers such as barrage fisheries have been abolished by the government and declared to be managed by the so called “Community Fisheries”.
- At community level, fishers often know each other. Each community fisheries have a community committee and community head. Though this committee and committee leaders fishing related activities including number of fishers, number of fishing gears. Catch and so on, are often discussed and reported to commune council on a monthly basis. Though this clammed, to a large extent statistics related to small-scale fishing gears at community level can be updated and managed.

2. Strengthen the existing fisheries statistics data collection though
   - Build capacity to FiA Cantonment staff.
   - Seek various donors /DP for financial support to collect fisheries statistics.
3. Raise awareness of the importance of the fisheries statistics, to CFi members so as to get their support in providing small-scale fishing gear statistics in their community.

VII. Conclusions

Currently, even though fisheries administration has involved many years in conducting scientific survey on fisheries statistic and information data collection with regional and international technical and financial support (Mekong River Commission (MRC), WorldFish Center, FAO and SEAFDEC), but some constraints have been arisen. The constraints which is usually occurred in the process of fisheries statistic and information data collection are related with small-scale fishing gears are highly diverse complexity of ecosystem, no proper landing places catch by small-scale fishing gears land everywhere which is caused in data collection, small-scale fishers are free to enter into fishing business difficult to control in terms number of fishers, fishing gear used, small-scale fishing gears are not requested for registration, according to the Law on Fisheries in Cambodia., cheap fishing gears, this makes it easy for people to cuter into fishing business especially in time of hardship. It is hard to define the number of common fishing gear due to the duration of using those gears is only for one year (i.e. floating net), knowledge of fisheries officers at Cantonment level is still limited, lack of fisheries officer and financial support in collecting fisheries statistic and information, most of local fishers are illiterate, which is the main constraint in the process of data recording, mobilization of fisher from one place to other places during peak season, some fishery products caught from marine large fishing boats sometimes sell their catch at the sea to neighboring countries (Thailand and Vietnam)., the process of fishing boat registration and the cooperation between relevant agencies still weak and need to be improved and; sometimes it is hard to get a good collaboration with fisher in the process of data collection, particularly for marine large fishing boat.

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Overview of Fisheries Data Collection (Capture Fisheries) in Coastal and Inland Small-scale Fisheries in Indonesia

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Paper presented at SEAFDEC Regional Workshop on the Effective of Fisheries Information Gathering in Coastal Small-Scale and Inland Fisheries for Southeast Asian Region, Bangkok, 28-30 January 2013

Introduction

Indonesia is one of the largest archipelagic states in the world. With 17,500 islands and 95,181 km long coastline, Indonesia has the potential for considerable coastal resources. Besides that, the size of the inland waters (rivers, lakes, reservoirs and floodplains) also made the potential for fish resources in inland waters are also quite large. Geographically, Indonesia waters which lies between the Indian Ocean and the Pacific Ocean with an area of 5.8 million km^2, has a non-homogeneous environment, the character of fish resources and the fisheries typologies are also different, have implications for management planning techniques (Nurhakim et al., 2007). There are several types of Indonesian waters: territorial waters, Indonesian Economic Exclusive Zone and high seas. The territorial waters have considerable potential with 95,181 km long of coastal line and 6.52 million ton/year of fish resources. For the fisheries management, Indonesian waters were divided into 11 Fisheries Management Areas (FMA) based on environmental condition, characteristic of fish resources, fisheries typology, and also to simplify monitoring, controlling, surveillance and determine fish stock (Figure 1).

Meanwhile, inland water also has an important role to the fisheries. The potential fish resources of inland water are about 3 million ton/year which derived from rivers, lakes, reservoirs and floodplains. Large number of freshwater fish was exploited by local fisherman each year, most of all only for their daily needs (artisanal fisheries).

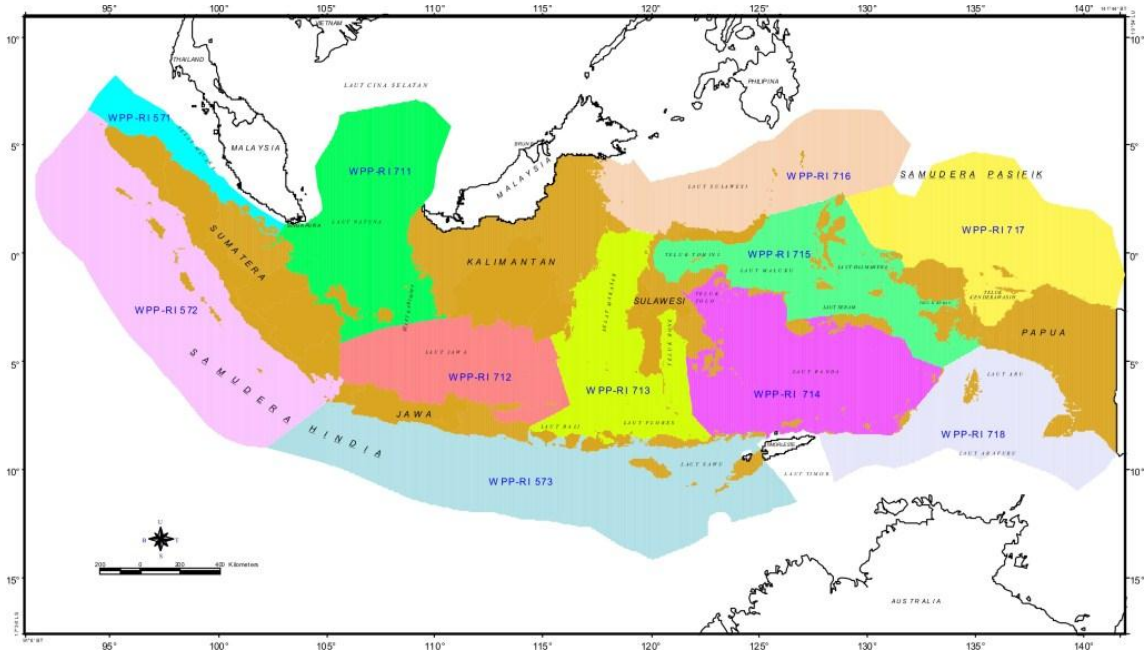


Figure 1. Fisheries Management Areas in Indonesia (FMA)

Overview of Indonesian fisheries

As a tropical country, Indonesia has large potential of fish resources with so many species of fish. Large number of fisherman cause the development of fishing gear and fishing technique to catch fish more effective, so there are many types of fishing gear used by fisherman to catch fish in Indonesia waters. Depend on both problems, multi-species and multi-gear approach should be used to manage fisheries in Indonesia.

For planning purpose, Indonesia's marine fisheries sector is divided into small, medium and large-scale subsectors. A clear distinction based on investment cost separates the small-scale subsector from other two. Both medium and large-scale fisheries are distinguished from the small-scale fishery by use of boats powered by inboard engines. Nevertheless, large-scale fisheries are differentiated from medium-scale fisheries on the basis of investment levels and areas in which they are permitted to operate (Sumiono, 1999).

There are a lot of fishing boats operated in all Indonesia, according to Indonesia Fisheries Statistic Data there were about 742,369 fishing boat in Indonesia consisting of 570,827 marine fishing boat and 171,542 inland waters fishing boat. Fishing boat divided into four types depends on the type of the

vessel: without boat, non-powered boat, outboard motor and inboard motor. Figure 2 showed that from the year 2000 to 2010 fishing boat were dominated by outboard motor, non powered boat and fishing without boat which is about 80% of total fishing boat, it indicated that most of fisheries in Indonesia are small scale fisheries. As well as the size of fishing vessel were dominated by small vessel (< 5 GT), medium and large vessel only about 10% of total vessel (Figure 3). According to Ministry of Marine Affairs and Fisheries Regulation No. PER.05/MEN/2008, fishing activities undertaken by small fisher and/or fisher which has a non-motorized fishing boats or motorized outside or motor in size under 5 (five) GT has no obligation to make fishing permit. Consequently, most of fisher in Indonesia do not have obligation to report their fishing activities.

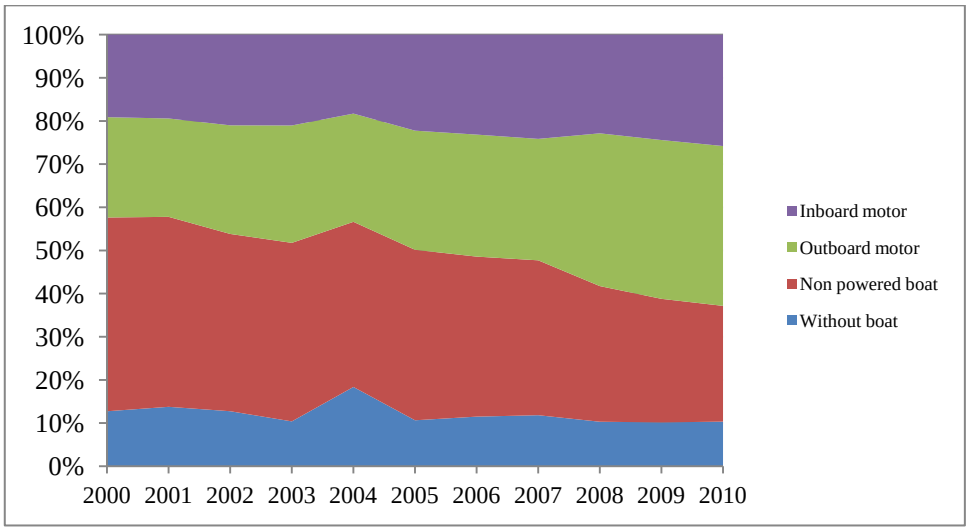


Figure 2. Proportion of fishing vessel by the type of vessel 2000-2010

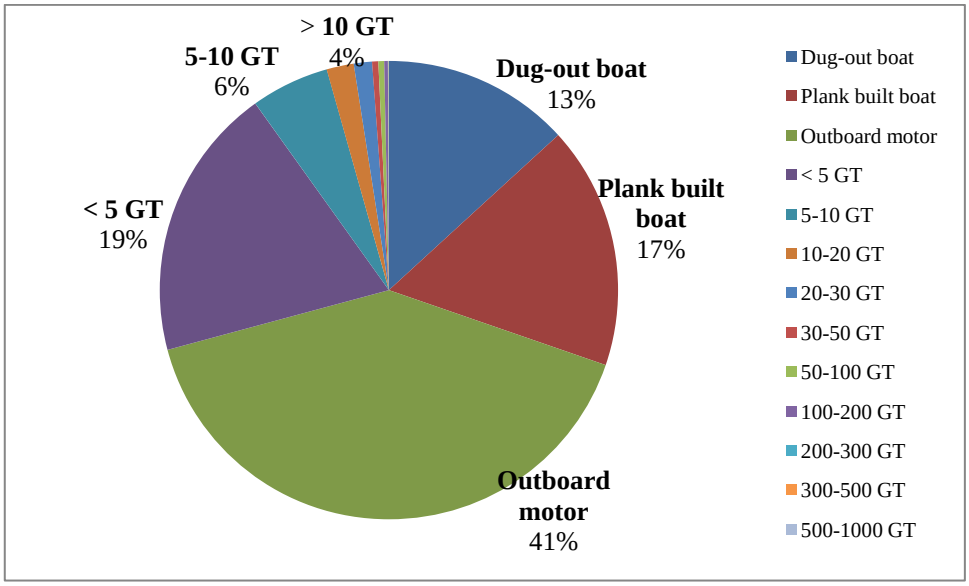
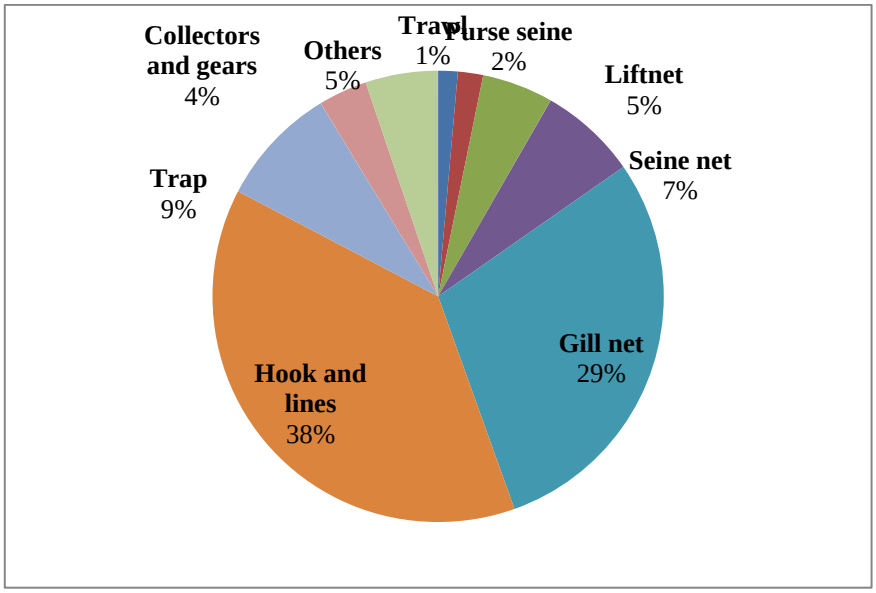


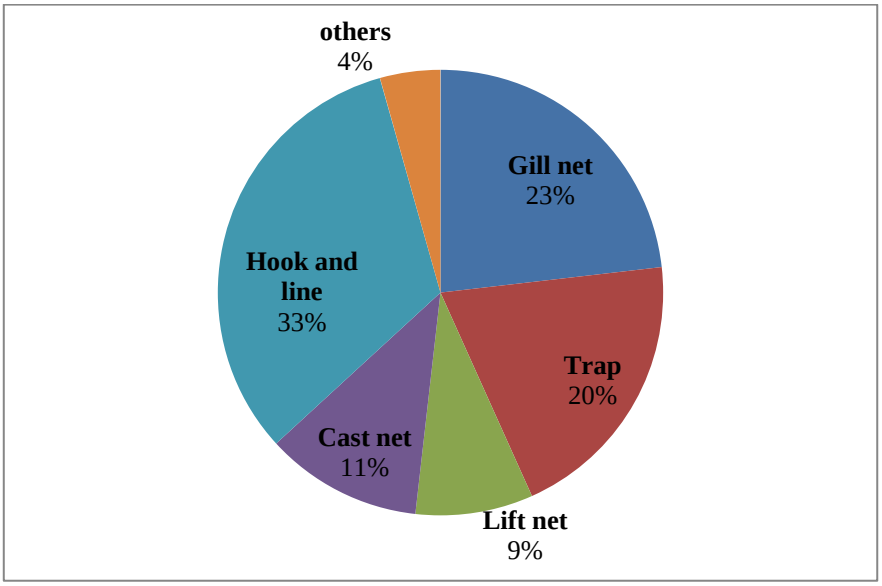
Figure 3. Proportion of fishing vessel by the size of vessel

Many species of fish, shrimp and other marine life in Indonesia with different behavior and characteristic also require different fishing tools and technologies (Subani & Barus, 1989). According to Sainsbury (1996), many factors enter into the choice of the method and gear used to catch a particular species in a particular area, principally the choice will depend on: the species being fished; individual value of the species to the fisherman; the depth of water; sea bed characteristics and selectivity required.

There are 40 types of marine fishing gear that being standard in Indonesia's fisheries statistic book and were grouped into 9 group: gill net, purse seine, trawl, traps, hook and line, seine net, lift net, collectors and gears and other fishing gears. Meanwhile for inland waters, fishing gears were grouped into 5 groups: gill net, traps, lift net, hook and line and other which consist of 12 types of fishing gears. Most of all fishing gear operated in Indonesia are traditional and semi-traditional gears that developed by small scale fisherman. Figure 4 shows that both marine and inland waters are dominated by small scale fishing gear such as gill net and hook and line, the number both gears more than half of all fishing gear. Trawl net which is the industrial-scale fisheries only amounted to less than 1 percent of total marine fishing gear.



(a)



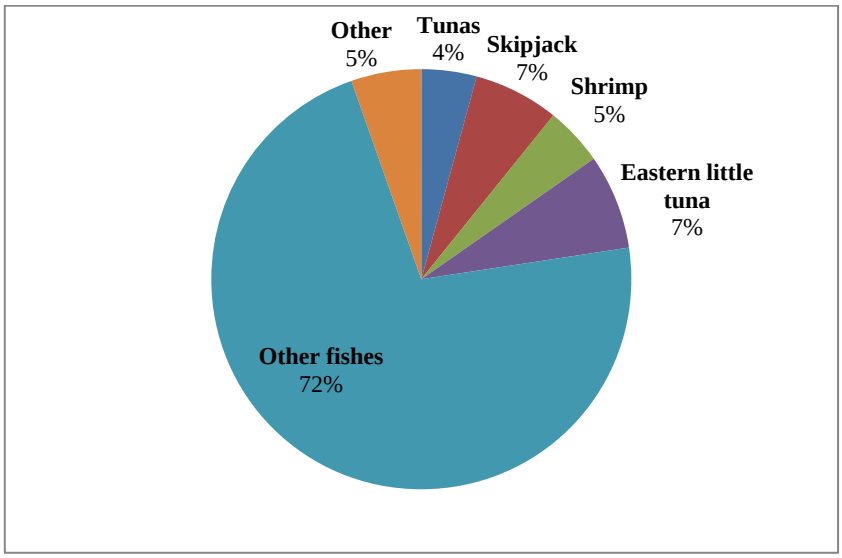
(b)

Figure 4. Proportion of fishing gear by categories: (a) Marine; (b) Inland waters

There are 91 species of fish, 11 species of shrimp, 11 species of mollucs and several species of other aquatic animals that being statistical standard classification of marine species in Indonesia, meanwhile for inland waters species there are 48 species of fish, 4 species of shrimp, 3 species of molluscs and several species of other aquatic animals including crocodiles and turtles.

In marine fisheries, there are 4 major commodities with high production and export-oriented: tunas, skipjack, eastern little tuna and shrimp (Figure 5a). All

the major commodities dominated more than 20% of total production. Different from marine fisheries, the major fish commodities are common carp, Mozambique tilapia, snake head and shrimp (Figure 5b).



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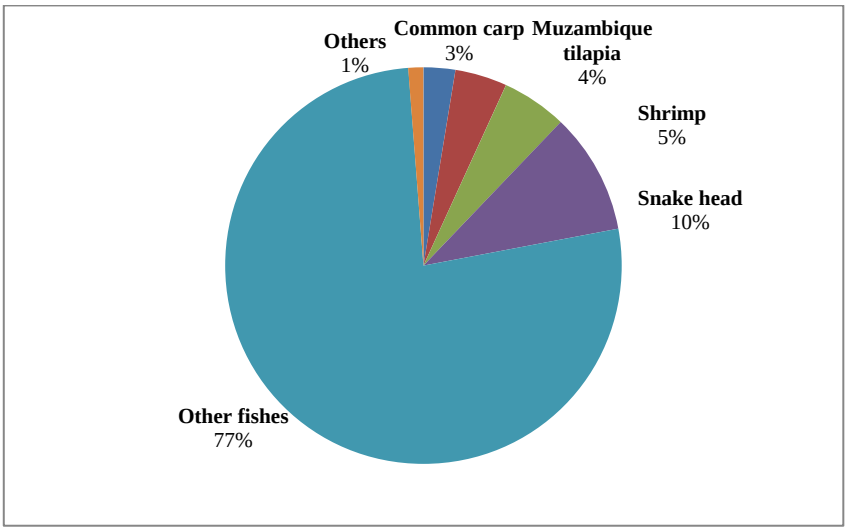

(b)

Figure 5. Proportion of capture fisheries production by major commodities: (a) Marine fisheries; (b) Inland water fisheries

Table 1. Some issues on marine and inland water fisheries data

ISSUES	Marine	Inland Water
Catching		
Catch amount (ton)	4.276.583	368.542
Catch species	small pelagic and demersal fishes, crustaceans, and seaweed	fishes and crustaceans
Fishing ground		
Fishing date	year round	
Fishing Vessel		
Type of fishing vessel		
- non power (units)	170.938	142.376
- in-board (units)	46.280	1.851
- out-board (units)	225.786	41.115
Type of engine	land based engine	
Size of fishing vessel	<30GT	<5GT
Type material of fishing vessel	timber [plank built boat]	
Fishing Gear		
Type of fishing gear	gill net, lif net, hook & lines, trap, cast net, muroami, harpoon,	
Number of fishing gear (units)	180.300	546.673
Socio-Economic		
Fishermen education level	dominated by non formal education level	
Religion	-	-
Age of fishermen	>17 - 50	>30 - 60
No. of fishery household (units)	458.283	324.928
Size of household	-	-
No. of hire labor (worker) for fishing	2.080.760	489.965
Monthly income	-	-
Monthly expenditure	-	-
Main source of loan	state bank	
Problem on fishermen livelihood	inferior quality, and lack of value added of fishery product	

Fisheries Data Collection in Indonesia

Fisheries statistical book is one of annual report that publishes by Ministry of Marine Affairs and Fisheries under the authority of Sub Directorate of Statistical Data, Directorate of Fish Resources - Directorate General of Capture Fisheries. It took a long time from collecting the data until it became statistical book, data from certain year will be published two years later because of the need of processing and validating. The recent statistical book is capture fisheries statistic of Indonesia 2010 that published on 2012.

The basic data were collected by fisheries officer in district/municipal level in the fishing company, landing site or sampling village that were specified before. There is a template format for statistic book that given by Directorate of Statistical Data to be filled by district and province fisheries office. Data that collected by officers are monthly data of catch and effort and then analyzed by local fisheries office into district statistical fisheries book which contain quarterly

data catch and trip and annual data of household, fishing vessel and fishing gear. In the provincial level, data from several district combined by and validated became provincial statistical fisheries book were then submitted to Sub Directorate of Statistical Data. In national level, the data from 33 provinces were revalidated, combined and then published by name annual book of Indonesia fisheries statistic (Figure 6).

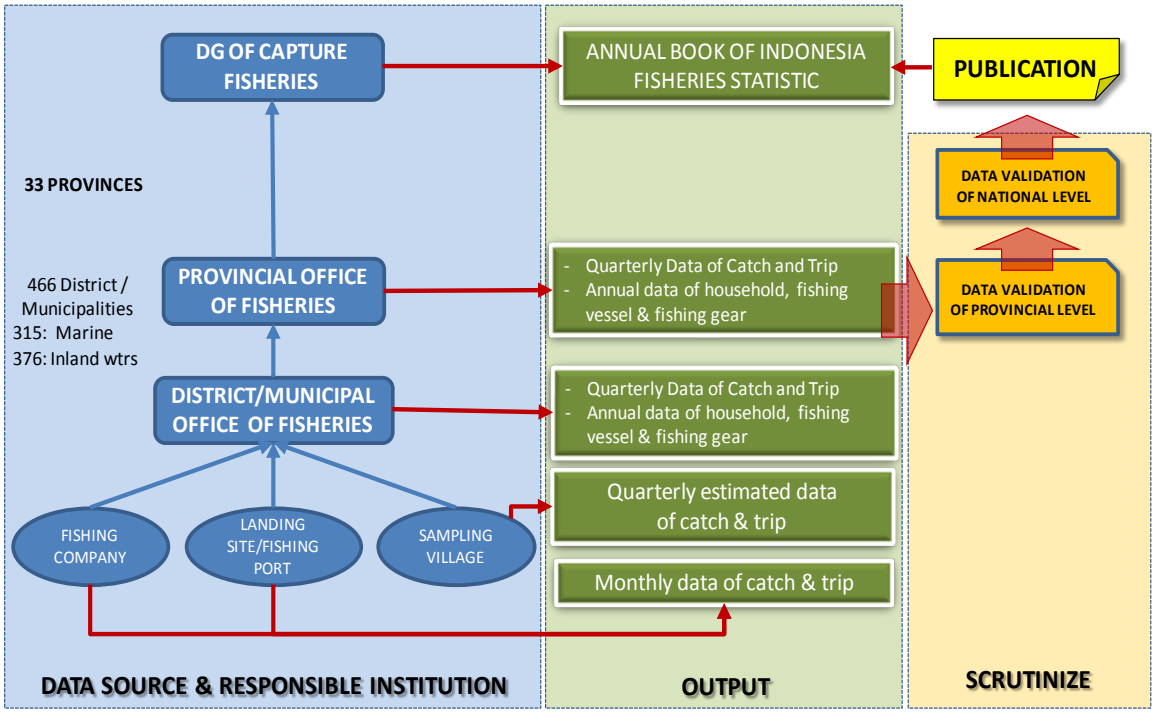

Figure 6. Schematic Diagram of Indonesia Fisheries Statistic Data

The process of getting statistic data started with identification of data that needs to collect then arrange the instrument that used to get the data such as the officer, tools and interview sheet. Next processes are data collection, data processing, data analysis and data presentation. To improve the quality of the data, Indonesia has several things undertaken such as human resources quality improvement by the way arrange training, technical assistance etc. The other thing is improve supporting facilities and infrastructure like hardware, software, internet facilities and develop Fisheries Statistic Information System (FSIS) which is electronic and internet based system. The last thing is improvement of institution

and cooperation by expanding support from national, local, cross-sectoral and international agencies/stakeholders.

The fisheries statistic data helped the officer to make regulations and management measures that most appropriate to manage fisheries in all sectors. While for scientist, the statistic data used to calculate fish stock and to make policy recommendation.

Problem and Challenge

There were several problems that occurred during the process of making fisheries statistic data. Inadequate human resources are the main problem both in quantity (number of officer) and quality of officer that involved in the process. The other problem is the lack of facilities to support the process of collecting, processing, and validating and finalization data. No less important is budget constrain because it requires a lot of money to collect data from the entire sampling site in 33 provinces and 466 districts. All those problems can lead to data quality that doubtful, not timely and inefficient data collecting and processing.

Challenges to be faced in the future in statistical fisheries data collections are how the data could be more accurate, reliable, timely and accessible. Several steps to be taken to develop fisheries statistical data are:

1. Human resources development
2. Facilities and infrastructure development including regulation and institutional
3. System and methods improvement/development
4. Networking and cooperation development (statistic center agency, local government, fisheries extension officer etc)
5. Sustainable and sufficient financing

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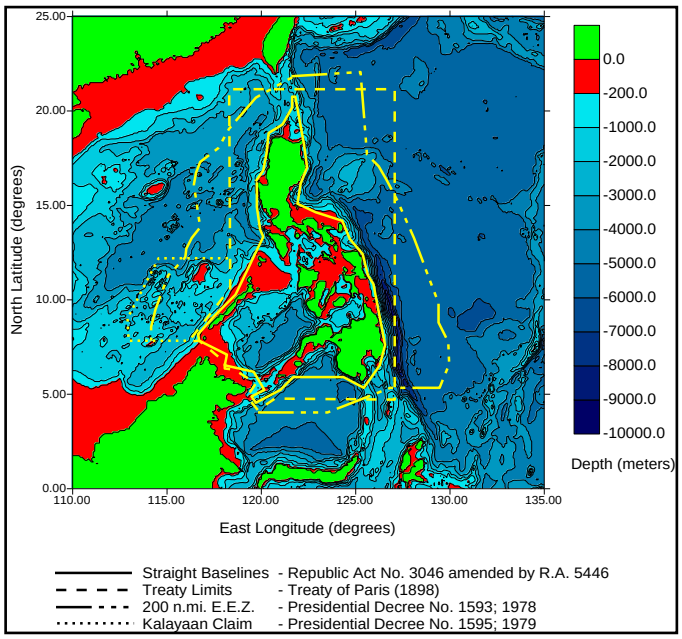
Regional Workshop on the Effective Fisheries Information Gathering in Coastal Small-Scale and Inland Fisheries for Southeast Asian Region

28-30 January 2013, Bangkok, Thailand

SUBJECT: Overview of Fisheries Data Collection (Capture Fisheries) in Coastal and Inland Small-Scale Fisheries in the Philippines

I. Philippine Fisheries Profile (Backgrounder)



a. The Philippines is an archipelago of 7,107 islands with a total territorial water area of 2,200,000 sq. km., a total shelf area of 184,600 sq. km (depth 200m), and a total coral reef area of 27,000 sq. km.
b. The country has a total land area, including inland bodies of water, of approximately 300,000 square kilometers (120,000 sq mi) with 246,063 ha of swamplands, 253,854 ha of brackish water fishpond, and 250,000 ha of other inland resources.
c. It has 36,289 kilometers (22,549 mi) of coastline which is the 5th longest coastline in the world.
d. The country is bordered by the Philippine Sea (east), the South China Sea (west), and the Celebes Sea (south).
e. In 2009, fisheries production in the Philippines contributed 4.3 percent in the total gross domestic product (GDP) and 22.4 percent to gross value added (GVA) in Agriculture, Fishery, and Forestry.
f. The country generates 1,614,371 employments from aquaculture, municipal, and commercial fisheries.
g. The Philippines ranked 6th in fish production. The 4.97 million MT production of fish, crustaceans, mollusks, and other aquatic plants (including seaweeds) constitutes 3.12 percent of the total world production of 159.1 million metric tons (FAO website, 2013).
h. It is ranked 9th in aquaculture production of fish, crustaceans, and mollusks contributing 1.4 percent share to the total global aquaculture production of 52.55 million MT.
i. The country's aquaculture production amounted to over 1.58 billion dollars (FAO website, 2013).
j. The Philippines is the 3rd largest producer of aquatic plants (including seaweeds), having produced a total of 1.67 million metric tons or nearly

10.6 percent of the total world production of 15.78 million metric tons (FAO website, 2013).

k. The seven major aquaculture species in the Philippines are the following (FAO website, 2013):

1. Seaweed (mainly *Kappaphycus* and *Eucheuma* spp.)
2. Milkfish (*Chanos chanos*)
3. Tilapia (mainly Nile tilapia,*Oreochromis niloticus*)
4. Shrimp (mainly giant tiger prawn,*Penaeus monodon*)
5. Carp (mainly bighead carp,*Aristichthys nobilis*)
6. Oyster (slipper cupped oyster,*Crassostrea iredalei*)
7. Mussel (green mussel,*Perna viridis*)

II. Fisheries Information and Methods of Data Collection

Type of Information	Methods of Data Collection	Problems and Constraints
1. <u>Catch and Effort Data</u> – Name of Fishing Ground – Landing Center – Date of Sampling – Name of Boat – Type of Fishing Gear – Number of fishing days of the actual fishing operation (time) – Total catch by boat (number of boxes/bañeras/weight by kgs.) – Catch sample weight (kgs.) – Catch composition (scientific names of the marine fishes) – Name and signature of samplers/encoders	1. Coordination with the Local Government Units (LGU) 2. Conduct of orientation and trainings to the identified data collectors/enumerators on the rationale and methodology including the following: • Filling-up of survey forms • Identification of catch composition • Hands-on activities on field (practicum) 3. Identification of landing sites (to represent the whole area) 4. Weekly/monthly submission of data	1. Requires more fund and manpower 2. Needs regular monitoring to ensure correctness of data 3. Dissemination of information to stakeholders and policy-makers 4. Proper interpretation of data in order to generate reliable information 5. Synchronization of data from different concerned agencies 6. Proper record keeping
2. <u>Aquaculture Production</u>	1. Formulate survey forms 2. Partnership with LGUs in the collection of data 3. As part of the requirements in the renewal of permits • Submission of harvest data per production cycle	

III. Policies/Regulations Related to Information Gathering

Policies	Agencies Involve	Reference
1. Republic Act no. 7160 (The Local Government Code of the Philippines)	Local Government Units (LGUs)	LGU Website
2. Republic Act no. 8550 (The Philippine Fisheries Code) • *Section 39.* Report of Meteorological and Other Data • *Section 122.* Assistance in Collecting Information	Bureau of Fisheries and Aquatic Resources (BFAR)	http://www.bfar.da.gov.ph
3. *FAO No. 214 (Code of Practice for Aquaculture), Sec. 11.* Aquaculture Data Management	LGU/BFAR	
4. Republic Act. No. 8435 • Mandating the Bureau of Agricultural Statistics (BAS) to serve as the central information source and server of the National Information Network (NIN) of the Department of Agriculture (DA)	BAS	http://www.bas.gov.ph

IV. Development Plan for Information and Data Collection

- Unified and Enterprise Geospatial Information System (UEGIS)
  - This project aims to enhance the planning and implementing capability of the Department of Agriculture in Strategic Agriculture and Fisheries Development Zones (SAFDZs).
  - This project will aid in the formulation of an Integrated Development Plan for the sector.
  - This project envisioned that UEGIS will help the Department in the provision of accurate agriculture and fisheries production forecasting, markets, and good governance.
- Strengthening of fisherfolk organizations which will help the agency (BFAR) to monitor the production catch of their co-fish worker as well as to monitor the landing centers in their specific areas.

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Regional Workshop on the Effective of Fisheries Information Gathering in Coastal Small-scale and Inland Fisheries for Southeast Asian Region
28-30 January 2013, Bangkok, Thailand

Overview of fisheries data collection (capture fisheries) in coastal small-scale fisheries in Thailand

1. Type of fisheries information and methodology of data collection in Thailand

The overall picture of marine production and fishing effort in Thailand base on the sample survey, log book survey, fisheries communities survey and the coastal aquaculture survey. Marine production divided to marine catch and coastal aquaculture production. The marine catch divided to small scale and large scale fisheries. The logbook surveys using for collecting large scale fishing gears data (trawler, purse seine, and etc.). The small scale fisheries information and methodology of data collection in the coastal zone showed as the table.

Issues (type of information	**How to collect the data**	**Problems and constraints**
1. Marine production 1.1 small scale fisheries catch Average catch/day Average catch/month Yearly catch Total catch 1.2 Catch by species Ratio of species per trip 1.3 Catch by fishing method Gillnet Stationary fishing gear Other 1.4 Landing place 1.5 Fishermen name 1.6 Fishing date 1.7 Fishing effort Catch/day/boat 1.8 Fishing area	To estimate quantity and value of marine aquatic animals catch by small-scale fishing gear in coastal zone by using communities fisheries production survey. The survey use stratified 2 stage sampling method. <u>First Stage</u> - Fishing communities were classified by coastal province to 5 zone. zone 1 : Trat, Chanthaburi, Rayong zone 2 : Chonburi, Chachoengsao, Samut Prakan, Samut Sakhon Samut Songkhram, Phetchaburi, Prachuap Khiri Khan zone 3 : Chumphon, Suratthani, Nakhonsithammarat zone 4 : Songkhal, Pattani, Narathiwat zone 5 : Ranong, Phangnga, Phuket, Krabi, Trang, Satun - Sampling sample villages of each coastal zone for making list of sample villages. <u>Second stage</u> - Making frame for sampling fishing units by list of all fishing gears of each sample villages. - Selection sample fishing units of each fishing gears in each sample villages at least 5 sample units, if fishing units are less than 5 units, it will be collected all. (The number of fishing units was counted according to the type of fishing gears. **Data Processing** -All filled questionnaires which had been editing at the provincial office were sent to the central office. - Manual editing for completeness and consistency of detail information. -Raw data were input and process by computer. -Reporting quantity and value of each species by coastal zone and fishing gears. **Times Reference** Field work on January – February of every year for make enquiries of catch by small-scale fishing gear on previous year. (Jan - Dec)	1.1 Lacking of interview skill for completing the questionnaire made difficult to get positive participation from fishermen. 1.2 Sample survey by officer - Take time - High cost and manpower

	Survey form 1) List of sample village for community production survey 2) Fishing community production questionnaire	
2. Fishing vessel 2.1 No. of fishing vessel 2.2 Type of fishing vessel - Non power - In-board - Out-board 2.3 Type of engine 2.4. Size of fishing vessel 2.5 Type material of fishing vessel	2.1 Sample survey by officer - Survey the number of fishing vessel by type of fishing gear 2.2 Boat registration 2.3 Fishing licenses	2.1 Boat registration Difficult to get real number of boat from boat registration because almost of small-scale fisherman don't understand how important of boat registration, so they think that no need to register their boat. 2.2 Fishing licenses - Almost fishermen have more than 2 fishing gears but registration only one fishing gear
3. Fishing gear 3.1 Fishing gear type 3.2 Number of fishing unit by type of fishing gear 3.3 fishing area 3.4 Sample village name 3.5 Fishing season	3.1 Face to face interview by using questionnaire 3.2 Collect secondary data from local government office	3.1 Face to face interview by using questionnaire - Spend a lot of budget and manpower -Lack of interview technic skill 3.2 Some Local government office has no data and some information are not up to date
4. Socio-economic 4.1 Fishermen education level 4.2 Religion 4.3. No. of fishermen 4.4 Age of fishermen 4.5 No. of fishery household 4.6 Size of household 4.7 No. of hire labor (worker) for fishing 4.8 Monthly income 4.9 Monthly expenditure 4.10 Main source of loan 4.11 Problem on fishermen 4.12 livelihood 4.13 Fish price	4.1 Face to face interview by using questionnaire 4.2 Collect secondary data from local government office 4.3 Fishing community production questionnaire	4.1 The fishermen did not want to answer about income they worried about tax. 4.2 The long detail of a questionnaire take time to complete and need a good interviewer. 4.3 Some question similar to question of other organization questionnaire. 4.4 No data record so the fishermen forgot the real data, just estimate for completing forms.

2. Available information and policy or regulation related fisheries information gathering in your country

Policy and information	Responsible by which organization	Display
The marine fisheries statistics base on the sample survey	Department of Fisheries (DOF)	Document and CD Report or book on fisheries statistic
Master plan on marine fisheries management	DOF	Document
Boat registration	DOF	Data form
Fisheries information gathering for fishery policy and management project	DOF	Manual

3. Way forward to develop data collection and gathering information in your country.

3.1 To upgrade the interview skill for data collector or the interviewer to complete the questionnaire. It will get good relationship, positive thinking and real data from fishermen.

3.2 Using high and new technology as Facebook, timeline, email and etc. connect to the local organization office at sub district or district level to collect and report the real time fisheries data.

3.3 Trainings or making advertisements for more public participation understanding on boat registration, fisheries information gathering and etc.

3.4 The new fishermen or before getting the new fishing licenses, the fishermen should have to participate the short training course on marine fisheries management and pass the examination as the way to get the car license.

3.5 Making the network on marine fisheries database online to the provincial fisheries office, 22 provinces, similar to farm registration online to decrease the long detail and boring time about the same data of socio-economic question as answer to the government office every year and also recheck personal data in short time.

3.6 The government should concern and understand how important of the real, correct and in time fisheries information for the country policy maker and fisheries management plan.

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Country Paper of Viet Nam

Overview of fisheries data collection (capture fisheries) in coastal and inland small-scale fisheries in Viet Nam

1. Fisheries information and methodology of data collection

Issues (type of information)	How to collect the data	Problems and constraints
Catching		
1. ***Catch amount*** *classified by :* - Marine capture fisheries - Inland fisheries	1) Monthly administration report from local to Directorate of Fisheries (DOF)	1) Monthly administration report - Not accuracy and timely - Poor data and sometimes not available
2. ***Catch species*** classified by group species as follows : - Fish of all kinds - Crustacian - Moluscs - Others	2) Sample survey by officer 3) Enumerators in local departments	2) Sample survey by officer - High cost and lack of manpower - Limited budget 3) Enumerators in local departments
3. ***Fishing ground*** - Data on this is not avalaible - Data on collected mainly classified by administration geography (by provinces)		- They lack of knowledge of statistics - Most of them have not been trained in method of collecting data
4. ***Fishing date*** - Data not available because an application of logbook is difficult in practice	4) Logbook record by fishermen	4) Logbook record by fishermen - It is difficult to get participation from fishers because they do not want to give information. - In many case, filling in logbook is not easy for fishers who have low level of education.
Fishing vessel		
1. ***Type of fishing vessel*** - Non power - Power 2. ***Type of engine*** - Based on producers 3. ***Size of fishing vessel*** - Classified by horse power (Hp) : <20hp; 20 – 50 hp; 50-90 hp, 90-150 hp; 150-250 hp, 250-400 hp, >400 hp - Size by grosstonage and length of boats is not applied 4. ***Type material of fishing vessel*** - by wood - by iron - by composites	1) Boat registration 2) Administration Report from local Sub-DECAFIREF under province's DARD (Department of Agricuture & Rural Development) and DECAFIREF under Directorate of Fisheries (DOF) 3) Logbook record by fishermen, 4) Sample survey by officer	1) Boat registration - Many small fishing boats have made difficulties for management of fishing activities - Mangement agencies lack human resources and budget. - Lack of staff specialized in technical register 2) Report do not provide complete data and information 3) Logbook record by fishermen - Most of fishers has low education level, so it is not easy for them to fill in logbook. 4)Sample survey by officer - High cost and manpower

Fishing gear		
1. ***Type of fishing gear*** - Trawl net - Purse seine net - Gillnet - Longline - Other 2. ***Number of fishing gear*** - one or two (depend on fishing vessel)	1) Fishing license 2) Administration Report from local Sub-DECAFIREF under province's DARD (Department of Agricuture & Rural Development) and DECAFIREF under Directorate of Fisheries (DOF) 3) Logbook record by fishermen, 4) Sample survey by officer	1) Fishing license - Almost fishermen have more than 2 fishing gears but registration only one fishing gear - Fishing gears used by fishing boats has not under control of an agency authority. - Mangement agencies lack human resources and budget. - A large number of fishing boat 2) Report do not provide complete data and information - Insufficient system of fisheries statistics 3) Logbook record by fishermen - Most of fishers has low education level, so it is not easy for them to fill in logbook. 4)Sample survey by officer - High cost and manpower
Socio-economic		
1. Fishermen education level 2. Religion 3. No. of fishermen 4. Age of fishermen 5. No. of fishery household 6. Size of household 7. No. of hire labor (worker) for fishing 8. Monthly income 9. Monthly expenditure 10. Main source of loan 11. Problem on fishermen livelihood	1) Face to face interview by using questionnaire 2) Sending questionnaire 3) Collect secondary data from local government office, and 4)Other	1) Face to face interview by using questionnaire - Spend a lot of budget and manpower 2) Sending questionnaire - Difficult to get return back of questionnaire 3) Collect secondary data from local government office - Information are not up to date 4) Other - it is not conducted usually - Only use for specific objectives such as researches, specific plans, etc.

2. Available information and policy or regulation related fisheries information gathering in your country

Policy and information	***Responsible by which organization***	***Display***
• A set of fisheries statistical criteria have approved. • A regulation of cooperation between agencies related to fisheries in collecting data • Establishment of system of boat registration submitted • Proposal for establishment of fisheries statistic	Directorate of Fisheries (D-fish) of Viet Nam and DARD in local	Website http://www.fistenet.gov.vn or www.agroviet.gov.vn *Report or book on fisheries statistics*

3. Way forward to develop data collection and gathering information in your country.

- Re-structure a system of fisheries statistics unified from the centre to the locals

- Strengthen human resources for the statistical system of fisheries including sufficient manpower and training on statistics

- Spend annual budget on the statistical system for data collection, sample surveys and building technological infrastucture for IT application on statistical area

- Improve awareness of a role of fisheries statistics for management and enhance knowledge of legislation for fishermen.

Overview of fisheries data collection (capture fisheries) in coastal and inland small-scale fisheries in Southeast Asian Region

Issues (type of information)	How to collect the data	Problems and constraints	Way Forward
<u>Brunei Darussalam</u> *Catching* - Catch amount - Catch species - Fishing ground - Fishing date *Fishing vessel* 1. Type of fishing vessel 2. Type of engine 3. Size of fishing vessel 4. Type material of fishing vessel *Fishing gear* 1. Type of fishing gear 2. No. of fishing gear *Socio-economic* 1. Fishermen education level 2. Religion 3. No. of fishers 4. Age of fishers 5. No. of fishery household 6. Size of household 7. No. of hire labor for fishing 8. Monthly income 9. Monthly expenditure 10. Main source of loan 11. Problem on fishermen livelihood	*Catching* - Logbook/Daily catch report record by fishers - Sample survey by officer, and - Random sampling - Others *Fishing vessel (from licenses)* - Logbook record by fishers - Boat registration - Sample survey by officer, and - Others *Fishing gear (from licenses/logbook)* - Logbook record by fishers - Fishing license - Sample survey by officer, and - Others *Socio-economic* - Face to face interview by using questionnaire - Sending questionnaires - Collect secondary data from local government office, and - Others	***Technical Problems*** 1. Logbook record by fishermen - Difficult to get participation from fishermen 2. Boat registration - Difficult to get real number of boat from boat registration because almost of small-scale fisherman don't understand how important of boat registration, so they think that no need to register their boat. 3. Fishing licenses - Number of fishing gear units are not declared properly - Most fishermen have more than 2 fishing gears but registration only one fishing gear 4. Collect secondary data from local government office - Information are not up to date ***Non-technical Problem*** 1. Sample survey by officer - High cost and manpower 2. Face to face interview by using questionnaire - Spend a lot of budget and	1. Better system of data collecting 2. Increase no. of sampling survey 3. Raise awareness on participation from fisher for sending back logbook or questionnaire to officers 4. Improve infra-structure facilities and infra-structure like software and hardware: Data exchange is quite slow because mostly using the e-mail system and basically depending on the connection itself. (which most of the time is slow) 5. People skill: • Training for local officers who are concern on data collection and data transfer. • Training on autonomous community-based management. 6. Good cooperation and communication with relevant agencies and institution for information exchange 7. Formulate/create a new kind of sampling of data collection: simple/easy to understand current take a lot of time 8. Consider to take voluntary data collection way through

Issues (type of information)	How to collect the data	Problems and constraints	Way Forward
12. Others		manpower	autonomous community-based management. 9. Review more on boat registration and fishing license scheme to find out clearly difficulty and problems. 10. More examine logbook and questionnaire format to whether or not to fit for recording by fisher.
<u>Cambodia</u> *Catching* - Catch amount - Catch species - Fishing ground - Fishing date *Fishing Vessel* - Type of vessel (for marine fishing boat) - Type of engine power (for marine fishing boat) *Fishing gear* - Type of fishing gear - No. of fishing gear *Socio-economic* - Fishermen education level - Religion - No. of fishers - Age ration of fishers - No. of fishing household - Size of fishing household	*Administrative Information System* - Record official fisheries statistics and information - Monthly report on fisheries statistics and information *Registration* *Scientific Survey/Research* - Catch monitoring or CPUE - Logbook	***Technical Problem*** 1. Small-scale fishing gears are highly diverse complexity of Ecosystem. 2. Small-scale fishing gears are not requested for registration, according to the Law on Fisheries in Cambodia. 3. Knowledge of fisheries officers at Cantonment level is still limited. ***Non-technical Problem*** 1. Small-scale fishers are free to enter into fishing business difficult to control in terms number of fishers, fishing gear used and son. 2. Lack of fisheries officer and financial support in collecting fisheries statistic and information. The process of fishing boat	1. Strengthening data collection through build capacity to FiA central and cantonment staff 2. Seek various donor for financial support 3. Fisheries policy reforms are more focusing on fisheries co-management 4. Raising awareness of the importance of the fisheries data collection to community fisheries 5. Consider to take voluntary data collection way through autonomous community-based management. 6. Consider to take secondary data collection through middleman. 7. Develop simple format for data collection.

Issues (type of information)	How to collect the data	Problems and constraints	Way Forward
- Labor in fisheries		registration and the cooperation between relevant agencies still weak and need to be improved.	
<u>Indonesia</u> *Catching* - Catch amount - Species - Fishing ground - Fishing date *Fishing vessel* - Type of fishing vessel - Type of engine - Size of fishing vessel - Type material of fishing vessel *Fishing gear* - Type of fishing gear - No. of fishing gear *Socio-economic* - Fishermen education level - Religion - Age of fishermen - No. of fishery household - Size of household - No. of hire labor for fishing - Monthly income - Monthly expenditure - Main source of loan	- The basic data were collected by local fisheries officer with template format for statistic book. - Data analyzed by local fisheries office into district statistical fisheries book which contain quarterly data catch and trip and annual data of household, fishing vessel and fishing gear. - In national level, the data in provinces level were revalidated and published by the Annual Book of Indonesia Fisheries Statistics - Fisheries Statistic Information System (FSIS)	***Technical Problem*** 1. Facilities and infrastructure development including regulation and institutional ***Non-technical Problem*** 1. Small number of human resources. 2. System and methods improvement/development 3. Networking and cooperation development (statistic center agency, local government, fisheries extension officer etc) 4. Sustainable and sufficient financing	1. Improve supporting facilities and infrastructure like software and hardware 2. Develop FSIS which is electronic and internet based system 3. Improvement of institution and cooperation by expanding support from national level and international agencies/ stakeholders 4. Need new fisheries census to know updated number of fisheries households. 5. Consider to take voluntary data collection way through autonomous community-based management. 6. Review data collection format for reducing effort of local officers in data collection.

Issues (type of information)	How to collect the data	Problems and constraints	Way Forward
- Problem on fishermen livelihood *(see more detail in Annex 1)*			
<u>Lao PDR</u> *Catching* - Catch amount - Catch species - Fishing ground - Fishing date *Fishing vessel* *Fishing gear* - Type of fishing gear - No. of fishing gear *Socio-economic* - Fishermen education level - Religion - Age of fishermen - No. of fishery household - Size of household - No. of hire labor for fishing - Monthly income - Monthly expenditure	- Logbook record by fishers - Sample survey by officer - The statistics system is based on administrative report	***Technical Problem*** 1. The generation of data is not yet systematic due to lack of standardization of fisheries data collection concept and procedures and due to non-compliance to the requirement; 2. Difference in the use of definition or interpretation as well as timing of data collection; 3. Timeliness of data submission and reliability of data from provincial level due to limitation of funds, time and facility, lack of understanding and interests of local staff in data collection, *4.* Lack of knowledge and experiences in data processing, analysis and reporting. *5.* ***Non-technical Problem*** Lack of qualified personnel and	1.Training involved personnel on the statistical data and information collection handling techniques in both central and local level. 2.Build awareness to fisherman to cooperate in providing data and information. They need to be trained on filling the data forms and encourages them to give the true information and trustfulness; 3.Establish good cooperation and communication with relevant agencies and institution for information exchange; and 4.Provide required equipment and facility such as computer and standard software for data compilation, processing, analysis and reporting. 5. Consider to take voluntary data collection way through autonomous community-based management. 6.Developing clear definition for data collection e.g. fisher, etc.

Issues (type of information)	How to collect the data	Problems and constraints	Way Forward
		drop-out of officers who have been undergone with the training to other works due to difficulty of work and undermining on fisheries data collection.	
<u>Malaysia</u> *Catching* - Catch amount - Catch species - Fishing ground - Fishing date *Fishing vessel* - No. of vessel - Vessel size (GRT) - Engine size (Hp) - Fishing ground (zone) - Vessel wheel house color to represent the flag state - Landing port *Fishing gear* *Socio-economic* - Education level - Race & Religion - Household income - Children education level	- Logbook of inshore fishing vessel (only Tanatheryi Region) - Sampling survey - *Survey form*	***Technical Problem*** 1. Lack of supervisions 2. Lack of training on basic data collection for new staff ***Non-technical Problem*** 1. Wide area of coverage – many landing port to cover 2. Insufficient enumerators 3. Insufficient fund	1. Device/gazet that can scan the receipt and transfer the data into the computer (electronic receipt) 2. To improve regulation on inland fisheries e.g. registration, licensing. 3. Consider to take voluntary data collection way through autonomous community-based management. 4. To improve data quality by providing awareness and educational programs to local community and improve their attitude on fisheries resources management.

Issues (type of information)	How to collect the data	Problems and constraints	Way Forward
<u>Myanmar</u> *Catching* - Catch amount - Catch species - Fishing ground - Fishing date *Fishing vessel* - No. of vessel - Size of fishing vessel - Type of engine - Name of fishing vessel *Fishing gear* - Type of fishing gear - No. of fishing gear *Socio-economic* - Economic indicator - Fishers income	Sampling survey method. **Survey form** 1) List of sample village for community production survey 2) Fishing community production questionnaire - Sample survey by officer - Boat registration - Fishing licenses 3) Face to face interview by using questionnaire 4) Collect secondary data from local government office - Face to face interview by using questionnaire - Collect secondary data from local government office - Fishing community production questionnaire	***Technical Problem*** 1. Lack of up-to-date data 2. Accuracy of data collection (Lack of sampling survey) 3. Weak of basic knowledge and standardization of data collecting 4. Lack of training ***Non-technical Problem*** 1. Scattered information (Transportation problem) 2. Lack of financial support	1. HRD program for statistic on inland/inshore fisheries 2. To develop appropriate cost effective sampling survey methodology/techniques so that sampling site could be increased in the future. 3. Improve supporting facilities IT such as software and hardware 4. To consider taking voluntary data collection way through autonomous community-based management.
<u>Philippines</u> *Catch and Effort* - Volume of catch - Catch species/composition - Fishing ground/landing center - Fishing date	1. Coordination with the Local Government Units (LGU) 2. Conduct of orientation and trainings to the identified data collectors/ enumerators on the rational and methodology including the	***Technical Problem*** 1. Data accuracy is difficult to ascertain, thus the need for regular monitoring of data collection procedure. 2. Some technical information is difficult to translate to local terms and concepts that can	1.Empower the fishing communities through seminars and trainings so they may act willingly as data collectors 2.Improve the skills of data collectors, update their capability in using new technology or

Issues (type of information)	How to collect the data	Problems and constraints	Way Forward
- Catch sample weight *Fishing vessel* - No. of fishing vessel - Size of fishing vessel - Name of fishing vessel - No. of fishing trip *Fishing gear* - Type of fishing gear - No. of mesh size used *Aquaculture production Data*	following: - Filling-up of survey forms - Identification of catch composition - Hands-on activities on field • Methods of sampling • Sample collection: sorting, weighing • Fish measurements - Data encoding 3. Identification of landing sites 4. Weekly/monthly submission of data	be easily understood by the stakeholders. 3. Misinterpretation of data result to unreliable information(misinformation). ***Non-technical Problem*** 1. Limited fund and manpower to perform data collection, processing interpretation and dissemination of information. 2. Data comparison with other and non-government and non government agencies statistic/data is impossible due to use of different methodology 3. Some record are not kept for future reference due to high data storage and protection cost.	methods of data collection. 3.Improve the skills of data collators so they can further perform processing timely submission to concerned agencies. 4.Develop incentive mechanism to encourage the regular and on-time submission of data to concerned units/agencies. 5.Improve the capability of manpower involved in data analysis and interpretation so that they may produce accurate, reliable and relevant information on-time. 6.Involve local communities before and during data collection and consult with them by presenting the output to them so they become familiar with the technical terms and later understand the purpose, procedure and final output. 7.Use new technologies such as Unified and Enterprise Geospatial Information System (UEGIS) 8.Provide the needed infrastructure support such as equipment, communication network, reliable power supply and transmission facilities to ensure proper storage,

Issues (type of information)	How to collect the data	Problems and constraints	Way Forward
			protection, processing and submission of data or information. 9.Develop and maintain relationship with information networks, agencies, institution and other entities and encourage information exchange to narrow or eliminate the data gaps as well as methodology differences. 10. Enhance capability and capacity of information experts by financially supporting their research and development activities, publications, local and international trainings, sharing information and improving their work conditions 11. Collaborate with other organizations focused on gathering fisheries information to reduce cost, share expertise and facilities and later develop better information networks. 12. Welcome donor organizations and countries to address the constraint on limited budget.
<u>Thailand</u> *Catching* - Catch amount - Catch species (ratio of species per trip) - Fishing date	1. Monthy administration report (from local to the D-Fish) 2. Sample survey for reviewing annual data	***Technical Problem*** 1) Lacking of interview skill for completing the questionnaire made difficult to get positive participation from fishermen.	1.Making network on fisheries database online at the provincial/district levels 2.To enhance the interviewing skill of local officer and networking with community in order to

Issues (type of information)	How to collect the data	Problems and constraints	Way Forward
Fishing Vessel - No. of fishing vessel - Type of fishing vessel - Type of engine - Size of fishing vessel - Type material of fishing vessel *Fishing Gear* - Type of fishing gear - Number of fishing unit by type of fishing gear - Fishing area - Sample village name - Fishing season *Socio-economic* - Fishermen education level - Religion - No. of fishermen - Age of fishermen - No. of fishery household - Size of household - No. of hire labor (worker) for fishing - Monthly income - Monthly expenditure - Main source of loan - Problem on fishermen - livelihood *Fishing effort*	3. Census of Agriculture, Rural Area and Fisheries (every 5 years) 4. Data collected from other mission 5. Logbook, report 6. Boat registration form 7. Fishery license	***Non-technical Problem*** 1) Sample survey by officer - Take time - High cost and manpower 2) Socio-economic data collection is not sufficient.	obtain better data from fishers 3.Using new information technology such as Facebook, email and etc. 4.Making advertisements for more understanding on boat registration, fisheries information gathering and etc. 5.Conduct training course on fisheries management and examination for the new fishermen as the way to get the car license. 6.Raise awareness on the important of the real, correct and in time data collection 7.Strengthening human resources to improve knowledge of scientific data collection by cooperation with intergovernmental organizations like FAO, NACA, MRC and SEAFDEC. 8.Conduct socio-economic surveys to obtain better information on fisheries situation. 9.Review data collection format to reduce efforts required for data collection.
<u>Vietnam</u> *Catching* - Catch amount		***Technical Problem*** 1. Poor data and sometimes not available	1. Improve software and IT facility to facilitate the collection of fisheries statistic

Issues (type of information)	How to collect the data	Problems and constraints	Way Forward
- Fishing ground - Landing site *Fishing vessel* - No. of fishing vessel - Size of fishing vessel *Fishing gear* - Type of fishing gear - No. of fishing gear *Socio-economic* - No. of fishers		2. Lack of knowledge of statistics 3. Most of them have not been trained in method of collecting data 4. Fisherman doesn't want to send logbook and report to authorities ***Non-technical Problem*** 1. Not accuracy and timely 2. High cost and lack of manpower Limited budget	2. Improve methods for data collection (including logbook, report and questionnaire) to be more cost effective and come up with more reliable data Strengthening human resources for the statistical system 3. Improve legislation and regulations for small-scale fisheries, and enhance knowledge of fisher on the legislation/regulation. 4. Strengthening budget for fishery statistics, and training for statistical staff 5. Strengthen autonomous community-based management on data collection.

Annex 1

Issues (type of information) by Indonesia

Marine Capture Fisheries

- Number of marine fishing establishments by size of fisheries management, coastal area and Province
- Number of marine fishers by category of fishers, coastal area and Province
- Number of marine fishing boats by size of boats, coastal area and Province
- Number of marine fishing units by type of fishing gear, coastal area and Province
- Number of marine fishing trips by type of fishing gear, coastal area and Province
- Volume of marine capture fisheries production by species, coastal area and Province
- Value of marine capture fisheries production by species, coastal area and Province
- Volume of marine capture fisheries production by type of fishing gear, coastal area and Province
- Volume of marine capture fisheries production by type of disposition, coastal area and Province
- Volume of marine capture fisheries processed product by product of processing, coastal area and Province
- Volume of marine capture fisheries production by quarter, coastal area and Province
- Value of marine capture fisheries production by quarter, coastal area and Province
- Volume of fry production caught from the sea by species, coastal area and Province
- Value of fry production caught from the sea by species, coastal area and Province
- Number of marine fishing establishments by size of fisheries management and Province
- Number of marine fishers by category of fishers and Province
- Number of marine fishing boats by size of boats and Province
- Number of marine fishing units by type of fishing gear and Province
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- Number of marine fishing trips by type of fishing gear and Province
- Volume of marine capture fisheries production by species and Province
- Value of marine capture fisheries production by species and Province
- Volume of marine capture fisheries production by type of fishing gear and Province
- Volume of marine capture fisheries production by type of disposition and Province
- Volume of marine capture fisheries processed product by product of processing and Province
- Volume of marine capture fisheries production by quarter and Province
- Value of marine capture fisheries production by quarter and Province
- Volume of fry production caught from the sea by species and Province
- Value of fry production caught from the sea by species and Province

Inland Open water Capture Fisheries

- Number of inland open water fishing establishments by size of fisheries management and Province
- Number of inland open water fishers by category of fishers and Province
- Number of inland open water fishing boats by size of boats and Province
- Number of inland open water fishing units by type of fishing gear and Province
- Number of inland open water fishing trips by type of fishing gear and Province
- Volume of inland open water capture fisheries production by species and Province
- Value of inland open water capture fisheries production by species and Province

- Volume of inland open water capture fisheries production by type of fishing gear and Province
- Volume of inland open water capture fisheries production by type of disposition and Province
- Volume of inland open water capture fisheries processed product by product of processing and Province
- Volume of inland open water capture fisheries production by quarter and Province
- Value of inland open water capture fisheries production by quarter and Province
- Volume of inland open water capture fisheries production by type of inland open water and Province
- Value of inland open water capture fisheries production by type of inland open water and Province