

# Profitability of Spanner Crab, *Ranina Ranina* (Linnaeus, 1758) Farming in Maimbung, Sulu Philippines

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## ABSTRACT

The question of sustenance and livelihood occupations and has become very important to governments and rural folks. The primary goal of this study was to determine the profitability of spanner crab farmers in Maimbung, Sulu, Philippines. The study was conducted using a quasi-experiment. The researcher developed fishing nets and fishing grounds determined. Daily and weekly catches were weighed and sold, with consistent record keeping. The study revealed a total catch of 4,221.6kg in six months, an average price of 166.38/kg, a total value of 640,342 pesos, and total expenses of 220,740 pesos profit of 419,602.

It is very prudent to mention that spanner crab farming is profitable and worth pursuing by fishers and is recommended for livelihood occupation of the rural folks in the Philippines.

**Keywords:** Spanner crabs, fishing grounds, Spanner Crabber, profitability, economics

## INTRODUCTION

In the Indo-Pacific region, the Philippines is one of the leading producers of crabs. Crab production fell from 7,632 metric tons in 1992 to 3,876 metric tons in 1996 (BFAR 2017), with milkfish or shrimp in monoculture or polyculture. Crabs sell for a lot of money on both the domestic and foreign markets. (Karasawa, Schweitzer, Feldmann & Luque, 2014).

Aquaculture Department, Southeast Asian Fisheries Development Center (SEAFDEC/AQD) is a Philippine government agency situated in Tigbauan, Iloilo, focusing on crab research. This technology is revolutionary and meant to help resource-poor fishers supplement their fishing skills and gears. It is envisaged that as a result of this program, fishers will be more confident in their abilities, cooperation in the conservation of fishing sites, which are considered to be one of the most important ecosystems on the planet.

Crab consumption growth rates and total consumption estimates are high in several Asian and European countries. Breinl and Miles (2014) ranked China, the United States, Japan, Korea, and Thailand as the top five largest consumers. Singapore is not far behind in terms of crabs. The Philippines has a supply shortage of crabs for the export market with growing demand. This research aims to assess the economic viability of crab farming in Maimbung, Sulu, Philippines, with a special focus on spanner crabs.

Spanner crab (*Ranina ranina*, Linnaeus 1758), locally known as "kagang pamah" in Tausug and "curacha" in Chavacano, is an essential food item in Sulu, in the Zamboanga areas, and other parts of the Philippines. Spanner crabs are internationally known as "kona crab" or "papa ikualoa" in Hawaii (Fielding & Halley, 2016), "krab giraffe" in Seychelles (Brown et al., 2011), "frog crab" or "red frog crab" in America and New Zealand, and "spanner crab" in Australia (Matondo & Demayo, 2015) and Queensland. Some literature revealed that they have other names in the different countries where they are known, namely: "Crabe" in France, "Krabbe" in Germany, "Granchio" in Italy, "Kani" in Japan, and "Cangrejo" in Spain. They are found throughout the tropical and subtropical areas. They are often sought and fished for their sweet, incredibly soft, and irresistibly succulent meat which is an esteemed delicacy in many different places in the world. It is very palatable and eaten wherever caught by gill net or crab trap (Motoh, 1980). It is the only known species in this genus (Tver, 2019).

Spanner crab belongs to Order Decapoda of Phylum Arthropoda, which means they possess ten walking legs or pereiopods. They are simply called "Ten-footed crustacean." The first pair of legs, known as cheliped or pincers, looks like a wrench or an adjustable tool, from which its name "spanner" is derived. These wrench-like pincers or claws are peculiar to this species. Spanner crab may grow up to a maximum size of 15 cm (5.9 in) long and may weigh up to 900 g (2 lbs.). The carapace is wider at the front and narrower to the rear, orange to reddish-brown, with usually ten white spots on its back. Spanner crab is mainly nocturnal and remains buried in the sand during the day. It is easily distinguished from other crab species in its habitat due to its red carapace (fresh or cooked) and long midsection. It is a brachyuran or an actual crab.

## MATERIALS AND METHODS

### Locale

The Municipality of Maimbung is a 5<sup>th</sup> class municipality in the Province of Sulu, Philippines, with a land area of 77.5 km<sup>2</sup> and 37,914 people (Census 2015). It is situated at Latitude 5° 56' N & Longitude 121° 02' E. Its natural boundaries are the Municipality of Jolo to the north, Parang to the west, Talipao to the east, and the island of Tapul to the south.

### Design of Fishing Gear

The researcher used a very simple crab lift net (Fig. 1,2,3) called "sangbaw" in Tausug and "bintol" in Tagalog. Sangbaw is made of two slats of bamboo, each measuring 15 inches long, fastened together at their center to form an "X" structure. A square net with 12 to 15 meshes in it, both horizontally and vertically, is attached to the four corners of the "X" structure corresponding to the net's four corners, and a nylon twine used for lacing the four sides of the net. The net may be made of monofilament nylon or white cotton twine. The size of the mesh w 2 inches. A skewer was fastened at the center of the structure where the bait was placed. A nylon twine measuring 182.9cm in length served as a connecting line between each net.

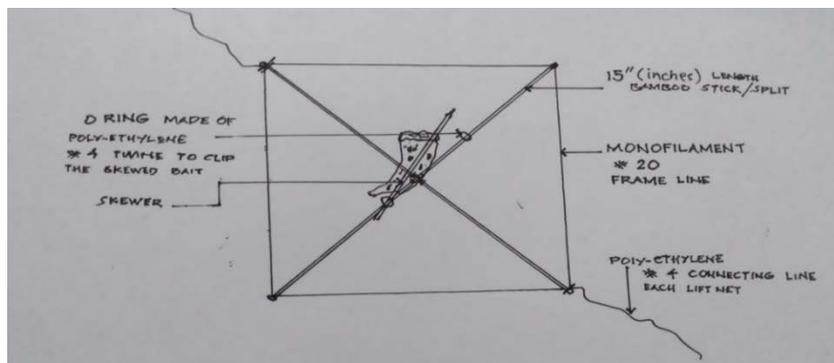


Fig. 1. Skeletal line drawing of a crab lift net

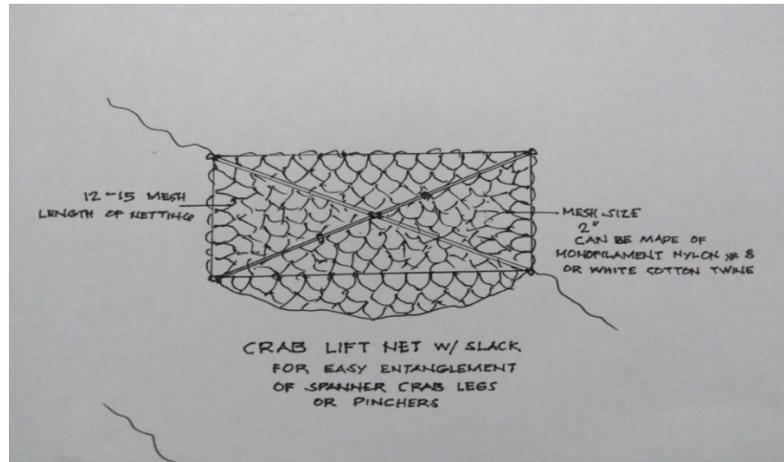


Fig. 2. A line drawing of a crab lift net (sangbaw)



Fig. 3. A crab lift net used by spanner crabbers from Maimbung, Sulu

The mananangbaw of Maimbung carried several sets or rigs. One fishing rig composed of two parts: one was the drop-line which started from the float to the anchor line, and the other was from the anchor to the series of lift nets attached with one-fathom interval between each net. The researcher brought some rigs at a time, and one rig was usually comprised of 20 to 30 lift nets,

averaging 20 crab lift net per fisher. Every crab lift net was baited with fish, preferably with odorous meat of stingray and some used intestines of chicken.

## Fishing Method

The researcher departed from home very early in the morning to the fishing grounds, carrying with him crab lift nets or sangbaw, food, and hunting for baits along the way if was unable to produce any bait earlier.

In the setting operation, the researcher skewed bait to the center of the bamboo slat of each net and readied his position regarding the direction of the current (Fig. 4). The last crab lift net baited was thrown first, followed by the rest of the traps released one by one, and an anchor attached to the last lift net was dropped (Fig. 5). A marker buoy was secured at the end of the anchor line for easy retrieval. The researcher carried with him 10 to 30 crab lift nets. Hauling of the nets took place after 20 to 30 minutes after setting. The buoy was hauled first, followed by the anchor, then the series of lift nets.

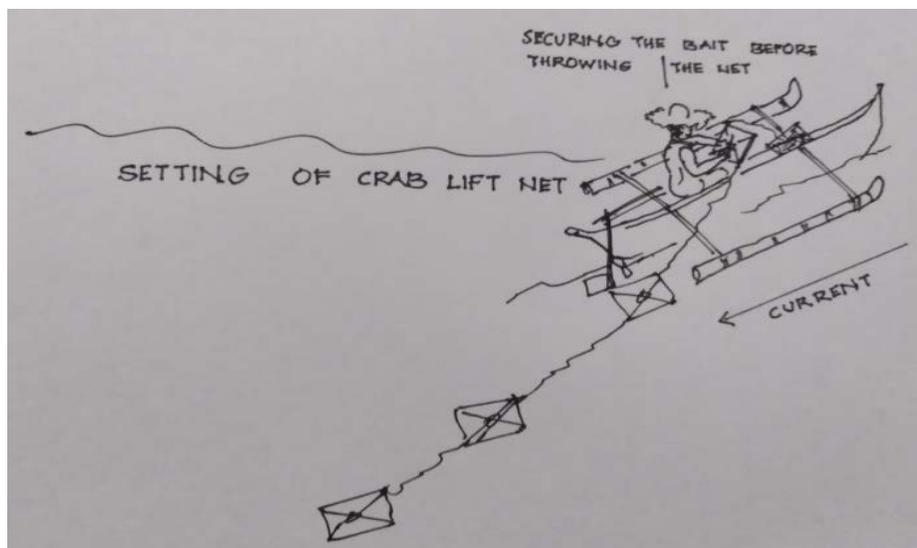


Fig. 4. Setting of crab lift nets

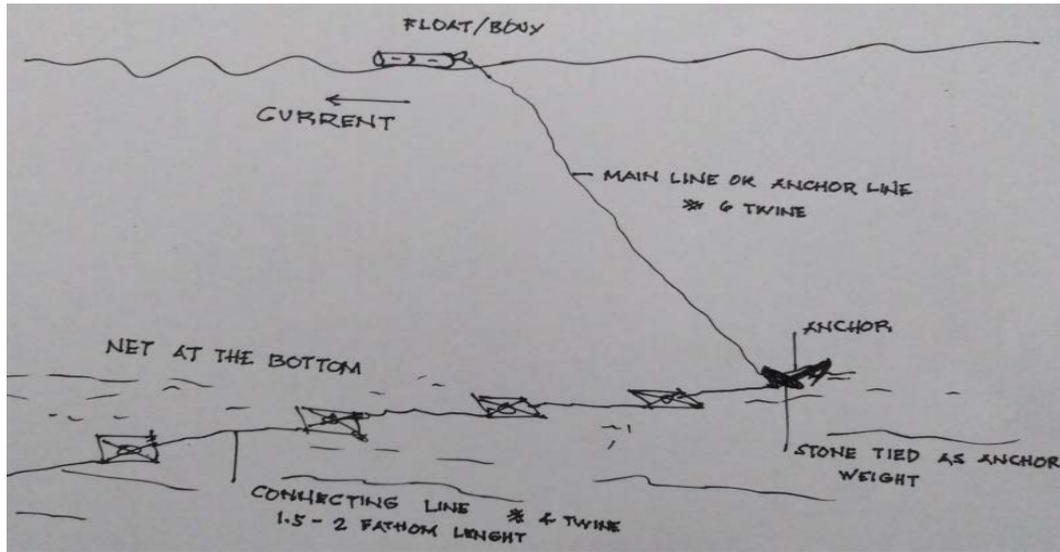


Fig. 5. A sketch of crab lift nets set on the bottom of the sea

### Data Collection

Data were collected weekly by the researcher at the fishing sites in Maimbung Poblacion by setting lift nets and taking the total weight of spanner crabs caught. The harvest crabs were sold and profit recorded

### Data Collected

Average catch per month = average observed catch (kg) x number of fishing days/month

Total catch for six month = Total monthly catch (kg) of crabs x 6 months

Average Profit per month = gross monthly profit – expenses per month

Total profit for 6 months = gross profit for 6moths – expenses for 6months

## RESULTS AND DISCUSSION

### Average catch and prices/kg of spanner crabs for January

Table 1 shows the total catch of spanner crabs lift-netted by the local fishers from Maimbung, Sulu for January, the average price, the total value of the yield, expenses and profit made for the month of January. The overall yield for January was 567.3kg, with a value of

86,513.25 pesos. The p profit for the January was 48,593.25 pesos. Details for individual fishing sites are provided in Table 1 below.

**Table 1. Average catch and prices/kg of spanner crabs for January**

<b>Fishing ground</b>	<b>Catch (kg)</b>	<b>Average price (pesos)</b>	<b>Total value (pesos)</b>	<b>Expenses (pesos)</b>	<b>Profit</b>
Takut	61.6	155	9,548	5,760	3,788
Kabingaan	112.2	140	15,708	7,200	8,508
Ipil	44.9	170	7,633	7,200	433
Kulasi	108.5	160	17,360	5,760	11,600
Maimbung	119.2	150	17,880	6,240	11,640
Teomabal	120.9	140	16,926	5,760	11,166
<b>Total</b>	<b>567.3</b>	<b>152.5</b>	<b>86,513.25</b>	37,920	48,593.25

**Average catch and prices of spanner crabs February**

Table 2 Portrays the results from the total yield, average price, and the corresponding financial value for February. The total catch was 463.7kg, with an average price of 160 pesos and a total value of 74,192 pesos. The highest yield was in Kulasi and the least in Takut fishing sites. However, the price per kilo was the highest (175 pesos) for Takut and the least for Kabingaan.

The profit margin for February was 35,609 pesos. Other details are provided in table 2.

**Table 2. Average catch and prices of spanner crabs February**

<b>Fishing ground</b>	<b>Total catch (kg)</b>	<b>Average price (pesos)</b>	<b>Total value (pesos)</b>	<b>Expenses (pesos)</b>	<b>Profit</b>
Takut	40.6	175	7,105	6720	385
Kabingaan	98.8	140	13,832	5760	8,072
Ipil	54	170	9,180	7200	1,980
Kulasi	109.1	160	17,456	5760	11,696
Maimbung	97.9	160	15,664	6240	9,424
Teomabal	63.3	155	9,811.5	5760	4,052
<b>Total</b>	<b>463.7</b>	<b>160</b>	<b>74,192</b>	37440	35,609

**Average catch and prices of spanner crabs in March**

A total value of 160,598 pesos was recorded in March for the fishing sites. The total crab yield was 1,015.8kg with an average price of 158.1 pesos. The highest (309.8kg) crab yield was

observed in Kulasi and the least (70kg) in Tapul. Nonetheless, the price per kilo was highest (175 pesos) in Tapul and lowest (140pesos) in Maimbung. The Profit made was 114,010 pesos. The remaining details are provided in Table 3.

**Table 3. Average catch and prices of spanner crabs in March**

<b>Fishing ground</b>	<b>Total catch (kg)</b>	<b>Average price (pesos)</b>	<b>Total value (pesos)</b>	<b>Expenses (pesos)</b>	<b>Profit</b>
Takut	125.3	156.7	19,634.7	5760	13,875
Kabingaan	86.2	160	13,792	5760	8,032
Kulasi	309.8	160	49,568	7200	42,368
Maimbung	207.8	140	29,092	7200	21,892
Teomabal	139.6	145	20,242	5760	14,482
Tapul	70.8	175	12,390	6240	6,150
Pata	76.3	170	12,971	5760	7,211
<b>Total</b>	<b>1,015.8</b>	<b>158.1</b>	<b>160,598</b>	43680	114,010

**Average catch and prices of spanner crabs April**

Table 4 reveals the total catch, the price and the total value of crabs for April. The total harvest was 567.7kg, with an average price of 145.84, and total value of 87,903 pesos. The highest (145.8kg) catch was observed for Teomabal and the lowest (32kg) catch for Pata fishing ground. Teomabal had the highest value of 22,847 pesos. The total expenses was 4,1280 and profit was 51,291. Other details are provided in Table 4 below.

**Table 4. Average catch and prices of spanner crabs April**

<b>Fishing ground</b>	<b>Total catch (kg)</b>	<b>Average price (pesos)</b>	<b>Total value (pesos)</b>	<b>Expenses (pesos)</b>	<b>Profit</b>
Takut	37.7	175	6,598	5760	838
Kabingaan	85.8	170	14,586	5760	8,826
Ipil	57.1	170	9,707	7200	2,507
Kulasi	6.4	200	1,280	480	800
Maimbung	121.7	165	20,081	7200	12,881
Teomabal	145.8	156.7	22,847	5760	17,087
Tapul	81.2	160	12,992	4800	8,192
Pata	32.0	140	4,480	4320	160
<b>Total</b>	<b>567.7</b>	<b>145.84</b>	<b>87,903</b>	41280	51,291

### Average catch and prices of spanner crabs May

In May, the total value of crabs from the fishing sites was 120,314.18 pesos. This value resulted from a total catch of 425.3kg with an average price of 233 pesos per kilo. With individual sites, the highest yield (138.1kg ) was obtained for Kulasi fishing ground and lowest (7.7kg) for Ipil fishing ground. The highest average price for crabs was obtained for Kulasi (510 pesos per kilo) and the lowest price per kilo was for Maimbung (175 pesos per kilo). The total profit was 94,454 pesos. The remaining details are provided in Table 5.

**Table 5. Average catch and prices of spanner crabs May**

Fishing ground	Total catch (kg)	Average price (pesos)	Total value (pesos)	Expenses (pesos)	Profit
Takut	65.2	185	12,062	5,760	6,302
Ipil	7.7	200	1,540	480	1,060
Kulasi	138.1	510	70,431	7,200	63,231
Maimbung	72.9	175	12,757.5	5760	6,998
Teomabal	4.6	200	920	480	440
Tapul	7.2	200	1,440	480	960
Pata	129.6	163.3	21,163.68	5,760	15,404
<b>Total</b>	<b>425.3</b>	<b>233.33</b>	<b>120,314.18</b>	<b>25,860</b>	<b>94,454</b>

### Average catch and price of spanner crabs for June

The total value, average price per kilo and average harvest for June is outlined in Table 6. It could be seen that the overall value of the crab harvest was 110,822 pesos. The total harvest was 674.1kg with an average price of **164.4 pesos per kilo**. **The highest catch (200.3kg) was obtained for Teomabal** whilst the lowest catch (16.1kg) was for Ipil fishing ground. The total expenses was 34560 pesos and the total profit was 72,512 pesos.

**Table 6. Average catch and prices of spanner crabs for June**

Fishing ground	Catch (kg)	Average price (pesos)	Expenses (pesos)	Total value	Expenses (pesos)	Profit
Takut	82.6	140	11,564	4800	6,764	
Ipil	16.1	190	3,059	2,880	179	
Kulasi	181	170	30,770	6,720	24,050	
Maimbung	107.7	173.3	18,664	5,760	12,904	
Teomabal	200.3	140	28,042	7,200	20,842	
Pata	86.4	173.3	14,973	7,200	7,773	
<b>Total</b>	<b>674.1</b>	<b>164.4</b>	<b>110,822</b>	<b>34,560</b>	<b>72,512</b>	

**Total catch, average price/kg, and value of spanner crabs from January to June**

The overall catch for 6 months was 4,221.6kg, with average price of 166.38 pesos. This resulted in a total value of 640,342 pesos. The total expenses was 220,740 and there a total income of 419,602 pesos.

**Table 7. Total catch, average price/kg, and value of spanner crabs from January to June**

Month	Catch (kg)	Price / kg (pesos)	Expenses (pesos)	Total Value (pesos)	Expenses (pesos)	Profit (pesos)
January	567.3	154.00		86,513	37,920	48,593
February	755.1	160.62		74,192	37,440	35,609
March	1,015.8	168.67		160,598	43,680	114,010
April	748.0	166.47		87,903	41,280	51,291
May	425.3	180.00		120,314	25,860	94,454
June	674.1	168.57		110,822	34,560	72,512
<b>Total</b>	<b>4,221.6</b>	<b>166.38</b>		<b>640,342</b>	<b>220,740</b>	<b>419,602</b>

**DISCUSSION**

It was observed that the prices of the crabs were not stable for all the month. In May, the highest price (180 pesos/kg) was recorded. Several factors could account for this. The product, price, location, and promotion, are critical elements in the crab marketing (Briggs, Funge-Smith, Subasinghe, & Philipps (2014) (Fig. 1). Crab eaters like live, hard-shelled crabs weighing at least 200 grams. Males were dominant. Females were purchased for their flesh and larger claws, while males were purchased for their beauty, ripe ovaries or "eggs" (Baruthio, A. (2016).).

In March, the highest catch (1,015kg) was recorded. This was unusual as March is a summer month. However, change in weather patterns resulted in several showers which could lured the crabs to feed more regularly.

In terms of profitability, the study revealed the a total value of 640, 342 pesos with expenses of 22,740 pesos. This means the farmers are like to make a profit of around 419,602 pesos in six months. Their monthly income could be about 69,933 pesos

It is therefore concluded that spanner crab farming is profitable and worth pursuing by fishers and recommended for livelihood occupation.

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