ABSTRACT

Pasaleng Bay has been one of the most important fishing grounds of the region. Nevertheless; the picture of its fishery has not been fully discussed in related literatures. This preliminary assessment of the bay will basically describe the capture fisheries that will be an integral part of a more systematic future studies on the bay's extent of exploitation and sustainable management. Pasaleng Bay is located in the northeastern part of Region 1. It is bounded by the Babuyan Channel in the east and South China Sea in the north and west. Adjacently located at the eastern side of Bangui Bay, the center of the bay has a geographical coordinates of 18^0 36' 15.12"N and 120^0 54' 53.74"E.

This paper presents the preliminary assessment results of a six year study (Year 2000 to Year 2006) on Pasaleng Bay fisheries gathered from two sampling/landing areas, Barangay Balao-i/Gaoa and Pasaleng in Pagudpud, Ilocos Norte. The National Stock Assessment Project (NSAP) standard methodology was used where collection of catch and effort data was conducted every other two days regardless of Saturdays, Sundays and Holidays at ten days per month for each landing site. To determine the data on the number of boats and gears operating in the bay, fishing boats and gear inventory were conducted in coastal barangays of Balao-i, Pancian and Pasaleng last 2001. All sample species per gear were recorded and measured for length and weight. The species caught per gear were classified according to families to determine the catch composition of the different gears, seasonality of gears and species and production estimates. Catch per unit of Effort was computed from the production of boats/day.

Pasaleng Bay is a major fishing ground of 169 boats; half are motorized while the other half are non-motorized. Majority are less than 3 gross tons which translates the bay into a small-scale municipal fishing ground. There are 457 fishing gears belonging to 16 types. The gears operating in the bay is dominated by hook and line at 75% which include multiple hooks and line, multiple/troll line/two boat troll line and bottom set long line. Bottom set gill net follows at 8%, and spear gun at 6% while the remaining 11% includes baby ring net, squid jigger, beach seine, drift gill net with hooks, scoop net, drive-in net, encircling gill net and 1 *otoshi ami (lambaklad)*. The drift gill net operating in the bay is modified by attaching series of hooks at the bottom of the gear. Majority of the gears were used throughout the year with their distinct trend of seasonality depending on the season and target species. Hook and lines targets *Scombridae* and *Carangidae*. Among the gears, spear gun catch the highest number of species annually with 94 species including *Ranina ranina*, hand line with 94 species and bottom set long line with 90 species. Among the net gears, bottom set gill net catches the highest number of species annually with 70 species. Each boat operating in the bay has an average of 2 fishermen per boat except for baby ring net and beach seine. However, the baby ring net which employs more than 2 fishermen during operation showed the highest production among the gears.

There were 319 species recorded and distributed among 59 families. These are dominated by Carangidae at 32 species followed by Serranidae at 28 species, Lutjanidae at 26 species; Nemipteridae has 18 species and Scombridae with 17 species. The rest have less than 15 species per family. Of the 59 families, 20 are pelagic and 39 are demersal. Invertebrates are represented by 6 demersal families and 3 pelagic families which include squids, lobsters, crabs and the red frog crab *Ranina ranina* while sharks are represented by six families. *Katsowonus pelamis* (skipjack) is the most abundant species caught followed by S*elar crumenopthalmus* (big-eyed scad). Next is *Auxis thazard* (frigate tuna) followed by *Encrasicholina punctifer* (anchovy) and *Decapterus macrosoma* (short fin scad). Skipjack, big-eyed scad, frigate tuna and short fin scad are caught mostly by baby ring net, and troll line/hand line while anchovy is caught by beach seine.

Beach seine, ring net and drive-in net recorded the highest average annual CPUE of 269.17kg/day, 47.145 kg/day and 42.90kg/day respectively. However, these gears were not used frequently during the year-round fishing operation. On the other hand, most of the gears like hand lines which comprises 75% have a CPUE of less than 1 kg/day and are operated almost daily.

Further analysis on the population parameters, the sizes of the catch, and the potential sustainable yield will be done to determine the exploitation of the bay leading to recommendation of policies on the status of fisheries stock and the appropriate gears that should be used to attain sustainable catch.

INTRODUCTION

The Philippines is endowed with vast natural resources, one of which is the fishery resources that supply fish and other fishery products abundantly for the increasing population. In order to determine the available fisheries resources of our marine waters particularly in areas where there are few or if none assessments have been made on the capture fisheries, the National Stock Assessment Project of the Bureau of Fisheries and Aquatic Resources was conceptualized and started in 1997 for Lingayen Gulf. However, the NSAP of region 1 started stock assessment activities in the Ilocos Coast including Pasaleng bay fisheries last August, 1999. Enumerators were trained on fish species identification, length and weight measurements and the basic concepts on stock assessment. Boat and gear inventory was also conducted. This paper presents the preliminary assessment Pasaleng Bay fisheries on two sampling/landing areas, Pasaleng and Balao-i/Gaoa from CY 2000 to CY 2005. The data include species and catch composition per gear, seasonality of species, catch per unit effort and biological parameters of species providing an estimates of production that will significantly clarify the state of the bay’s major marine resources.

REVIEW OF LITERATURE

Not much has been written on the fisheries of Pasaleng bay. Most of the published materials were studies on seaweeds made by Cordero, et al. in the 1980s and published in the Mariano Marcos state University Fisheries Journal. The area was part also of the sampling sites for the published books on seaweeds resources published by Dr. Trono (1997 & 2004). A. Ragasa, *et.al* conducted studies on gel producing seaweeds which was funded by BAR (2003) while L. Santos, et.al conducted a study on post harvest of the seaweeds Porphyra (gamet) on a PCAMRD funded research (2005).

The socio economic profile of the municipality of Pagudpud included data on municipal fishing such as the coastal barangays, number of fishermen and the estimated catch. There are nine coastal barangays of the municipality and in 1999, about 1, 503 workers were engaged in municipal fishing with an estimated annual catch of 3,335 MT from both motorized and non-motorized boats. An Environmental Baseline Information was also conducted by students of UP Los Baňos as part of their thesis in 2002 on the coastal barangay of Pancian which mentioned of fishing as the second major occupation next to farming. However, in the report, farmers far outnumbered the fishermen in that barangay with only 32 full time fishermen with 10 motorized banca and 22 non-motorized banca having an average catch of 5-10 kgs.

OBJECTIVE

1. To determine the catch composition of the different gears operating in Pasaleng bay.

2. To determine the seasonality of species and gear.

3. To determine estimates of production (raised catch) per boat per month per gear per landing site.

METHODOLOGY

Assessment of the Pasaleng Bay's fisheries started from September 1999 and is a continuing activity up to the present. For this paper, the results presented and analyzed contain six years data starting January of CY 2000 to December CY 2005. The four months of 1999 was used to conduct inventory of boats and gears and preliminary sampling at pre designated landing sites. Hence, year 1 covers CY 2000, up to year 6 which covers CY 2005.

Sampling Sites:

Sampling was conducted from two municipal landing sites, where municipal boats (3 GT. and below) landed (Fig.1). Two enumerators conducted sampling surveys on the landed catch and gears of the municipal fishing boats. There are three landing sites in the bay, however only two landing sites were sampled which represented most of the fishing gears used in the area. The first sampling area sampled on day 1 is Balao-i/Gaoa located at the western portion of the bay. The second sampling area is sampled on day 2 is Pasaleng located at the eastern part of the bay.

Figure 1. Map of the Study Area

Sampling site:
- Balao-i, Pagudpud, Ilocos Norte
- Pasaleng, Pagudpud, Ilocos Norte

Unsampled site
- Pancian, Pagudpud, Ilocos Norte

Sampling Methods:

Collection of catch and effort data on selected landing sites was conducted every other two days regardless of Saturdays, Sundays and Holidays. This was done throughout the month so that a total of twenty sampling days were conducted, ten days for each landing site. In cases where there are 31 days in a month, the first landing site is sampled for eleven days.

All pertinent data on the landed catch were recorded such as:

- name of fishing ground
- landing center
- date of sampling
- name of boat/number of fishing days/ the actual fishing operation (time)
- total catch by boat (no of boxes/bañeras or weight by kgs.)
- catch sample weight (kgs)
- length measurements (fish length)
- catch composition (scientific names of the marine species)
- name and signature of samplers/recorders

Inventory of Fishing Boat and Gear:

Fishing boats and gear inventory were conducted in coastal barangays along the Bay namely: Pancian, Balao-i and Pasaleng. Inventory was done for the first year while total inventory for all coastal barangays was conducted on the third year of the study.

Species and Catch Composition:

All species were recorded and samples of each major species were measured for length frequencies and weight. The species were classified according to families.

CPUE:

Catch per unit of Effort was computed from the production of boats/day.

Production Estimates:

Estimated production per boat of the different gears per site was computed from the monthly total catch of each gear per site divided by the total number of boat landings. The result was multiplied by the raising factor to determine the raised catch per boat per month. The raising factor is determined by dividing the number of days in a month over the number of sampling days (RF is 2.82 for 31 days with 11 sampling days, 3 for the months with 30 days and 3.1 for the months with 31 days with 10 sampling days).

The raised catch per boat per month was computed by the formula:

$$\text{Raised catch} = \frac{\text{Total Catch}}{\text{No. of boat landed}} \times \text{raising factor} \quad ;$$

➢ Raising factor = $\frac{\text{No. of days in a month}}{\text{No. of sampling days}}$

Data Analysis Tool:

The tools used in analysis are MS Excel for the line graphs.

Scope and Limitation

1. Total boat and gear inventory was conducted for coastal municipalities within the bay.

2. The production data comes from municipal fisheries landings.

3. The municipal fisheries production data gathered is limited to the actual gears sampled in the landing sites.

4. Fishing effort was recorded by number of fishing days for municipal fishing.

5. Effort was standardized to gross tonnage of boats for the municipal fisheries.

6. Pasaleng landing site was included from September 2000 to December 2005.

7. Data analyzed started from January 2000 to December 2005.

RESULTS & DISCUSSION

Study area

Pasaleng Bay is located at the northern tip of Luzon island and it is facing the China Sea. It lies at latitudes 18°30' to 18°40' north and longitudes 120°51' and 120°60' east. It is bounded on the north by the China Sea, on the east by the Cordillera mountains, on the south by the municipality of Adams and on the west by the Patapat mountains. The bay has a type II climate with pronounced dry and wet season. The prevailing weather condition follows that of Cagayan Valley which is characterized by long raining season and short dry season. The dry season starts from the later part of February to early part of May and rainy for the rest of the year (later part of May to early part of February).

Pasaleng bay is within the municipality of Pagudpud, which is the last municipality of Ilocos Norte bordering the Cagayan Province. However, Pagudpud is located in two bays, the Pasaleng bay at the east and Bangui bay at the west. In between the two bays is the Patapat mountains. There are 16 barangays and 9 are coastal. The study area, Pasaleng Bay is composed of three coastal barangays, Balao-i, Pancian and Pasaleng.

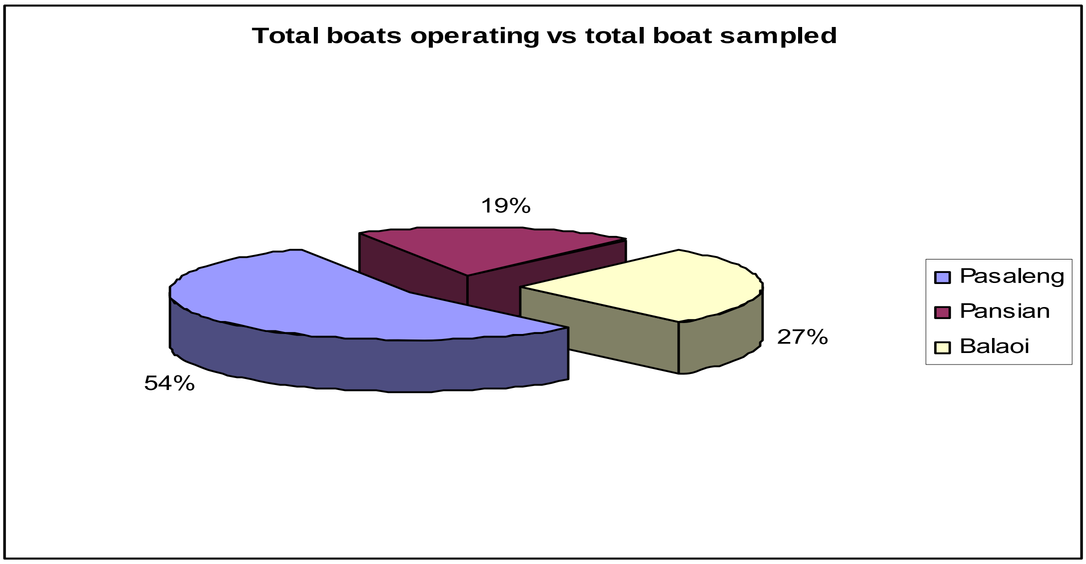
The municipality of Pagudpud has eight river systems, however, four river systems Pancian River, Aqua Grande River, Pasaleng and Balao-i drains into the bay.

Figure 2. Map of Pasaleng Bay

Boat and Gear Inventory

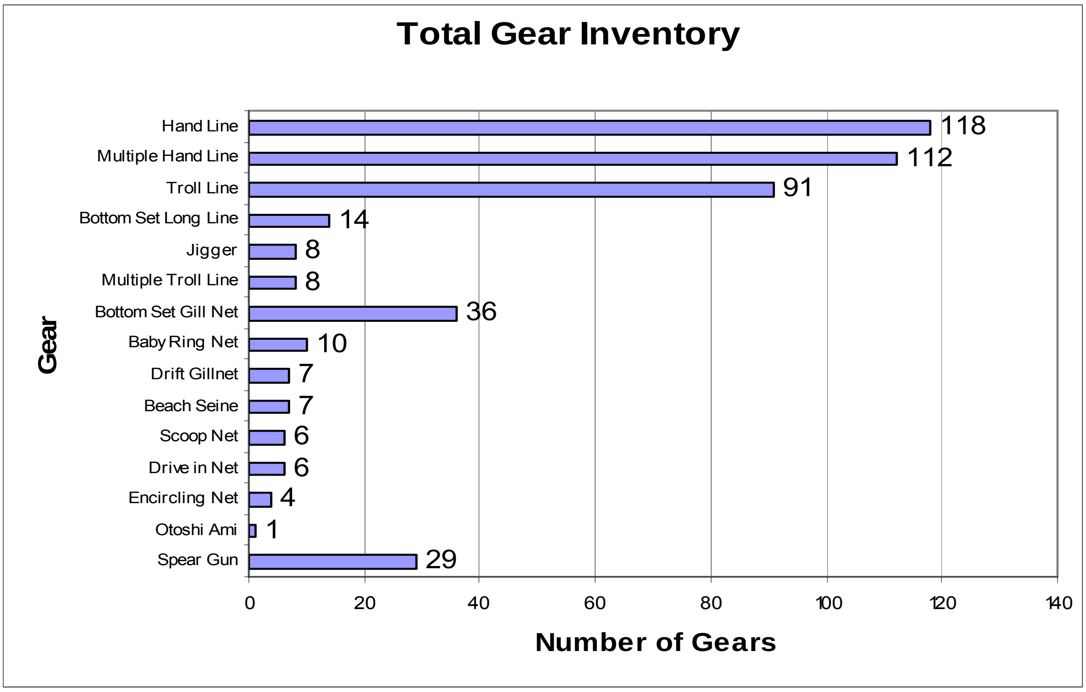
Pasaleng bay accommodates a total of 169 fishing boats (82 are motorized and 87 are non- motorized) distributed to Pasaleng with 91 units, Pancian with 32 units and Balao-i with 46 units. Majority of these boats are less than 3 GT which translates the bay into a typical municipal fishing ground. It is worth noting that 81% or 137 boats (Pasaleng and Balao-i) were regularly sampled for catch and effort while the remaining 19% or 32 boats (Pancian) were the un-sampled sites.

Figure 3. Total Boat Inventory



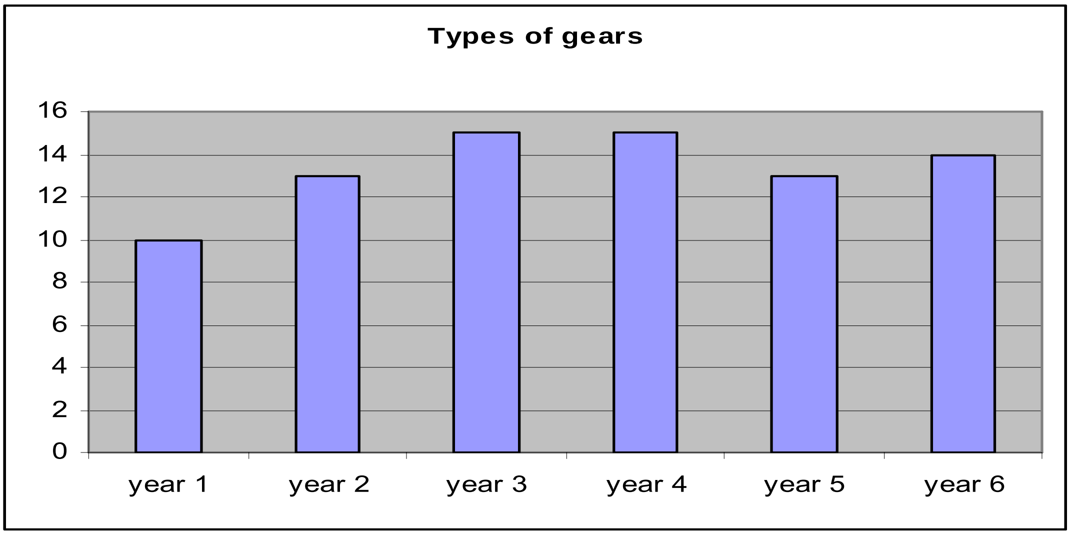
There are 457 fishing gears operating in Pasaleng Bay distributed to 16 types. This was dominated by hook and lines which make up 75% of the total fishing gears which include multiple hooks and line, multiple/troll line/two boat troll line and bottom set long line, followed by BSGN (8%) and spear gun (6%). The remaining 11% includes baby ring net, squid jigger, beach seine, drift gill net with hooks, scoop net, drive-in net, encircling net and 1 *otoshi ami (lambaklad).*

Figure 4. Total Gear Inventory



An increasing trend of the number of gears was noticed from the start to the 3rd year of the study. However, in 2003 because of the preference of troll line operation in the area it is worth noting that the operation of drift gill net in the area was modified by attaching series of hooks at the bottom of the gear to maximize the effort and time of fishing.

Figure 5. Annual Number of Gears



A total of 482 fishermen are fully operating the fishing boats and gears. This means that 1:1 is the ratio of gears and fishers and 1:3 boats and fishers operating in the area since

Boat and Crew Status

There are a total of 169 boats operating in Pasaleng Bay (82 are motorized and 87 are non-motorized) with 482 fishermen. With an average gross ton of 0.98 GT, each boat has an average of two (2) fishermen per boat except for baby ring net and beach seine which employs more than 2 fishermen. Majority of the fishing boats are less than 3 GT, attesting that the bay is municipal fisheries. This reflects that majority of the fishers in the area are artisanal or traditional fishers who has limited capital.

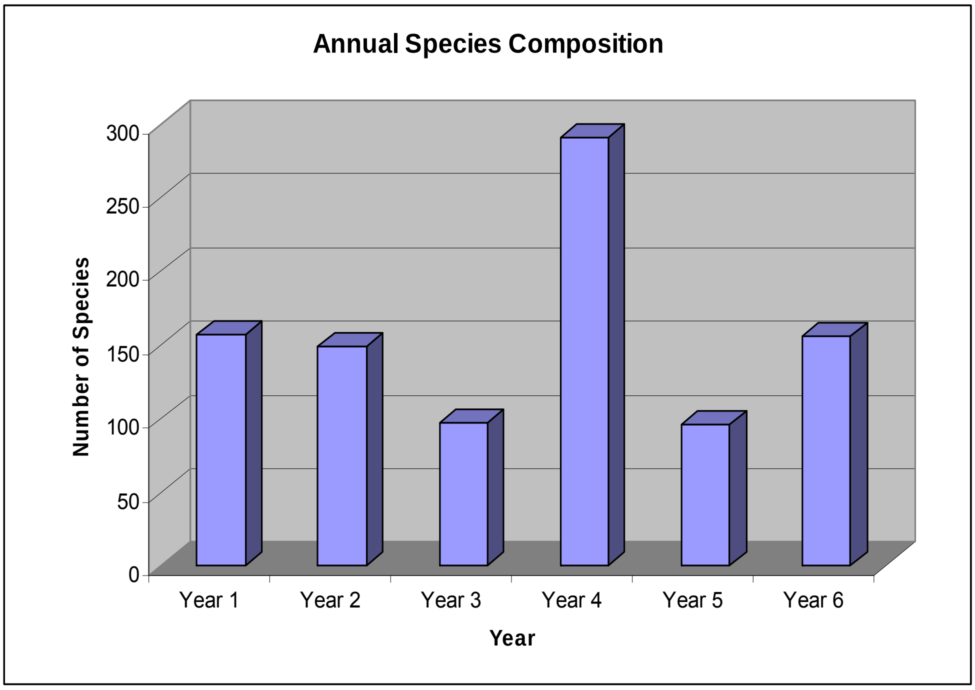
Table 1. Number of fishers, number of boats and number of fishing gears per barangay:

Barangay	No. of Fishers	No. of boats	No. of fishing gears
Pasaleng	295	91	213
Pansian	58	32	59
Balao-i	129	46	185
Total	**482**	**169**	**457**

Species and Catch Composition

There were 319 species of marine organisms recorded belonging to 59 families. Annual catch composition ranged from 96 to 291 species; year 4 yielded the most number of species while year 5 has the least.

Figure 5. Annual Species Composition



It should be noted that catch composition was dominated by demersal families (39) and species (204) over pelagic families (20) and species (115). Demersal species, which makes up 64% of the total catch, are represented by 30 families of fish, 3 families of shark/rays, and 6 families of invertebrates which include squids, lobsters, crabs and the red frog crab *Ranina ranina*. The remaining percentage belongs to the pelagic species represented by 14 families of fish, 3 families of shark/ray and 3 families of invertebrates. This is attributed to the operation of baby ring net and beach seine which significantly shown high CPUEs coupled with the operation of demersal-specific gears such as bottom set gill net/long line, jigger and speargun. Among the gears, speargun caught the highest number of species annually (93 species) while bottom set long line caught 90 species annually.

Table 2. Species Composition of Pasaleng Bay Fisheries classified according to Family

Demersal				Pelagic		
	Families=39	*Sp* =204			Families=20	*Sp* =115
1	SERRANIDAE	28		1	CARANGIDAE	32
2	LUTJANIDAE	26		2	SCOMBRIDAE	17
3	NEMIPTERIDAE	18		3	CLUPEIDAE	9
4	ACANTHURIDAE	15		4	CAESIONIDAE	8
5	MULLIDAE	15		5	EXOCOETIDAE	8
6	LETHRINIDAE	11		6	ENGRAULIDAE	6
7	LEIOGNATHIDAE	10		7	HEMIRAMPHIDAE	4
8	PRIACANTHIDAE	9		8	TRICHIURIDAE	4
9	HOLOCENTRIDAE	7		9	ISTIOPHORIDAE	3
10	SIGANIDAE	7		10	SPARIDAE	2
11	HAEMULIDAE	5		11	BELONIDAE	1
12	SCARIDAE	5		12	CORYPHAENIDAE	1
13	SPHYRAENIDAE	5		13	ECHENEIDAE	1
14	MURAENIDAE	4		14	XIPHIIDAE	1
15	POLYNEMIDAE	3		Shark/Rays		
16	BALISTIDAE	2		1	ALOPIIDAE	1
17	GERREIDAE	2		2	CARCHARHINIDAE	7
18	KYPHOSIDAE	2		3	MYLIOBATIDAE	2
19	MONACANTHIDAE	2		Invertebrates		
20	MUGILIDAE	2		1	LOLIGIDINAE	5
21	PEMPHERIDAE	2		2	SEPIIDAE	1
22	APOGONIDAE	1		3	THYSANOTEUTHIDAE	2
23	LABRIDAE	1				
24	POMACENTRIDAE	1				
25	SCORPAENIDAE	1				
26	SILLAGINIDAE	1				
27	SYNODONTIDAE	1				
28	TERAPONTIDAE	1				
29	TETRAODONTIDAE	1				
30	CHAETODONTIDAE	1				
Shark/Ray						
1	SCYLIORHINIDAE	1				
2	DASYATIDAE	5				
3	RHINOBATIDAE	1				
Invertebrates						
1	PALINURIDAE	3				
2	PORTUNIDAE	1				
3	OCTOPODIDAE	1				
4	RANINIDAE	1				
5	SCYLLARIDAE	1				
6	OMMASTREPHIDAE	1				
TOTAL						**319**

Carangidae has the most number of species (32 species); followed by demersal species of Serranidae with 28 species and Lutjanidae with 26 species. Nemipteridae ranked 4th with 18 species, while Scombridae ranked

5th with 17 species. The rest of the families have less than 15 species per family.

Katsuwonus pelamis (skipjack) is the most abundant species caught in Pasaleng Bay followed by *Selar crumenopthalmus* and *Auxis thazard*. The abundance of these pelagic species is a reflection of the dominant use of hook and lines among the gears in the area.

Catch Composition per gear

The 16 gear types operating in the bay, there are seven hook and lines, eight nets and spear gun. The catch of spear gun and handline composed of the most diverse species with 94 species each, followed by bottom set long line with 92 species. Conversely, drive-in net production has the least number of species (2 species) among the gears.

There are 8 types of net fishing gears operated in the bay. The species composition of these gears ranges from 2 to 59 species annually. Bottom set gill net production has the highest number of species (with 52 species) and drive in net (with 2 species) having the least number of species. Three species of Carangidae dominated by *S. crumenopthalmus* makes up 74% of the total catch of bottom set gill net while *T. crocodilus* dominated the total production of drive-in net and encircling net at 85% and 74% respectively. On the other hand, *H. rondeletii* dominated the drift gill net fisheries while *E. punctifer* makes up more than half (54%) of the total beach seine production. Other species dominated the net fishery are: *K. pelamis* making up 46% of the total baby ring net production, *A. solandri* with 23% of lambaklad fishery and *S. oualaniensis* with 38% of the scoop net fishery.

Table 3. Catch Composition of top 5 Species per Gear (Nets)

GEAR	No. of Species	Name of Top 5 Species	Total	Percent(%)
Baby Ring Net	17 species	*Katsuwonus pelamis*	71,065.92	46.65
		Selar crumenopthalmus	24,687.52	16.20
		Auxis thazard	21,645.33	14.21
		Decapterus macrosoma	8,285.09	5.44
		Euthynnus affinis -	6,236.83	4.09
		Other Species	20,433.59	13.41
Scoop Net	14 species	*Symplectoteuthis oualaniensis*	4,992.30	38.18
		Encrasicholina punctifer	3,536.00	27.04
		Anchovy fry	2,557.50	19.56
		Stolephorus indicus	452.00	3.46
		Sthenoteuthis oualaniensis	388.50	2.97
		Other Species	1,149.21	8.79
Beach Seine	19 species	*Encrasicholina punctifier*	9,730.00	54.18
		Stolephorus indicus	3,805.00	21.19
		Auxis thazard	710.90	3.96
		Decapterus macrosoma	517.96	2.88
		Tylosorus crocodilus crocodilus	150.00	0.84
		Other Species	3,045.84	16.96

Drift Gill Net	16 species	*Hirundichthys rondeletii*	5,252.81	71.53
		Coryphaena hippurus	1,335.85	18.19
		Cheilopogon furcatus	267.36	3.64
		Exocoetus volitans	197.16	2.68
		Exocoetus momocirrus	165.76	2.26
		Other Species	124.90	1.70
Drive In Net	2 species	*Tylosuros crocodilus crocodilus*	6,878.75	84.98
		Siganid spp. (fry)	1,216.00	15.02
BSGN	59 species	*Selar crumenopthalmus*	1,843.47	41.83
		Decapterus macrosoma	947.59	21.50
		Decapterus kurriodes	481.60	10.93
		Amblygaster leiogaster	144.73	3.28
		Decapterus tabl	121.83	2.76
		Other Species	868.33	19.70
Otoshi Ami	30 species	*Acanthocybium solandri*	516.95	22.73
		Amblygaster sirm	409.04	17.99
		Katsuwonus pelamis	315.00	13.85
		Aluterus monoceros	249.76	10.98
		Istiophorus plarypterus	235.25	10.35
		Other Species	547.88	24.09
Encircling Gill Net	5 species	*Tylosuros crocodilus crocodilus*	716.10	74.22
		Rastrelliger brachysoma	90.50	9.38
		Atule Mate	90.00	9.33
		Rastrelliger brachysoma	50.00	5.18
		Euthynnus affinis	18.18	1.88
		Other Species	0.00	0.00

Hook and lines production registered the range of 4 to 94 species annually, in which handline has the most with 94 multiple troll line and jigger has the leas. Belonging to family Carangidae, *E. bipinnulata* and *S. crumenopthalmus* dominated the production handline (at 42%) and multiple handline (at 91%) respectively. On the other hand, *L. ornatus* makes up 15 % of the total bottom set long line production. *K. pelamis* is the most abundant species caught by troll and 2 boat troll line making up 48% and 79% of their total production respectively while jigger production was dominated by 94% of *O. macropus*.

Table 4. Catch Composition of top 5 Species per Gear (Hook and Lines)

GEAR	No. of Species	Name of Top 5 Species	Total	Percent(%)
Troll Line	27 species	*Katsuwonus pelamis*	13,284.84	48.36
		Acanthocybium solandri	6,758.85	24.60
		Coryphaena hippurus	6,554.93	23.86
		Istiophorus platypterus	201.25	0.73
		Thunnus albacares	181.18	0.66
		Other Species	488.65	1.78
Multiple Hand Line	16 species	*Selar crumenophthalmus*	11,976.68	90.77
		Decapterus macrosoma	1,037.53	7.86
		Decapterus tables	77.00	0.58
		Atule mate	35.50	0.27
		Rastrelliger kanagurta	9.95	0.08
		Other Species	58.45	0.44

Handline	94 species	*Elagatis bipinnulata*	2,506.42	42.39
		Etelis radiosus	1,076.41	18.21
		Seriola dumerili	692.80	11.72
		Aphareus rutilans	145.35	2.46
		Caesio cuning	140.52	2.38
		Other Species	1,351.00	22.85
2 BTL	6 species	*Katsuwonus pelamis*	2,617.81	79.05
		Corypheana hippurus	546.45	16.50
		Elagatis bipinnulata	64.45	1.95
		Thunnus albacares	41.75	1.26
		Tylosorus crocodilus crocodilus	41.00	1.24
		Other Species	0.00	0.00
Jigger	4 species	*Octopus macropus*	6,162.90	93.96
		Loligo chinensis	384.80	5.87
		Sepia lycides	10.80	0.16
		Panulirus versicolor	0.50	0.01
		Other Species	0.00	0.00
Multiple Troll Line	4 species	*Corypheana hippurus*	88.75	73.32
		Euthynnus affinis	11.80	9.75
		Auxis thazard	10.80	8.92
		Auxis rochei	9.70	8.01
		Other Species	0.00	0.00
Bottom Set Long Line	92 species	*Lethrinus ornatus*	597.94	15.07
		Priacanthus hamrur	357.18	9.00
		Lethrinus elongatus	326.47	8.23
		Lutjanus quinquelineatus	245.97	6.20
		Lutjanus gibbus	218.13	5.50
		Other Species	2,220.82	55.99

Among the gears, spear gun production was evenly distributed to a widest variety of species including the red frog crab *Ranina ranina*. It was dominated by *P. penicillatus* at 17% followed by *A. lineatus* at 10% and *N. unucornis* at 9%.

Table 5. Catch Composition of top 5 Species per Gear (Speargun)

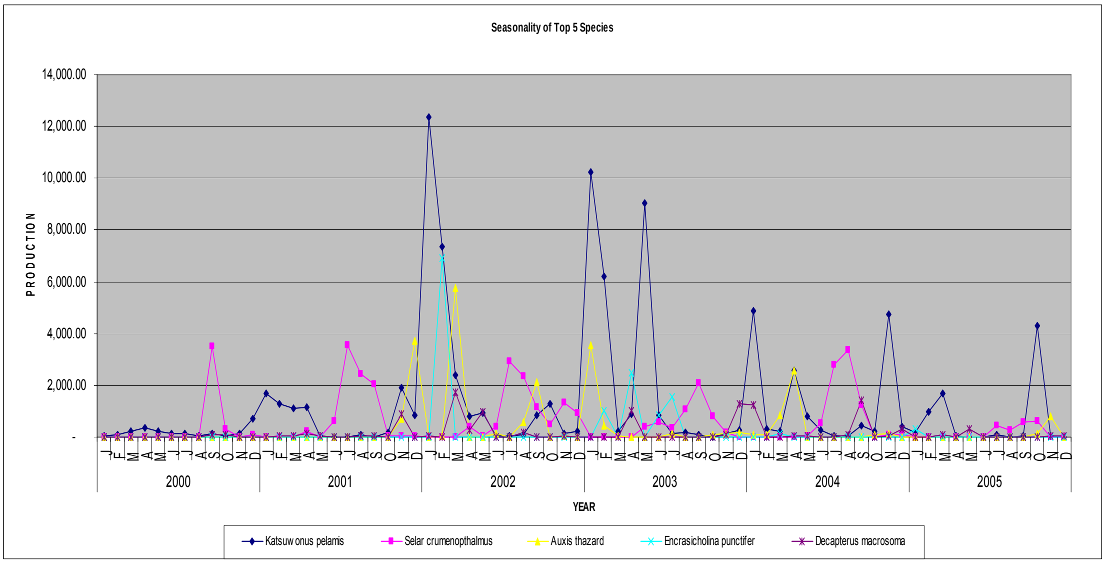
GEAR	No. of Species	Name of Top 5 Species	Total	Percent(%)
Speargun	94 species	*Panulirus penicillatus*	5,019.06	17.34
		Acanthurus lineatus	2,806.54	9.69
		Naso unicornis	2,463.67	8.51
		Kyphosus vaigiensis	2,231.52	7.71
		Scarus rubroviolaceus	1,537.81	5.31
		Other Species	14,893.22	51.44

Seasonality of top five species

The total production was dominated by *K. pelamis*. It makes up 30% of the total catch followed by *S. crumenopthalmus* at 13%. *A. thazard* ranked 3rd at 8%, *E. punctifer* at 4.% and *D. macrosoma* 3.6% 4th and 5th respectively. The species which contributed the least in the total production *P. nigripinnis* with 0.05 kgs.

K. pelamis registered higher peaks in the 1st quarters at the span of the study, however, peaks was also observed in the last quarters of 2004-2005. The highest catch of this gear was recorded in January 2002. On the other hand, the production of *S. crumenopthalmus* started to increase from June and peaked in the 3rd quarters yearly while lean months for this gear fall between the last quarters to early quarters. *A. thazard* which ranked 5th in the total production by volume peaked in March 2002. Peak season of this species was observed in different months per year.
E. punctifer peaked in the 1st quarters of 2002-2005 and even extended up to the 2nd quarter in 2003. Lean months for this species were observed from May to December. For *D. macrosoma*, its seasonality was observed in different quarters. Its highest peak was observed in March 2002.

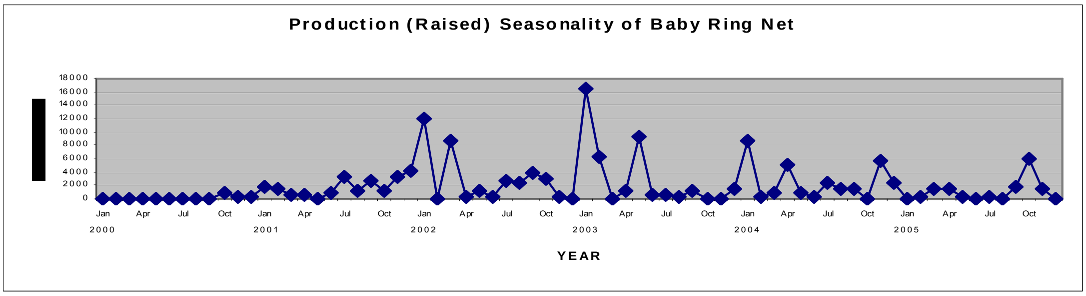
Figure 6. Seasonality of Top 5 Species



Seasonality of Boat and Catch

The year round operation of baby ring net has no distinct seasonality however; its production peaked in the last quarters to the 1st quarters and shown increased catch in May 2003 similarly with the peak season. It s highest operation in 2003 has recorded the gear’s highest annual production. On the other hand, drive in net operated occasionally in a year and sudden raise in operation likewise increase in catch. This set up was manifested in the total drive in net operated and total production in April 2001 and May 2005. Among the lines operated in the bay, troll line shared the most catch in the total fisheries production. It operates year-round and has distinct peak in March to June; however, it must not mean its highest catch in a year. In fact, the lowest operation of this gear in 2001 yielded its highest volume of production compared with the other years.

Figure 7. Seasonality of Boat and Catch of Baby Ring Net



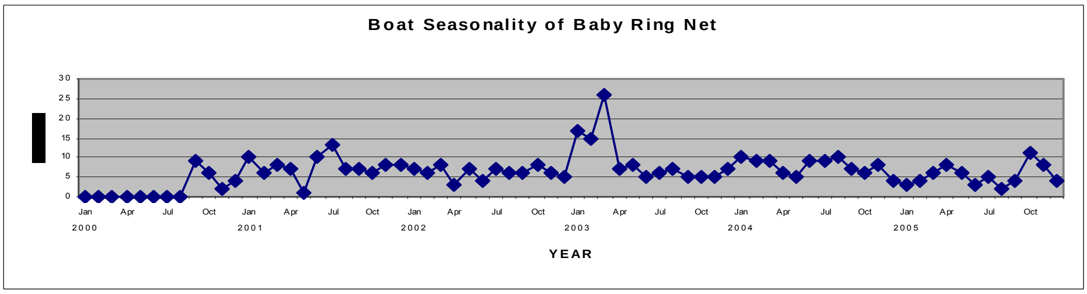
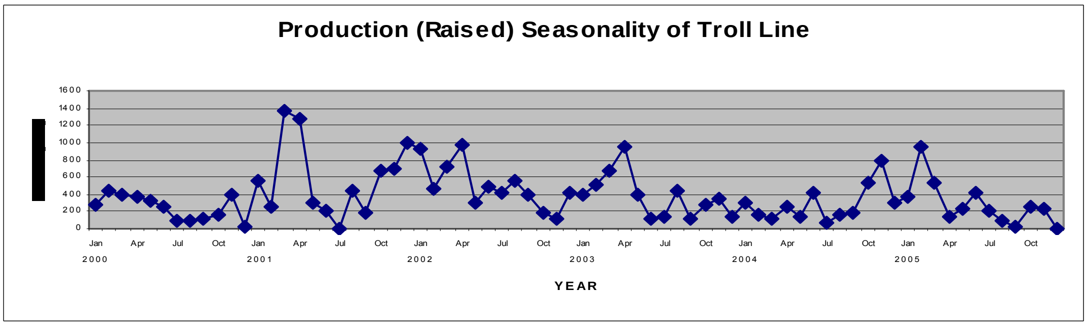


Figure 8. Seasonality of Boat and Catch of Troll Line



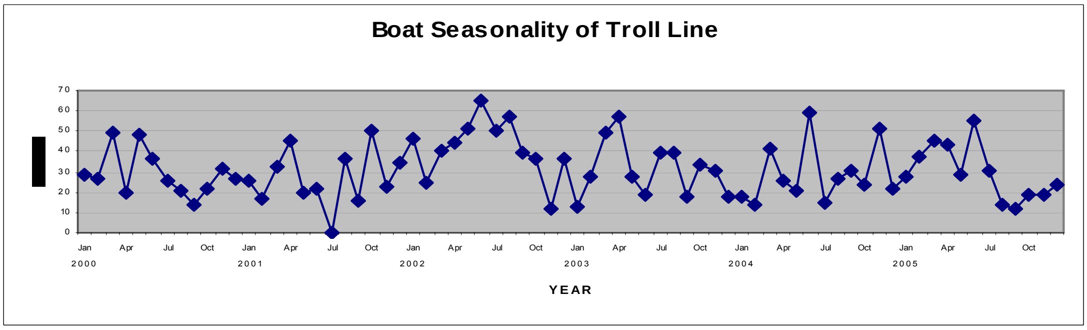
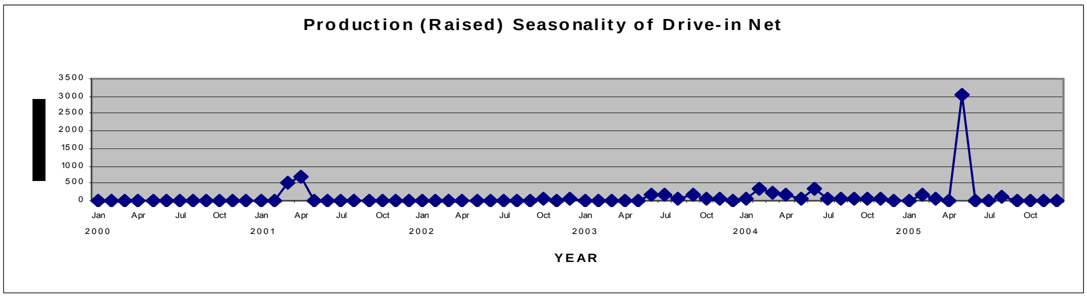
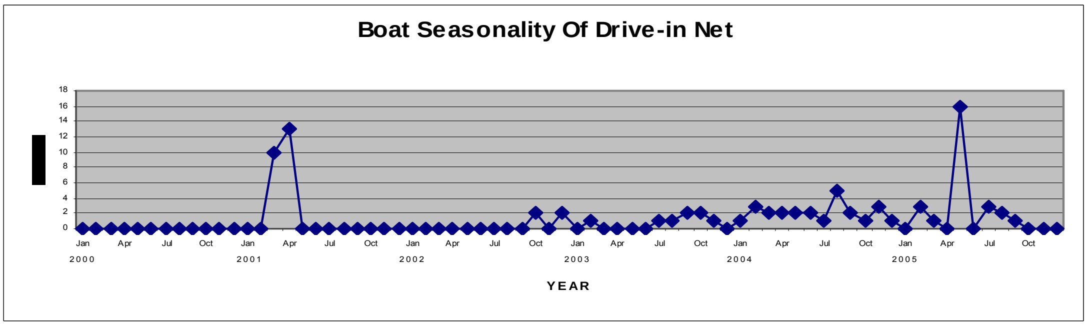


Figure 9. Seasonality of Boat and Catch



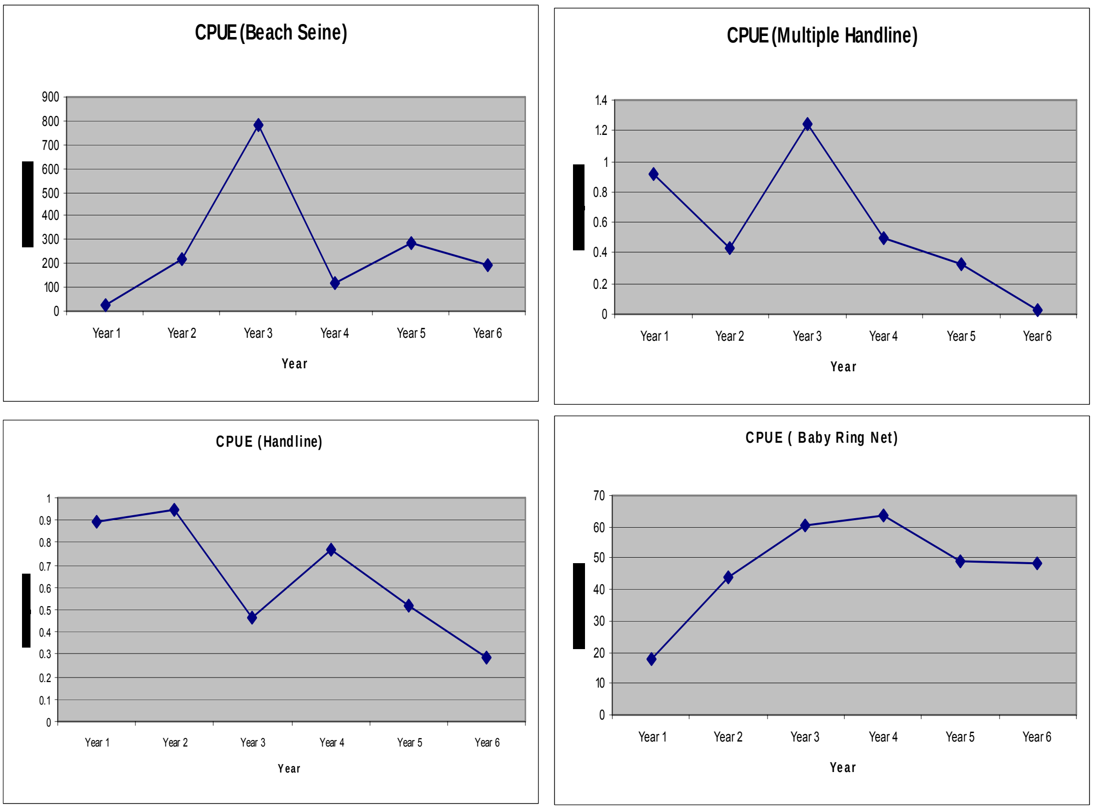


Catch Per Unit Effort

The annual CPUE recorded in Pasaleng Bay ranged from 0.03 kg/day (by MHL in 2005) to 783.5 kgs/day (by beach seine in 2002). Beach seine was recorded to have the highest average annual CPUE of 269.175 kg/day ranging from 21.6 kgs/day (2000) to 783.5 kgs/day (2003) and peak in the 1st quarters to the 2nd quarters. This was followed by baby ring net which has registered an average annual CPUE of 47.145 kg/day (ranging from 17.54-63.38 kgs/day). High monthly CPUE for this gear was noticed in September to December in the 2nd semesters and January to February in the 1st semesters.

Annual CPUE of followed a “rise and fall” pattern. Beach seine followed a descending pattern from 2000 to 2002, fall in 2003, increased in 2004 and decline in 2005. In the case of baby ring net, its CPUE showed increasing pattern from 2000 to 2003, however, it dropped off during the succeeding year.

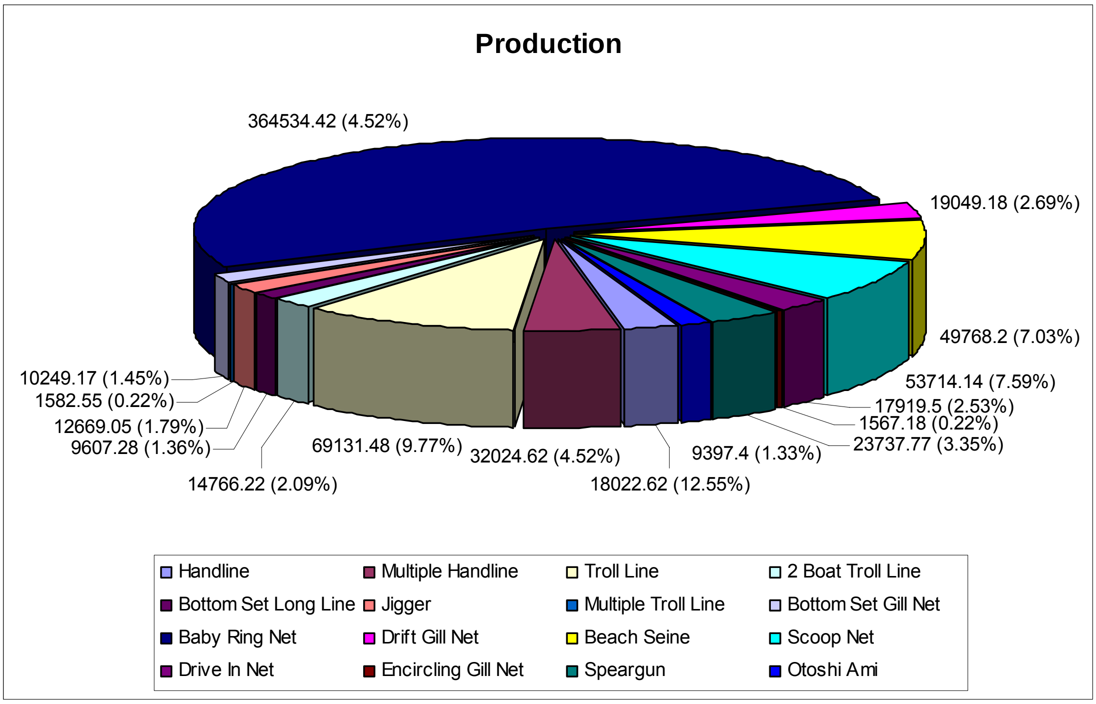
Figure 10. CPUE of Beach Seine, Multiple Handline, Handline, Baby Ring Net



Production of Estimate

Baby ring net contributed 364,534.42 or 51% to the total production. This was followed by troll line at 10% and scoop net at 8%. Beach seine and multiple handline contributed 7% and 5% respectively. The other gears contributed less than 5% each in the total production. Encircling gill net contributed the least with 1,567.18 kgs in the total production.

Figure 11. Production Estimates



SUMMARY AND CONCLUSION

1. Pasaleng Bay is a municipal fisheries that accommodates 169 fishing boat of less than 3 GT. There are 457 fishing gears belonging to 16 types operating in the area. The number of gears was dominated by hook and lines.

2. There were 319 species of marine organisms recorded belonging to 59 families. Demersal species dominated the total catch including the red frog crab *Ranina ranina*. This is attributed to the operation of baby ring net and beach seine which significantly shown high CPUE and the operation of demersal-specific gears such as bottom set gill net/long line, jigger and the speargun which caught the very high number of species annually.

3. Skipjack is the most abundant species caught in Pasaleng Bay followed by *Selar crumenopthalmus* and *Auxis thazard*. The abundance of these pelagic species is a reflection the dominance of hook and lines among the gears used in the area.

4. The operation of gear exhibited their own trend of seasonality depending on the target species and the season: BSGN, speargun operation dropped off during wet season, MHL operation peaked in the 3rd quarters when small tuna and tuna like species is abundant.

Operation of the other gears is year-round and showed indistinct peak season.

5. Beach seine was recorded to have the highest average annual CPUE among the gears. Annual CPUE of the sampled gears followed a “rise and fall” pattern.

6. Baby ring net contributed most in the total production while the speargun caught the highest number of species.

RECOMMENDATION

1. Encourage the use of selective gears instead of using nets.

2. 3 cm mesh size of nets should be strictly followed as indicated in RA 8550.

3. Further analysis on exploitation rate, length frequency and MSY to draw up policy recommendations on the sustainable management of the bay.

4. Continue the assessment of Pasaleng Bay so that fisheries can be monitored

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