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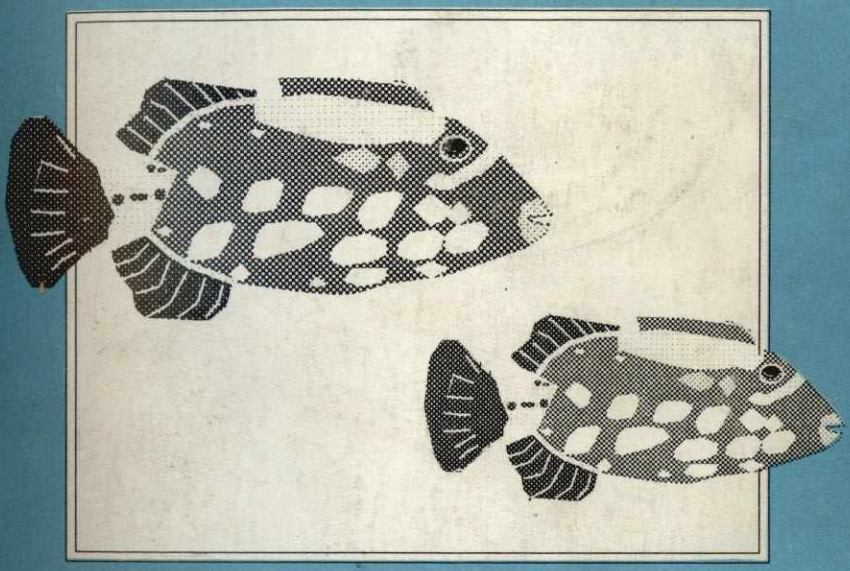

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Comparative Catch Efficiency of Different Kinds of Fish Pots

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ABSTRACT

Improvements were made on traditional fish pots - using modified designs, different materials and different kinds of baits. Procedures for gear design and construction, setting and banking operations are described and the comparative catching efficiency and effectiveness of the fishpots determined.

Keywords: fish pots, *bubo*, fishing methods, fishing gears

INTRODUCTION

Fish pots, locally known as *bubo,* are enticing devices used in many coastal localities, especially around coral reefs. They are small-scale gears used to catch demersal fishes and crustaceans. Traditionally they are made of woven bamboo splits, but synthetic material is now more commonly used. These fishing gears are simple in structure and easy to handle even on board small fishing boats. They have been used by municipal fishermen for generations in coastal fishing grounds (E. Andrews, 1947).

The use of fish pots, among other traditional fishing methods, contributes about 2.22 % to the total annual marine municipal catch of 803.194 metric tons (Bureau of Agricultural Statistics, 1993). It is believed that the catch from fish pots may still be increased due to their advantages, namely: (1) the structure of the fish pots is simple and they are easy to handle; (2) they make fishing operations possible in both deep and shallow waters as well as in coral reefs which are otherwise less exploited due to the rugged terrain that makes trawl and gill net operations difficult; (3) gear selectivity for species is high and; (4) catch taken remain alive and fresh. These among other factors led the Fishing Technology Division of the Bureau of Fisheries and Aquatic Resources to conduct a study on

the catching efficiency and effectiveness of fish pots of various designs and material.

This study was made in line with the objective of the Bureau of Fisheries and Aquatic Resources to improve the living conditions of the municipal fishermen through the development of new or advanced fishing technologies for increasing their catch. The municipal fishermen comprise 60 to 85% of the Philippine fishing industry, with the majority still using traditional fishing methods.

Efforts were made in the study to improve the fish pots. Various designs were applied and different kinds of materials were used in constructing them. Different kinds of baits were also used. The purpose was to determine which fish pot and bait got the better catch.

The design, construction materials and baits found to be most efficient and effective may be recommended to the municipal fishermen to increase their catch.

METHODOLOGY

The preliminary study was conducted at Puntod bank, adjacent to Agfa Point at Tangalan, Aklan, about 2.4 km from shoreline, with a depth of 7.35 m. That the project site was a suitable area for the study was determined after a series of site surveys in Western Visayas, specifically the area of the Visayan Sea, Jintotolo Channel. The following factors were considered in the choice of the site: (1) abundance of coral reefs; (2) accessibility of land and water transportation and to the capital town of Kalibo; (3) existence of the DA/BFAR district office; and (4) receptiveness of the municipal fishermen to the researches conducted by the BFAR fishery technologist.

The following procedure was followed in the study:

1. Gear Design and Construction

Eight types of pot designs were modified and tested, namely: (1) the box type with one funnel; (2) the box type with two funnels; (3) the cylindrical type with two funnels; (4) the conical type with one funnel; (5) the rectangular type with two funnels; (6) the standard dungeness type with two funnels; (7) the Korean bell cod type and; (8) the octagonal type (Fig. 1A to 1H).

A comparative study of catch efficiency (in kilograms) of the various designs was conducted and the catch efficiency of each was determined.

A polyethelene net using a twine No. 400/18x28 mm mesh size (13 knots) and a poultry wire mesh 0.32 mm in diameter were tested to compare their life span and durability. Each design was tested for efficiency of construction materials.

For example, a box-type fish pot made of polyethelene net was compared with another fish pot of the same design but made of poultry mesh wire. Observations were done on all other designs.

To attract fish, each pot was provided with baits placed in a bait box made of either galvanized wire or netting, which was hung near the entrance of the fish pot. Natural baits of fresh sardines, slipmouth and trash fish, etc., as well as artificial baits of broken porcelain (chinaware) were used and tested in the study. An observation on the catch efficiency of each design using the natural and artificial baits was conducted for comparative purposes.

The following procedure was followed in the construction of the fish pots:

1) Preparation and cutting of steel frames with the required dimensions of each design
2) Welding of structural frames
3) Painting each frame with anti-corrosive paint and finishing with green marine paint
4) Preparation and cutting of the polyethelene nets and poultry wire mesh, according to specific measurements of each designs
5) Mending and attaching the polyethelene nets or poultry wire mesh to the frame of each of the fishing gear.
6) Preparation, construction and mounting of the required funnels
7) Preparation of the main and branch lines

The main and branch lines are ropes with diameters of 10 mm and 8 mm, respectively. They are used in connecting the different pots to be set in the project site for actual operations.

Before the actual preparation of the main and branch lines, they must be checked first and stretched for easy handling.

The main rope, 400 m long, is connected to the branch lines, which are attached at every 20 m distance along the main line. Each branch line is connected to the main line by forming an eye, an 8 mm diameter rope, 15 cm long, attached or connected to the main line by splicing method. The 10 m long branch line hangs connected to a pot. Floats, Viny #G-6.5, are attached along the main line, one float between every two branch lines.

8) Preparation of marker or flag with bamboo pole and anchor

The marker or flag is a piece of cloth, 1 m x 1 m, indicating the name of

the project. It is provided with a Viny #7B-2 float and an improvised anchor of 10 kg cement weight tied to a 12 mm diameter rope.

2. Setting Operation

Five trial settings were done to gather data for the study. In setting the pots, the physical conditions that facilitate the operation were taken into consideration, such as the prevailing wind direction, current and wave action.

The activities undertaken in the actual setting of the fish pots were as follows:

1) In pot fishing, the depth of the water must be from 7 to 35 m, which is measured by the use of a sounding lead line.
2) Three kinds of lines (nylon ropes) are used in the setting of the fish pots; namely: (1) the main line 10 mm diameter rope; (2) branch line 8 mm diameter rope and (3) anchor line 12 mm diameter rope.
3) One anchor line is released first. The main line, tied to the anchor line, is released next, followed by the series of branch lines to which the pots are tied.
4) Finally, after the last pot has been set, the other anchor line is released.

3. Hauling Operation

Correspondingly, five hauling trials were done during the entire duration of the study. The pots were hauled after 14 hours from the time of the setting.

The hauling process was as follows:

1) One anchor line is hauled first, followed by the first 20 meters of the main line to which the first branch line with the corresponding pot is tied, and so on until the last pot is hauled in.
2) To prevent entanglement of the main and branch lines, every branch line attached to a pot is detached from the main line before hauling in the next branch line.
3) Lastly, the second anchor line is taken aboard the motorized (116 HP) banca.

4. Species Catch Composition

Species catch taken from every pot is weighed and identified.

RESULTS AND DISCUSSIONS

Fish Pot Design

The ranking order from highest to lowest in the comparative average kilogram catch and percentage to total catch showed that the box type with two funnels had the highest average catch, with 17.06 kg or 19 %; followed by the box type with one funnel, with 13.64 kg or 15%; and then by the rectangular type with two funnels, with 11.40 kg or 13%; followed by the conical type, with 11.20 kg or 12% average catch. The Korean bell cod type and the cylindrical type got the lowest average kilogram catch, with 9.39 kg or 10% and 8.93 kg or 9%, respectively. Tables 1a and 1b show the comparative catch efficiency of the various designs.

The highest average catch taken by the box type with two funnels may be attributed to the modification made on the typical box type with triangular collapsible netting constructed on top of the fish pot (Figure 2-B). The net covering the space is bouyed up with a plastic float Viny G-6.5 at the center, creating an additional area for attracting and catching fish. Likewise, the two funnels with baits situated at the opposite sides of the box type attracted and caught more fish.

To sum up, data from the study suggest that fish pots designed with two funnels and provided with wider space caught more fish in comparison with those provided with only one funnel and less space.

Materials for Construction

With regard to construction materials, the study indicates that fish pots made of polyethelene net are more durable than those made of the poultry mesh wire. During bad weather most of the pots made of poultry mesh wire were destroyed. Wire mesh nets entangled with the corrals could no longer be recovered unlike those made of the polythelene net which lasts longer than the poultry wire, which is metallic. It is a common knowledge that metals deteriorate when soaked in sea water.

Baits Used

Between using natural baits (trash fish) and artificial baits (broken porcelain), the data indicated that natural baits more often than not obtained a higher catch than artificial baits. Out of eight types of pots used, natural baits resulted in more catches in five types (Table 2).

In order of descending comparative advantage per type of bait:

1) rectangular pot with two funnels, + 14.61 kg;

2) box pot with two funnels, + 7.06 kg;

3) conical pot, + 6.31 kg;

4) cylindrical pot, + 5.66; and

5) standard dungeness, + 5.12

The advantage of natural baits over artificial baits may be attributed to the attraction of fish to the scent emitted by the natural baits.

Catch Composition

Sixteen species of fish comprise the over-all fish catch composition. They are as follows: Sea mantis *(Squilla sp.),* 104.85 kg or 11%; Manila Sea Catfish *(Arious manillensis),* 98.62 kg or 10%; San Francisco Crab *(Chrybdis feriata),* 67.99 kg or 7%; Spotted Grouper (*Epninephilus magachir),* 57.42 kg or 6%; Sea Catfish, Family Aridae, 45.35 kg or 5%; Long tailed Nemipterid (*Nemipterus japonicus*), 45-28 kg or 4%; and Red Caesio *(Pinjalo* typus), 41.89 kg or 3%. Other species of fish caught are indicated in Table 3.

The catch composition taken during the study does not mean that the same species of demersal fish can be realized in the replicate study. Factors such as fishery resources of the area; topography, and fishing season, among other limiting factors, must be taken into consideration.

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Table 1a. **Comparative catch efficiency of fish pots "bubo" with one funnel using polyethelene netting**

		Catch (kg) of fish pots with one funnel			
Hauling Date 1983-1984	**Hauling No.**	**Box type**	**Conical type**	**Korean bell cod type**	**Octagonal**
Sept. 27 - Oct. 2	1	4.95	9.88	4.95	8.70
Oct. 3 - 10	2	5.26	5.92	4.84	6.89
Dec. 21 - 29	3	28.66	14.11	9.41	7.53
Feb. 8 - 18	4	16.87	10.96	17.21	12.10
April 23 - May 3	5	42.44	15.11	19.82	16.81
Average Catch		13.64	11.20	11.24	10.40
Total Catch		68.18	55.98	56.23	52.03

Fish Pots with one funnel
Ranking:

1. Box Type (13.64 kg)
2. Korean Bell Cod Type (11.24 kg)
3. Conical Type (11.20 kg)
4. Octagonal Type (10.40 kg)

Table 1b. **Comparative catch efficiency of fish pots "bubo" with two funnels using polyethelene netting**

		Catch (kg) of fish pots with two funnels			
Hauling Date 1983 - 1984	**Hauling No.**	**Box Type**	**Cylindrical Type**	**Rectangular Type**	**Standard Dungeness Type**
Sept. 27 - Oct. 3	1	8.70	4.95	8.70	4.95
Oct. 3 - 10	2	7.05	2.18	1.79	4.45
Dec. 21 - 29	3	24.43	18.41	18.15	14.80
Feb. 8 - 18	4	15.17	8.60	14.84	9.84
April 23 - May 3	5	29.97	10.53	16.46	11.75
Average Catch		17.06	8.93	11.40	9.56
Total Catch		85.32	44.67	55.72	47.79

Fish Pots with Two Funnels
Ranking:

1. Box type (17.06 kg)
2. Rectangular type (11.40 kg)
3. Standard Dungeness type (9.56 kg)
4. Cylindrical type (8.93 kg)

Table 2. **Comparative catch efficiency of natural and artificial baits used in different types of fishpots**

TYPE OF POT	TYPE OF BAIT		
Pot with 2 funnels:	**Natural (kg)**	**Artificial (kg)**	**Advantage of Natural Bait (kg)**
Rectagular	22.35	7.74	+ 14.61
Box	26.78	19.72	+ 7.06
Cylindrical	15.57	9.91	+ 5.66
Standard Dungeness	13.64	8.52	+ 5.12
Pot with 1 funnel:	**Natural (kg)**	**Artificial (kg)**	**Advantage of Natural Bait (kg)**
Conical	17.54	11.23	+ 6.31
Octagonal	10.81	11.40	- 0.59
Box	17.25	17.93	- 0.68
Korean bell cod	7.82	16.37	- 8.55

The catch figures here are averages of three hauling periods: Dec. 21-29, 1983; Feb 8-18 and April 23-May 3, 1984.

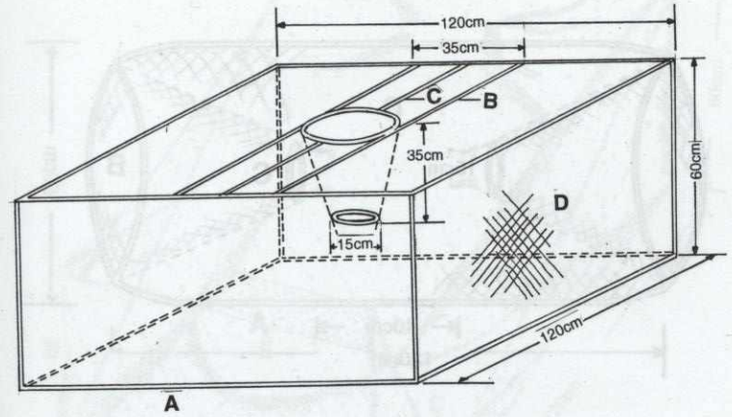

Figure 1a. **Box-type Fish Trap with One Funnel**

A -- Round steel bar 8mm diameter
B -- Round steel bar 6mm diameter
C -- Round steel bar 4mm diameter
D -- Polythelene net 400/18 x 28mm mesh size 13 knots
E -- Round steel bar 8mm diameter

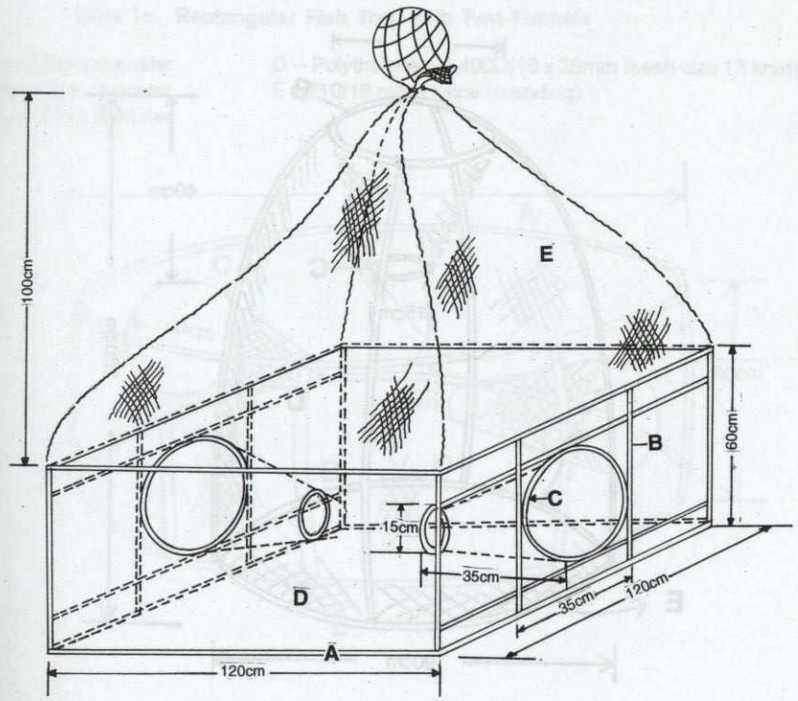

Figure 1b. **Box-type Fish Trap with Two Funnels**

A -- Round steel bar 8mm diameter
B -- Round steel bar 6mm diameter
C -- Round steel bar 4mm diameter
D -- Polythelene net 400D/18 x 25mm mesh size 13 knots
E -- 210/18 nylon twine (lacing)
F -- Float

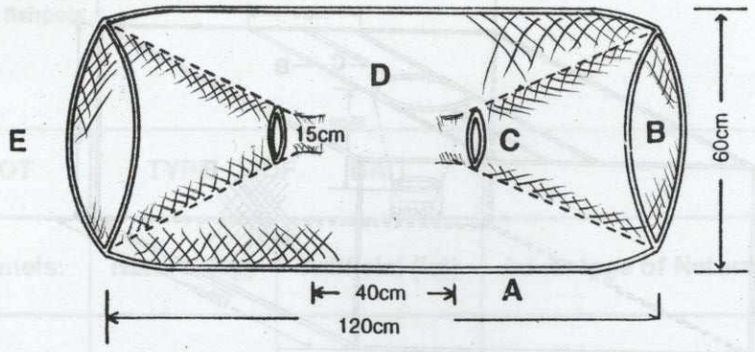

Figure 1c. **Cylindrical Fish Trap with Two Funnels**

A -- Round steel bar 8mm diameter
B -- Round steel bar 6mm diameter
C -- Round steel bar 4mm diameter
D -- Polythelene net 400D/18 x 25mm mesh size 13 knots
E -- 210/18 nylon twine (mending)

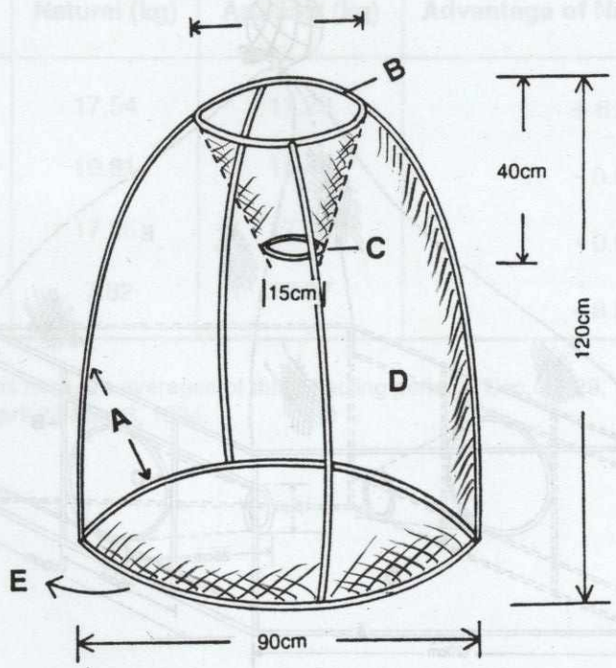

Figure 1d. **Conical Type Fish Trap**

A -- Round steel bar 8mm diameter
B -- Round steel bar 6mm diameter
C -- Round steel bar 4mm diameter
D -- Polythelene net 400D/18 x 25mm mesh 13 knots
E -- 210/18 nylon twine (mending

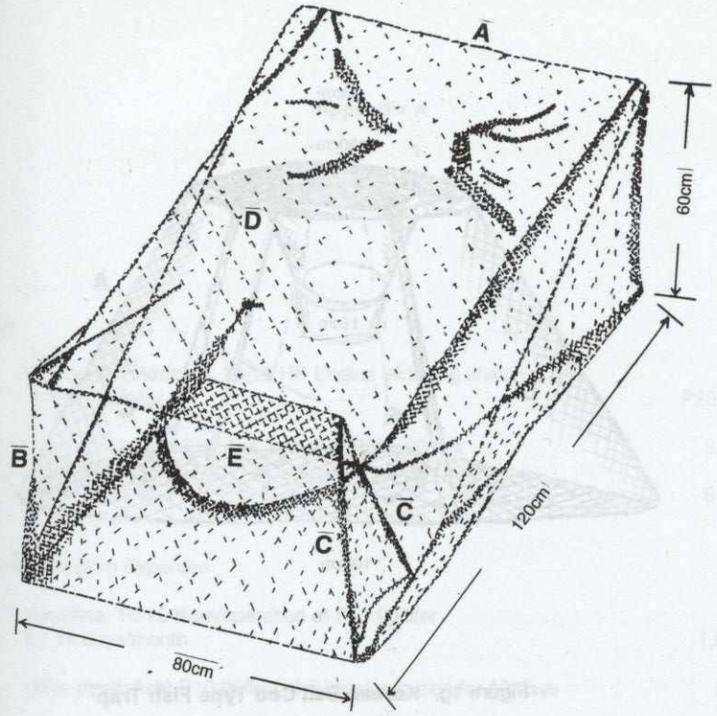

Figure 1e. **Rectangular Fish Trap with Two Funnels**

A -- Round steel bar 8mm diameter
B -- Round steel bar 6mm diameter
C -- Round steel bar 4mm diameter
D -- Polythelene net 400D/18 x 28mm mesh size 13 knots
E --210/18 nylon twine (mending)

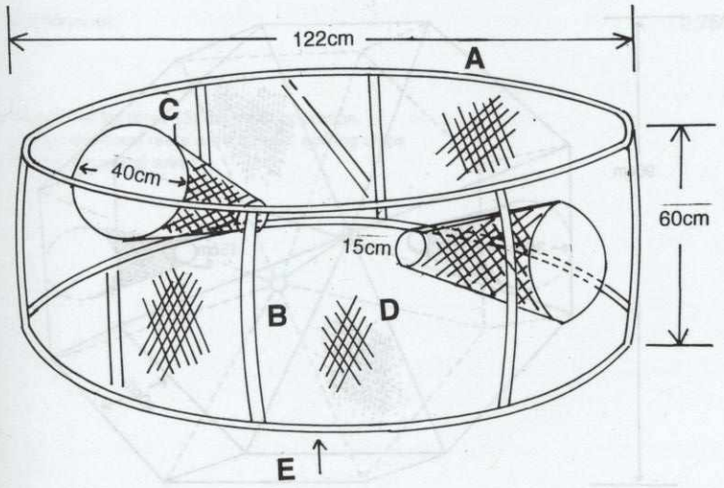

Figure 1f. **Standard Dungeness Crab Pot**

A -- Round steel bar 8mm diameter
B -- Round steel bar 6mm diameter
C -- Round steel bar 4mm diameter
D -- Polythelene net 400/18 x 25mm mesh size 13 knots
E -- 210/18 nylon twine (mending)

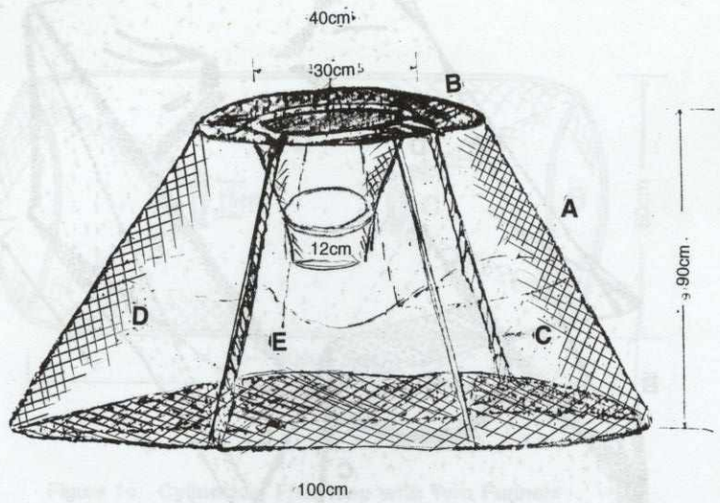

Figure 1g. **Korean Bell Cod Type Fish Trap**

A -- Round steel bar 8mm diameter
B -- Round steel bar 6mm diameter
C -- Round steel bar 4mm diameter
D -- Polythelene net 400/18 x 25mm mesh size 13 knots
E -- 210/18 nylon twine

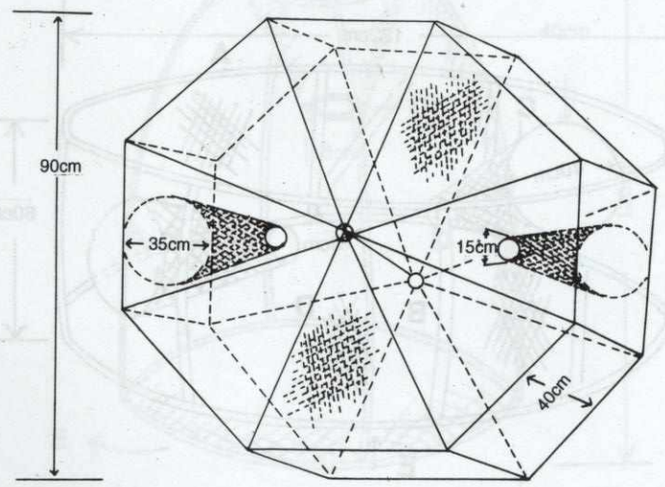

Figure 1h. **Octagonal Type Fish Trap**

A -- Round steel bar 8mm diameter
B -- Round steel bar 6mm diameter
C -- Round steel bar 4mm diameter
D -- Polythelene net 400D/18 x 25mm mesh size 13 knots
E -- 210/18 nylon twine

Appendix A

Cost and Estimate
(1994)

A.	Capital	
	Banca with outrigger, 10-16 HP Engine including shafting, rudder profeller	P28,000.00
	Ten (10) Unite of Fish Pot "bubo" at P350.00/unit	3,500.00
	Floats, lines and etc.	5,000.00
B.	Monthly Operating Expenses	
	Gasoline, 10-15 liters/operation at P10.00/liter for 10 days/month	1,500.00
	Baits (trash fish) P10.00/kilo at 5 kilos/operation for 10 days	500.00
	Contingencies	500.00
C.	Monthly Net Income	
	Average catch of 15 kilos/operation at P35.00/kilo for 10 days	5,250.00
	Less Expenses	2,500.00
	Net Income	2,750.00

Note: The pots "bubo" set for three (3) days per operation.
Usually set near the coral reefs area or near sinking ships and abandoned fish corral areas.

Appendix B

Costing of materials, supplies and equipment used in the project (1994)

Quality	Unit	Description	Unit Price	Total
2	rls.	P.E. Rope 12 mm. dia.	P 282.00	P 564.00
5	rls.	P.E. Rope 10 mm. dia.	P 192.00	P 963.00
3	rls.	P.E. Rope 8 mm. dia.	P 123.00	P 369.00
2	rls.	Poly Net 400D/18x25 mm. mesh size (13 knots)	P 687.00	P1,375.00
2	rls.	Poly Net 400D/18x27 mm. mesh size (12 knots)	P 588.00	P1,176.00
10	spls.	Nylon twine 210/15 (mending)	P 31.50	P 315.00
12	pcs.	Viny floats 7B-2	P 45.00	P 540.00
50	pcs.	Viny floats G-6	P 30.00	P1,500.00
50	mtrs.	Poultry mesh wire 50 mm. dia.	P 9.00	P 450.00
1	bdl.	Steel wire 3 mm. dia.	P 350.00	P 350.00
24	pcs.	Steel bars 6 mm. dia. round	P 15.00	P 360.00
12	pcs.	Steel bars 7 mm. dia. round	P 18.50	P 222.00
TOTAL			P2,317.00	P8,184.00