

I.0 INTRODUCTION

1.1 RATIONALE

The Aquaculture Statistics Section (AqSS) of the Fisheries Statistics Division (FSD) generates quarterly estimates of aquaculture production and value. Over the years, improvements were made on the survey design, data collection and generation of estimates in the aquaculture sector. This activity, Aquaculture Production Survey (AqPS) is a probability survey designed in support of the continuous effort towards efficient and reliable data systems.

1.2 OBJECTIVES

Primarily, the Aquaculture Production Survey aims to generate statistics on volume and value of aquaculture production by province.

Specifically, it aims to gather information on

- a. Volume and value of production by species cultured, by aquafarm type and by environment,
- b. area harvested; and
- c. management and culture system of the aquafarm.

1.3 REFERENCE PERIOD

For the 4th Quarter, 2009 Round of Aquaculture Production Survey (AqPS) the reference period is July – December, 2009. As the survey form provides, AqPS gathers information for two (2) quarters. July – September shall be used to review and finalize the previous quarter while the other one shall be used to estimate the production for the 4th quarter of 2009.

2.0 METHODOLOGY

2.1 COVERAGE

The survey is conducted in 40 major aquaculture provinces. By aquafarm type, the provinces were selected by taking all the provinces whose cumulative share is at least 90% based on the three-year average (2005-2007) production data.

All aquafarm types are covered depending on which are available in the province. These include: brackishwater fishponds, fish pens and fish cages; freshwater fishponds, fish pens and fish cages; marine fish pens and fish cages; oyster, mussel and seaweed; rice fish and small farm reservoirs.

2.2 SAMPLING FRAME

The sampling frame is the list of aquafarms from the Aquaculture Farms Inventory (AqFI) conducted prior to this activity. The last nationwide inventory was conducted in 1997. Succeeding updating was done in selected provinces in varying reference periods.

2.3 SAMPLING DESIGN

The domain of the study is the province. The AqPS adopts one-stage stratified sampling design. By aquafarm type, all operators from municipalities with at least 80% cumulative share to total aquafarm area were stratified into three (3) strata using area as the stratification variable. The boundaries between strata were determined by the distribution of data. If the number of aquafarms in a stratum is less than or equal to fifteen (15), all aquafarms shall be taken as sample. Sample aquafarms shall be selected through systematic random sampling procedure.

3.0 ESTIMATION PROCEDURE

By aquafarm type, the aquaculture production is estimated using the following formula:

$$\hat{Y} = \frac{\sum_{k=1}^s \frac{N}{n} \sum_{i=1}^n Y_{ik}}{mr}$$

- Where:
- \hat{Y} - estimate of production of the province
 - Y - volume of production of sample aquafarm
 - N/n - number of total and sample aquafarm in the stratum
 - s - number of strata in the province
 - mr - municipality rate is the cumulative percentage share of sample municipalities to total aquafarm area in the province

Weighted average price is computed using the following formula:

$$WAP = \frac{\sum_{k=1}^s \sum_{i=1}^n Y_{ik} P_{ik}}{\sum_{k=1}^s \sum_{i=1}^n Y_{ik}}$$

- Where:
- WAP - weighted average price
 - Y - production of sample aquafarm
 - P - price per kilo corresponding to the production
 - s - number of strata in the province

4.0 DATA COLLECTION

Contractual Data Collectors (CDCs) shall conduct the interview. For this activity, the owner, operator, technician and/or caretaker of all sample aquafarms in the province shall be interviewed using **AqPS Form 1. Aquaculture Production Survey**. For seaweed farms, **AqPS Form 2** shall be utilized.

I. SAMPLE IDENTIFICATION

This block identifies the sample aquafarm and the respondent for the aquafarm.

- 1.1 Region**
- 1.2 Province**
- 1.3 Municipality**
- 1.4 Barangay**
- 1.5 Sample Aquafarm Serial No.**

Write the region, province, municipality and barangay name on the space provided. Enter the corresponding code in the box provided, including sample aquafarm serial number. These sets of information are available from the list of samples.

1.6 Stratum

Stratum is a number assigned in an aquafarm based on its homogeneous grouping from the frame, usually 1 – 3. Enter the number on the space provided.

1.7 Municipality Rate

Municipality rate is the cumulative percentage share of sample municipalities to total production. Enter the rate in four (4) decimal places.

1.8 Expansion Factor (N,n)

Expansion factor is composed of the number of total aquafarms (N) and the number of sample aquafarms in the stratum. These figures are necessary in estimating the area and production of the province as indicated in the estimation procedure discussed in 3.0. Enter the N and n corresponding to the stratum.

Items 1.1 – 1.7 are predetermined and available from the list of samples. These items shall be filled out before going out for data collection.

1.9 Name of Respondent

The respondent may be the owner and/or operator of the aquafarm or any other knowledgeable person of the farm operations, such as farm technician or caretaker. Write the name of the respondent.

1.10 Designation

Indicate the position/designation of the respondent, e.g., owner, operator, technician, caretaker, etc.

II. AQUAFARM INFORMATION

This block aims to gather information about the sample aquafarm.

2.1 Aquafarm Area

Ask the total area of the sample aquafarm in hectare unit and enter in four (4) decimal places.

2.2 Aquafarm type

Cross out (X) the box corresponding to the type of aquafarm operation.

01 - Fishpond	04 - Rice fish
02 - Pen	05 - SFR
03 - Cage	06 - Others

- **Fishpond**

A land-based type of aquafarm; a body of water (artificial or natural) where fish and other aquatic products are cultured, raised or cultivated under controlled conditions.

- **Pen**

An artificial enclosure constructed within a body of water for culturing fish, fishery/aquatic resources made up of bamboo poles closely arranged in an enclosure with wooden material, screen or nylon netting to prevent escape of fish.

- **Cage**

A stationary or floating fish enclosure made of synthetic net wire/bamboo screen or other materials set in the form of inverted mosquito net ("hapa" type) with or without cover with all sides either tied to poles staked to the water bottom or with anchored floats for aquaculture purposes.

- **Rice Fish**

An integrated farming system involving raising of fish in rice paddies.

- **Small water body (Small Farm Reservoir)**

Small water bodies include reservoirs and lakes with an area of less than 10 km², small ponds, canals, irrigation canals, swamps and small, seasonal, inland floodplains. They may be permanent or temporary and can be separated into natural waters or constructed ones.

2.3 Environment

Environment is the water condition under which the aquafarm operates and species are reared and cultured. Cross out (X) the box corresponding to the aquafarm environment.

1 - Brackishwater 2 - Freshwater 3 - Marine

- **Freshwater environment**

Refers to water without salt or marine origin. It is pure fresh water. Examples of no mixture of seawater (Laguna de Bay, Taal Lake, Candaba Swamps, Liguasan Marsh and rivers, canals, dams and paddy fields and rice fields.

- **Brackishwater environment**

Refers to mixed seawater and freshwater and salinity varies with the tide. Examples are estuaries, mangroves, and mouth of rivers where seawater enters during high tide.

- **Marinewater/Seawater environment**

Inshore, open waters and inland seas in which the salinity generally exceeds 20%.

2.4 Management system

Management system concerns on the decision on how the aquafarm operates consistent with the operator's or family's objectives and resources. Ask the management system on the basis of the following discussion and cross out (X) the box corresponding to the response.

1 - Extensive 2 - Semi-intensive 3 - Intensive

- **Extensive**

System where stocking rate ranges from 3,000 pcs to 5,000 pcs/ha for milkfish. 1-15 pcs/sq.m. for shrimps. The cultured species depend completely on natural food propagated in the pond with or without fertilization and depends solely on tidal water exchange.

- **Semi-Intensive**

Refers to a system where stocking rate ranges from 16-25 pcs./sq.m. for shrimps and from 5,001 to 20,000 for bangus and 40,000 to 80,000/ha for tilapia. This requires supplementary feeding of commercial pellets, trash fish, etc. aside from the natural food propagated in it. Water pumps are used aside from the tidal water and paddle wheels as aerators.

- **Intensive**

Refers to a system where ponds are smaller about 1,000 to 5,000 sq m; stocking rate ranges from for 26-40 pcs/sq.m. shrimps from 20,001 to 50,000/ha for bangus. The high stocking could only be supported through major inputs such as formulated feeds mostly in pellet form. Water exchange is done through pumps and paddle wheels are also needed for aeration purposes.

2.5 Culture System

Culture system refers to production practices applied. Ask the culture system by referring to the intention of the operator on the number of species stocked at a time. Mark an “X” the box of the appropriate answer and specify, if *Others*.

1 - Monoculture 2 - Polyculture 3 - Others

- **Monoculture**

Refers to the culture of single species in one compartment.

- **Polyculture**

Refers to the culture of two or more species in one compartment.

- **Others**

Refers to other culture systems not classified above. Included here may be Alternate culture system and others.

Alternate culture system refers to crop rotation of two species, (e.g. interchanging bangus and prawn crops). For instance, bangus will be cultured from November to March followed by prawns from May to October.

III. PRODUCTION INFORMATION

The Production Information block gathers information on the area harvested, production and price for each species harvested for two (2) quarters.

For the succeeding table, enter the reference quarters in the space provided for in the table heading. Allocate one row per species harvested, including the natural entry species.

Col 1 Line Number

Line number aids filling up of rows.

Col 2 Species

Enter the species and the corresponding species code. The following are the species code:

- | | |
|--------------------------------------|---|
| 01 - Milkfish (<i>Bangus</i>) | 13 - Sergeant fish (<i>Dalag dagat</i>) |
| 02 - Tiger Prawn (<i>Sugpo</i>) | 14 - Shovel-nosed lobster (<i>Tsinelas</i>) |
| 03 - Tilapia | 15 - Siganid (<i>Samaral</i>) |
| 04 - Carp (<i>Carpa</i>) | 16 - Snapper (<i>Maya-maya</i>) |
| 05 - Catfish (<i>Hito</i>) | 17 - Spiny lobster (<i>Banagan</i>) |
| 06 - Cavalla (<i>Talakitok</i>) | 18 - Surgeon fish (<i>Labahita</i>) |
| 07 - Endeavor prawn (<i>Suaje</i>) | 19 - White shrimp (<i>Puting hipon</i>) |
| 08 - Grouper (<i>Lapu-lapu</i>) | 20 - Freshwater prawn (<i>Ulang</i>) |
| 09 - Mud crab (<i>Alimango</i>) | 21 - <i>P. Vannamei</i> |
| 10 - Mudfish (<i>Dalag</i>) | 22 - Sea Urchin |
| 11 - Pomfret (<i>Pampano</i>) | 99 - Others (<i>Specify</i>) |
| 12 - Seabass (<i>Apahap</i>) | |

Write the specific species classified under *Others*. Indicate “NE” for natural entry species.

Col 3 Quantity Stocked

Ask the usual quantity stocked in '000 pieces of fry/fingerlings and record the response in one (1) decimal place.

Ask the information for columns 4 – 6 based on the reference quarter printed above it.

Col 4 Area Harvested

Ask the area of the aquafarm harvested during the reference quarter and enter in four (4) decimal places. Refer to the following helpful conversion guides.

$$\text{Area (Hectare)} = \frac{\text{Area (Square Meter)}}{10,000}$$

$$\text{Area (Hectare)} = \frac{\text{Length (Meter) X Width (Meter)}}{10,000}$$

If the culture system is Monoculture, i.e, Item 1.5 is 1, enter area corresponding to the species stocked. If the species is natural entry, do not indicate an area. If the culture system is Polyculture, i.e, Item 1.5 is 2, allocate the area harvested among the species stocked according to stocking proportion.

Col 5 Production

Ask the production of the species during the reference quarter. Enter the reported production in three (3) decimal places, hectare unit. One (1) metric ton is equivalent to 1,000 kilograms.

Col 6 Price/Kg

Ask the price per kilogram of the harvested species. Price is the amount received from the first point of sale. Record price in two (2) decimal places, peso unit.

COLS 7 - 9

Follow the same filling up instructions of Columns 4 - 6, however, referring to the indicated quarter.

IV. REMARKS

Indicate some notes related to the operation that will help explain the information given. Comments about stocking density, existence of pests and diseases, etc., may be included.

NAME OF ENUMERATOR/DATE ACCOMPLISHED

Print the name and signature of the enumerator and the date the interview was undertaken.

NAME OF EDITOR/DATE EDITED

Print the name and signature of the editor and the date the questionnaire was edited.

5.3 AqPS FORM 2. AQUACULTURE PRODUCTION SURVEY (OYSTER, MUSSEL AND SEAWEED)

This form is applicable for oyster, mussel and seaweed aquafarms.

I. SAMPLE IDENTIFICATION

Refer to filling up instructions in Item 5.2

II. AQUAFARM INFORMATION

2.1 Aquafarm Area

Ask the total area of the sample aquafarm in hectare unit and enter in four (4) decimal places.

2.2 Aquafarm type

Cross out (X) the box corresponding to the type of aquafarm operation.

1 - Oyster 2 - Mussel 3 - Seaweed

- **Oyster**

An aquafarm involved in the cultivation of oyster in shallow brackish or marine areas by any method for production purposes.

- **Mussel**

An aquafarm involved in the cultivation of mussel in shallow brackish or marine areas by any method for production purposes.

- **Seaweed**

An aquafarm involved in the cultivation of seaweed in suitable water areas by any methods with appropriate intensive care for production in commercial quantities.

2.3 Culture System

Culture system refers to method of production of oyster, mussel and/or seaweed.

. If Others, specify.

A. Oyster/Mussel

1 - Staking 2 - Hanging 3 - Spreading 4 - Others

- **Stake Method "Tulus"**

A culture method where bamboo poles either whole or halved are driven into the bottom where the water is not less than 1 meter deep during the lowest tide. These are aligned and spaced at 1 to 2 feet. The bamboo poles act as collectors.

- **Hanging Method "Bitin"**

An off-bottom method of culture that is suitable in relatively deeper waters of at least 2.5 meters depth during the lowest tide. Empty oyster shells or coconut shells are used as collectors. The shells are hung to a meter of no. 10 galvanized iron wire having a space of about 4 inches by a loop on the wire.

- **Spreading Broadcast Method "Sabog"**

This culture method makes use of stones, gravels, empty oyster shells, and other media as collectors. These are positioned in hard bottom areas where natural populations of oysters/mussels are known to occur.

B. Seaweed

1 - Bottom 2 - Floating 3 - Triangular 4 - Others

- **Bottom Monoline Method/Fixed Bottom Monoline**

Monolines are constructed by the use of mangrove post or wooden stakes anchored/staked deep into the substrate at 10 meters apart and 32-cm. interval in rows. The seaweed planting materials (seed) or cuttings are tied to the nylon monolines at 20-25 cm intervals using soft plastic materials. The monolines are stretched and tied to the stakes at 0.3-0.5 meter away from the bottom during low tide. A culture method where bamboo poles either whole or halved are driven into the bottom where the water is not less than 1 meter deep during the lowest tide. These are aligned and spaced at 1 to 2 feet. The bamboo poles act as collectors.

- **Floating Monoline**

A method where a raft or longlines can be constructed in any way feasible as long as it will buoy up the line with plants, which are at least 30-cm. submerged in water. The lines with plants are stretched with the raft/longlines. The raft/longlines should be anchored either at the bottom with a stone or tied to a bamboo pole. The lines used is the same as that used in fixed bottom monoline (for shellfish/seaweed)

- **Triangular**

This method uses polyethylene rope #12 as cultivation line fixed five meters from the bottom through a wooden stake embedded firmly to the seabed. A rope of smaller size (#7) is used to construct a triangle. A float using float ball or empty plastic container is provided at the triangle's tips to add more buoyancy. The seedlings are planted at the side of the triangles at 30 centimeters apart.

III. PRODUCTION INFORMATION

Refer to filling up instructions in Item 5.2.