The Philippines Squid Fishery: A Review

ANICETO M. HERNANDO, Jr. and EFREN ED. C. FLORES

Introduction

Squids were among the important commercial fishes landed in the Philippines in 1976, representing about 2.08 percent or about 11,000 t (24,250,600 pounds) in the multispecies fishery which prevails. Despite ever increasing squid production, it cannot meet the increasing demand of local, national, and foreign markets.

The amount by which the Philippines can increase its squid production is unknown. Voss (1973) estimated the squid resource for the western central Pacific continental shelf (which includes Hong Kong, Taiwan, Malaysia, Thailand, and the Philippines) at 500,000 t (1,102,300,000 pounds). The Philippines' probable productivity may well be over 25 percent of that estimate. Unknown to us is the possible (and probably larger) stocks of squid in the relatively unexplored outer shelf. This potential stock remains unharvested.

Little has been written about the squid fisheries of the Philippines. Voss (1963) wrote the first extensive report on the taxonomy of Philippine cephalopods. The other important paper is that of Flores (1974) which surveyed traditional Philippine squid fishing grounds. There has been no extensive study on the geographical distribution and abundance of Philippine cephalopods. Likewise, a biological study of a single species of squid has not yet been attempted. Even a review of the Philippines' squid fishery has been lacking. Thus, this report surveys and provides some useful information on the present status of Philippine squid fisheries.

The Squids

Squids harvested in the Philippines belong to the order Teuthoidea, with the suborders Myopsida and Oegopsida. The myopsids, being neritic, are the ones subjected to exploitation, owing to the fishermen's habit of fishing within the interisland and coastal waters of the Philippine archipelago. On the other hand, the oegopsids, being oceanic, are not now being exploited and will not be discussed here.

Four genera and seven species of the Loliginidae have been caught by various fishing gears. Research since 1976 has identified these squids. In the Visayas Sea, Ed Enderez1 provided the identification with subsequent confirmation from the Department of Zoology, University of the Philippines. In the other research studies, the identification was made by the senior author. In identifying the species, we have relied extensively on Voss (1963).

The local names for Loligo, Sepioteuthis, and Doryteuthis are "pusit" (widely used), "panus" (Southern and Western Tagalogs), "locus" (Visayan), and "bomagto" (Ilocano). Uroteuthis bartschi fished in the Palawan waters is commonly named by fishermen as "sputnik" because its body shape is likened to a slim rocket ship.2

Squid Production

Landings of "squid" have been recorded since the start of the Philippine Fisheries Statistics in 1940 by the Philippine Bureau of Fisheries. Here, the term "squid" will be used to connote either squid, cuttlefish, and octopus unless otherwise specified. Similar records have been kept also by the Food and Agriculture Organization of the United Nations.

Table 1 shows the squid production trend for 1957-76. The total commercial catch can be characterized by a gradual increase with a few declines spaced between several successive years. This upward climb may be due to the increase in the use of otter trawls, purse seines, and beach seines. While the bagnet occupies an important role in the fishing industry, and is a very productive gear at that, the number has been fluctuating. This may indicate additional production with an increased number of gears or lower production with less bagnets (Tables 2, 3).

Municipal (also called sustenance or artisanal) fisheries, an important factor in the Philippines' national fish production, lacked detailed figures on its squid catch until 1976. The municipal sector then contributed as much as 50 percent, in which squid, cut-

1 Ed Enderez, Fisheries Division, Development Bank of the Philippines, Makati, Philippines. Personal commun.
2 Antero Belnas, Bureau of Fisheries and Aquatic Resources, Intramuros, Manila. Personal commun.
ottel, and octopus, grouped separately, were estimated at 13,079 t (28,833,963 pounds) compared with 10,560 t (23,280,576 pounds) from the grounds in the Philippines, of which (Table 4). The squid catch of the II major fishing areas follows a generally variable or downward trend. Only the Samar Sea and the Bohol Sea have shown an increase in the squid catches. To assess whether a fishing ground is underexploited, fully exploited, or overfished, an evaluation of the catch per unit area, is necessary. Three regions (IV-A, V, X) produced 90 percent squid among the cephalopod groups. Basnig was the most productive in the commercial and municipal sector and, on the other hand, the scoop net with light and ringnet are the second and third most productive fishing gears (Table 5).

The third workshop dealt with the coastal Pacific side of the Philippines. This area, comprising five regions, has a rugged coastline and an extensive continental shelf extending over 1,500 km (900 nautical miles). San Miguel Bay, the most productive fishing ground in the Philippines per unit area, is located here. The northern or upper region (Region II) was excluded in this discussion. Four regions (IV-A, V, X, XI) produced 90 percent squid among the cephalopod groups. Basnig was the most productive in the commercial and municipal sector and, on the other hand, the scoop net with light and ringnet are the second and third most productive fishing gears (Table 5).

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**Table 1.** Total commercial squid catch in metric tons for the Philippines, 1957-76. Source: BFAR, 1957-76.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total catch (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1957</td>
<td>1,002</td>
</tr>
<tr>
<td>1958</td>
<td>976</td>
</tr>
<tr>
<td>1960</td>
<td>859</td>
</tr>
<tr>
<td>1962</td>
<td>743</td>
</tr>
<tr>
<td>1964</td>
<td>650</td>
</tr>
<tr>
<td>1966</td>
<td>568</td>
</tr>
</tbody>
</table>

**Table 2.** Numbers of commercial fishing gear in the Philippines. Source: BFAR (1957-76).

<table>
<thead>
<tr>
<th>Year</th>
<th>Bagnel</th>
<th>Beach seine</th>
<th>Purse seine</th>
<th>Otter seine</th>
<th>Round haul seine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1967</td>
<td>8.1</td>
<td>85.0</td>
<td>115.7</td>
<td>645.5</td>
<td>480.2</td>
</tr>
<tr>
<td>1968</td>
<td>9.2</td>
<td>99.2</td>
<td>1,309.8</td>
<td>532.6</td>
<td>467.9</td>
</tr>
<tr>
<td>1969</td>
<td>10.5</td>
<td>167.3</td>
<td>594.1</td>
<td>26.6</td>
<td>117.2</td>
</tr>
<tr>
<td>1970</td>
<td>12.0</td>
<td>1,039.2</td>
<td>333.5</td>
<td>124.8</td>
<td>5,769.7</td>
</tr>
</tbody>
</table>

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**Table 3.** Catch percentage by type of fishing gear on squid. Source: BFAR (1957-76).

<table>
<thead>
<tr>
<th>Year</th>
<th>Total catch (kg)</th>
<th>Bagnel</th>
<th>Other seine</th>
<th>Beach seine</th>
<th>Purse seine</th>
<th>Round haul seine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td>7,138</td>
<td>7,439</td>
<td>1,746</td>
<td>92.73</td>
<td>0.24</td>
<td>0.80</td>
</tr>
<tr>
<td>1972</td>
<td>3,749</td>
<td>3,342</td>
<td>4,621</td>
<td>62.81</td>
<td>2.51</td>
<td>1.35</td>
</tr>
<tr>
<td>1973</td>
<td>2,174</td>
<td>2,456</td>
<td>6,938</td>
<td>63.12</td>
<td>0.85</td>
<td>0.58</td>
</tr>
<tr>
<td>1974</td>
<td>9,266</td>
<td>8,907</td>
<td>84.14</td>
<td>8.65</td>
<td>6,862</td>
<td>0.10</td>
</tr>
</tbody>
</table>

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**Table 4.** Major Philippine squid fishing grounds based on production (in metric tons). Source: BFAR (1957-76).

<table>
<thead>
<tr>
<th>Year</th>
<th>Asid Gulf</th>
<th>Bohol Sea</th>
<th>Guimaras Strait</th>
<th>Lamon Bay</th>
<th>Manila Bay</th>
<th>Ragay Gulf</th>
<th>Samar Sea</th>
<th>San Miguel Bay</th>
<th>Sulu Sea</th>
<th>Tayabas Sea</th>
<th>Visayas Sea</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td>154</td>
<td>203</td>
<td>365</td>
<td>281</td>
<td>254</td>
<td>154</td>
<td>10,560</td>
<td>7,174</td>
<td>9,222</td>
<td>6,366</td>
<td>7,451</td>
</tr>
<tr>
<td>1972</td>
<td>1,002</td>
<td>976</td>
<td>859</td>
<td>743</td>
<td>650</td>
<td>568</td>
<td>10,553</td>
<td>10,533</td>
<td>10,31</td>
<td>10,560</td>
<td>10,560</td>
</tr>
</tbody>
</table>

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The first workshop covered the fishing areas between Luzon and Mindanao Islands, the Sibuyan and the Visayas Seas (Fig. 1). It is the most heavily fished area in the Philippines, producing over 50 percent of the total catch by municipal and commercial fisheries for the whole country. Included in these areas are the Tayabas Bay, Samar Sea, Ragay Gulf, Asid Gulf, Guimaras Strait, and other fishing grounds.

This first workshop made use of the catch per trawler to obtain the estimated total fishing effort. Squid as well as cuttlefish were treated as one. Between 1965 and 1974, statistics showed increasing effort but with the total catch increasing very little (Fig. 2). It was surmised that the area is fully exploited and the maximum yield is expected to be around 1,200 t. The Visayan Sea and Guimaras Strait contributed much to the production of squid while the rest produced a minor quantity. It seems that the Samar Sea has been overlooked. Trawl and basnig (bagnet) are the main gears but jigging by municipal vessels does occur (Table 5).

The second workshop did not mention squid in particular but the areas analyzed, including the Sulu Sea, Bohol Sea, and Moro Gulf, are rich grounds for pelagic fishes.

The third workshop dealt with the coastal Pacific side of the Philippines. This area, comprising five regions, has a rugged coastline and an extensive continental shelf extending over 1,500 km (900 nautical miles). San Miguel Bay, the most productive fishing ground in the Philippines per unit area, is located here. The northern or upper region (Region II) was excluded in this discussion. Four regions (IV-A, V, X, XI) produced 90 percent squid among the cephalopod groups. Basnig was the most productive in the commercial and municipal sector and, on the other hand, the scoop net with light and ringnet are the second and third most productive fishing gears (Table 5).
The northern and western coast of Luzon were the last areas assessed. Similar problems like those of the previous workshop were encountered. Data for analysis on potential yield and status of stocks are incomplete in the previous years. There is a strong belief that a large quantity of squid abounds off the western Philippine coast. Again squid are caught by trawls, and at night by lift nets with lights to attract these myopsids. Harvesting is by hook and line, including jigs.

In almost all the workshops, we see that the squid, including cuttlefish and even the octopus, were given recognition as an important stock contributing to major production.

**Fishing Methods**

Though the present squid fishery is limited to sustenance fishermen (Flores, 1974), many loliginids are taken from otter trawls, basnig, purse seine, round haul seine, and scoop nets. Statistical data on myopsid squid at the municipal level are available only after 1975. Table 3 shows squid catches by five commercial fishing gears.

In Figure 3, the most common squid jigs used by sustenance fishermen are shown. Operation of the shrimp-type jig and the cylindrical-type jig are limited to one line, so fishermen, to increase their catch, should set at least three or four lines while fishing. The Tañon Strait jigs are used in waters 200 m (656 feet) deep while the cylindrical type with the whole fish bait is a bit similar to the second type. The difference is that the hooks have a wider spread. Table 5 shows Region VIII which includes the northern and eastern Samar Sea as the area where squid jigging is most prevalent.

Figure 4 shows the commercial and municipal squid fishing seasons. Generally, the fishing by municipalities is continuous throughout the year with peak seasons occurring at different places. Rasalan and Datingaling (1953) reported on the fishing gears which use lights. This section will briefly describe the fishing methods and some of the following account on the seines.
Table 5.—Philippine squid and cuttlefish catch in 1978 separated according to region and gear (in metric tons). Source: SCSP (1978).

<table>
<thead>
<tr>
<th>Gear</th>
<th>Fishery</th>
<th>Region</th>
<th>IV-A</th>
<th>V</th>
<th>VIII</th>
<th>X</th>
<th>XI</th>
<th>Total</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bagnet</td>
<td>C</td>
<td></td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>263</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,649</td>
<td></td>
</tr>
<tr>
<td>Ring net</td>
<td>M</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>947</td>
<td></td>
</tr>
<tr>
<td>Beach seine</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>896</td>
<td></td>
</tr>
<tr>
<td>Trawl</td>
<td>C</td>
<td></td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>Spear gun</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>435</td>
<td></td>
</tr>
<tr>
<td>Scoop net with light</td>
<td>M</td>
<td></td>
<td>1,348</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,348</td>
<td></td>
</tr>
<tr>
<td>Jigger</td>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>194</td>
<td></td>
</tr>
<tr>
<td>Scoop net</td>
<td>M</td>
<td></td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Not classified</td>
<td>M</td>
<td></td>
<td>81</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>C</td>
<td></td>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,107</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M</td>
<td></td>
<td>1,780</td>
<td></td>
<td>1,942</td>
<td>636</td>
<td>1,107</td>
<td>5,550</td>
<td></td>
</tr>
</tbody>
</table>

(Note: The Workshop on the Fishery Resources of the Pacific Coast did not include Region II. C = Commercial; M = Municipal.)

(except purse seine) are extracted from that paper.

The round haul seine is an indigenous commercial gear locally known as "sapyaw." The sapyaw can be operated during daytime or nighttime. At nighttime it is usually aided by a third boat which also acts as a tow vessel. This boat usually carries a light and leads the attracted school between the two boats where the net awaits the catch. This gear is bulky and requires several hands. Thus, it may become a costly operation as there is less profit when employing a larger crew. More are converting to basnigs which are cheaper to operate than sapyaw. The popularity of the round haul seine (Table 2) is declining.

The least productive of the commercial/municipal methods of fishing is the beach seine. Common to fishing villages, the beach seine is operated once or twice a day or at night, and the work is done by the villagers. During the dark phase of the moon, the boats equipped with lights go out to attract the fish, bringing them nearer to shore and the net. Hauling time to shore usually averages 3 hours or more, depending on the currents and the mode of operation. Catch per season is sometimes insignificant due to the presence of trash fauna, especially ophiuroids and jellyfishes. There are more people involved at one time with this single gear than with any other method now in use.

The purse seine, using artificial lights, was first introduced in the Philippines in 1962 (Ronquillo, 1972). This gear has now surpassed the trawl in total productivity for several years, though there are more than twice as many otter trawls (Table 2). This gear, when operated at night with light to attract fish, catches from 35 to 100 t (from 77,161 to 220,460 pounds) of fish. Rasalan (1968) reported catches of 100 t (220,460 pounds) in the Palawan waters. This gear might well be the most productive squid fishing gear although it is not solely designed for squid fishing.

Probably more has been written about fishing with the basnig in the Philippines than any other fishing gear (Rasalan, 1959; Rasalan and Villadolid, 1955; Spoehr, 1968; Manacop and Laron, 1953; and Ronquillo, 1972).

The basnig is an indigenous gear that originated in northern Panay and adjacent areas. Although this gear ranks as the third most productive fishing gear, it does not contribute to the export market. The catches are immediately landed in local markets because the boats do not have refrigeration facilities. But, in catering to local markets, it helps to alleviate shortages of fish in rural areas. Otherwise, the catches would be mostly distributed in urban and semiurban areas.

The basnig, a totally night fishing gear, is operated near submerged shoals and reefs, using lights to attract fish to the net (Manacop and Laron, 1953). This gear, along with the purse seine and round haul seine employing lights, accounted for about 23 percent of the Philippines' total commercial fish production in 1976.

Basnig boats proceed before twilight to their destination where they set their nets once or twice in the night. The net, which resembles an inverted box-type mosquito net, is hung under the boat...
The most common Philippine squid jigs. A = Shrimp-type jig; B = Cylindrical-type jig; C = Tañon Strait cylindrical jig with bait attachment; D = Cylindrical-type jig with whole fish bait; e = plastic ball “eye”; b1 = lead weight; b2 = stainless steel; c = nylon monofilament “appendages”; d1 = barbless hooks, 12 pcs stainless wire 200-pound test; d2 = barbless hooks, 12 pcs stainless steel; d3 = barbless hooks, 14 pcs stainless steel; d4 = barbless hooks, 16 pcs stainless steel; e = body; f = cone; g = shaft; h = hook for bait attachment. All measurements are in centimeters. Source: Flores (1974).

Research

Some of the research presented here did not include or involve squid research because they were generally stock assessments of demersal fishes. However, trawling gear was used and loliginids were also taken and recorded. This section presents results of studies conducted in the different interisland seas most of which contain useful squid fishery data.

At the height of a growing clamor for closures of certain traditional and productive fishing grounds for management and regulation purposes, several fishing areas in the Philippines were designated for assessment and investigation to determine whether these are potential fishing grounds or whether they are depleted of marine resources. (The Malampaya Sound, located in the northwestern portion of Palawan, was closed in 1973 under Fisheries Administrative Order III.)

Virginia Aprieto, former Director of the Institute of Fisheries Development and Research, initiated early in 1974 sustained studies on the fisheries, biology, and ecology of traditional and nontraditional fishing grounds. So far
four papers have been published and more are being readied. The principal author has participated in some of this investigation and also discusses here a current project. The data or figures presented in this section are not final, until published separately. Summaries of this research follow.

The first in the series deals with echo surveys of northwestern Palawan waters (Aprieto et al., 1974). This area is adjacent to Malampaya Sound. Before the closure was enforced, it ranked in the top 10 fish producing grounds in the Philippines where the majority of the catch was taken from pelagic fisheries. To provide additional trawling areas and to break away from the traditional fishing grounds, new areas were explored. This 125,950 km² area representing a nontraditional fishing ground showed echographs of fishes. However, it further revealed steep slopes, peaks, and a rugged bottom. An experimental trawl in the area which is supposedly trawlable got snagged after 30 minutes. The total catch, one Alectis sp., three nemipterids, four Loligo spp., one Scoliodon sp., sponges, and alcyonarians, represented some of the probable stocks.

The senior author was only able to join two cruises in the Visayan Sea Project (conducted from 1976 to 1977). All 12 fishing tracks were positive for squid. The species present, in order of relative abundance, were: Loligo sp. (Voss, 1963); L. duvauceli and L. edulis; Sepia pharaonis, Doryteuthis singhalensis, and Sepia esculenta. Sepioteuthis lessoniana was caught in small numbers. Generally the Visayan Sea substratum is sandy-muddy as determined by systematic random samples.

Lingayen Gulf was the site of the third fishing ground investigated. Nine out of the twelve stations were set for a 2-hour standard tow. All tracks fished produced loliginid squids averaging 2.4 kg (5.3 pounds) per track. The squids caught were similar to those taken in the Visayan Sea. However, the most abundant was Loligo duvauceli, followed by sepiids Sepia esculenta and S. pharaonis. Occasional catches of Sepioteuthis lessoniana and Loligo edulis were noted. One S. lessoniana caught weighed 1.5 kg (3.3 pounds). In higher latitudes Choe (1961) noted specimens attaining 3.0 kg (6.6 pounds). Several Octopus membranaceus and other unidentified octopi were caught, some resembling the unknowns of Voss and Williamson (1972).

The loliginid catch consisted mostly of various sizes ranging from 3.5 to 14 cm (from 1.4 to 5.5 inches) with an average mantle length of 7.5 cm (2.9 inches). Most Loligo duvauceli were egg bearing at 5 cm (2 inches). On the basis of field observations the subsampled squid population does not spawn singly in a particular season but has

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4*Sepia is not a loliginid.
protracted spawn year-round. *Doryteuthis singhalensis* were few in the trawling test but were observed to be present in the local market bordering the Lingayen Gulf.

Trawling investigations in the neighboring Samar Sea and Carigara Bay are currently being conducted by the Department of Marine Fisheries, College of Fisheries, University of the Philippines. There were 28 fishing tracks out of the original 34 plotted on the map. A standard 1-hour tow was made in each track per month. Five months of fishing had averaged 198 kg (435.6 pounds) per month. For the Samar Sea alone it was 158 kg (347.6 pounds) per month. There was an abundance of *Sepia pharaonis* and *Loligo duvauceli* with the latter species appearing more often. *Sepia esculenta* and *Sepioteuthis lessoniana* were also present in the fishing area. *Sepioteuthis lessoniana* were large with lengths reaching 30 cm (12 inches) while *Sepia esculenta* ranged from 7 to 10 cm (2.8 to 4 inches).

This relative abundance result seems to indicate that the Samar Sea is productive (Table 4). However, due to a Presidential decree banning trawlers within 7 km (4.3 miles) of shore, the fishing effort in the area was reduced. This might account for the large catch.

**Developments**

From the above discussion, it can be concluded that the Philippine squid fishery has been given little attention. However, there is now a government program on the development of municipal fisheries which may well include squid fishing. For commercial fishing, the government relaxed its policy on the importation of secondhand vessels. This move was hailed by the fishing industry because it believes it can boost annual catch by 32,000 t (70,547,200 pounds) (Anonymous, 1979). These boats, however, will probably not introduce new technology as they will be used to increase the otter trawl and purse seine fleets.

Foreign aid has been contributing its share too. The ongoing Samar Sea/Carigara Bay Project testing the midwater trawl is done in cooperation with the German Technical Aid Program.

No such gear has been used in the Philippines before. According to Peter Jarchau, some countries have met success with the midwater trawl and the Japanese have used it to catch squid. In practice, the new trawl can function both as a near-bottom and as a pelagic gear.

**Conclusion**

The Philippines has one of the most extensive coastlines and territorial waters in which a healthy economy could be built through fishing. Several spe-
cies of cephalopods, especially squids, are available for which no potential stock measurement is yet known. Coastal, inshore, and territorial waters abound with myopsid and with some oegopsid squid. The fishing industry, with its numerous vessels, has so far limited itself to fishing in waters close to land and could, in time, overcrowd and overexploit that marine resource.

Trawling remains the most productive fishing gear for squid. However, only a small portion of the possible fishing grounds are available to the otter trawlers. What remains are larger nontrawlable areas where vessels using the purse seine, basnig, and scoop nets aided by lights can venture. By increasing the number of boats using lights with the above gear, we believe that the present production of squid can be doubled.

Jigging is the common method of squid exploitation in the municipal fishery. The number of people using this gear is unknown, but could be substantial in view of Smith’s (1979) estimate of 500,000 municipal fishermen in the Philippines. Financial attention should be focused on the squid jiggers as they utilize inexpensive fishing gear and low technology.

Identification and geographical distribution data on squids are lacking so that species stock assessments cannot be properly conducted.

Local and foreign squid markets have grown. Thus, the Philippines must broaden its marine product exports to include canned fishery products because all canned squid and some canned fishes in the local market are import products in which the government loses hundreds of thousands of dollars annually.

Acknowledgment

We especially wish to thank Norman Reyes for the basnig picture.

Literature Cited


