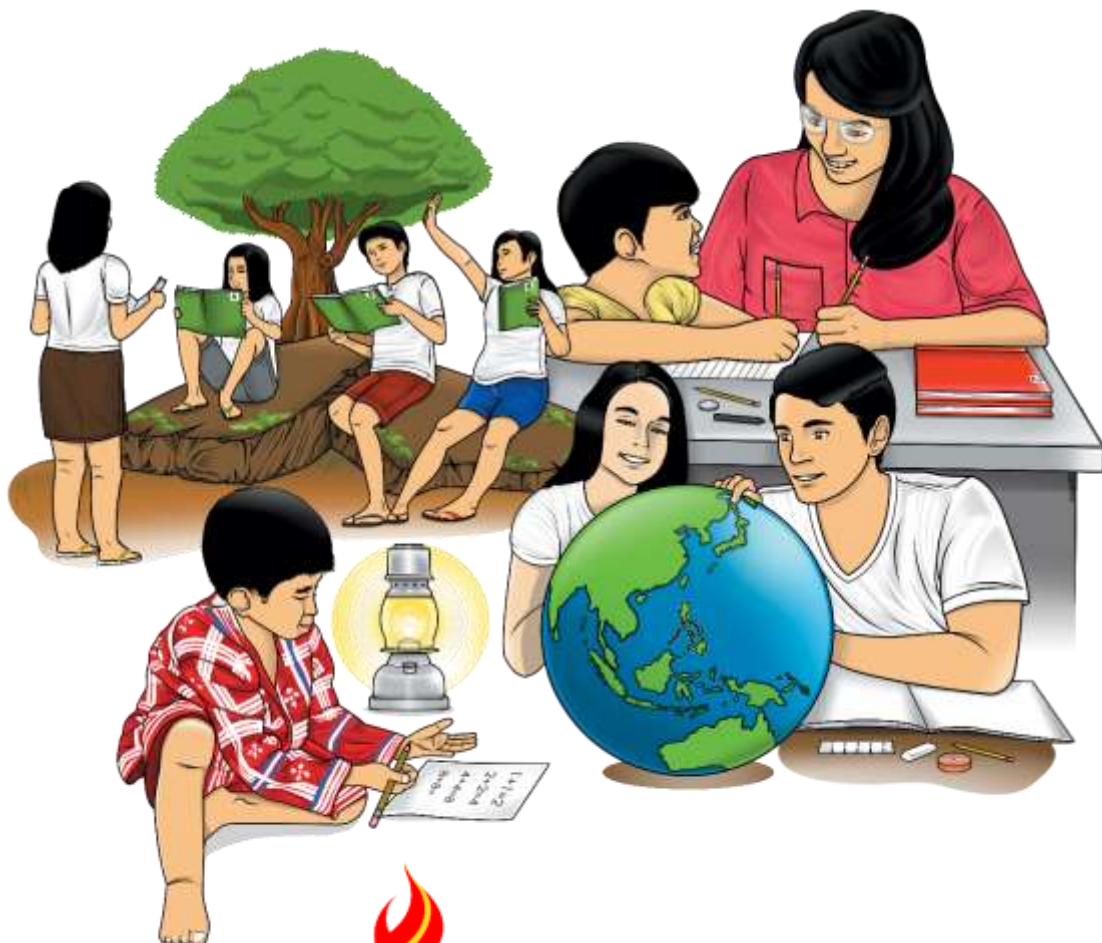


Technology and Livelihood Education

AQUACULTURE

Quarter 1 – Module 4:
Draw and Layout Ponds
(Exploratory Course)



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7/8

**Technology and
Livelihood Education
AQUACULTURE
Quarter 1 – Module 4:
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(Exploratory Course)**

Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.



What I Need to Know

This module covers the knowledge, skills and aptitude required in drawing a lay-out plan for ponds.

After going through this module, you are expected to:

1. identify different ponds compartment;
2. determine scaling procedures; and
3. draw lay-out of different pond designs according to established procedures.



What I Know

Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. Why are fishpond layouts drawn to scale?
 - a. To lessen labor exerted in the construction.
 - b. To show the layout in a smaller space.
 - c. To show all the compartment units of a fishpond project.
 - d. To display the common accessory units of a fishpond.
2. What type of fishpond layout that has one sluice gate and long water supply canal which supplies the different compartment?
 - a. Conventional
 - b. Radiating
 - c. Progressive
 - d. Specialize
3. What fishpond unit is intended for rearing fingerlings to marketable size?
 - a. Transition pond
 - b. Nursery pond
 - c. Rearing pond
 - d. Brood pond
4. Which among the fishpond units is used as a water reservoir?
 - a. Head pond
 - b. Catching pond
 - c. Rearing pond
 - d. Transition pond

5. Which is intended for the confinement of breeders?
- a. Breeding pond
 - b. Rearing pond
 - c. Head pond
 - d. Hatching pond
6. In brackish water fishpond, where should fingerlings be acclimatized?
- a. Transition pond
 - b. Rearing pond
 - c. Catching pond
 - d. Nursery pond
7. The following are the advantages of pond layout, except.
- a. easy control of pond water
 - b. low productivity
 - c. artificial feeding can be conducted easily
 - d. easy eradication of fish pests and predator.
8. It consists of one sluice gate, long supply canal and a secondary gates provided to different compartments of progressively increasing number.
- a. Radiating pond
 - b. Conventional pond
 - c. progressive pond
 - d. specialized pond
9. How many percent of the Total production area will be allocated for the nursery pond?
- a. One percent
 - b. 80 percent
 - c. 10 percent
 - d. 20 percent
10. This can be reduced or enlarged by certain amount.
- a. Value
 - b. Scale
 - c. map
 - d. pond

Lesson

1

Draw and Layout Ponds



What's In

Let's try if you can still remember what you learned about your previous lesson. Choose the letter of the best answer. Write the chosen letter on your test notebook.

1. The total weight of 30 pcs fish samples is 900g, what is the average body weight of fish?
A. 30 g
B. 25 g
C. 50 g
D. 60 g
2. How many kilograms are there in 1 ton?
A. 10,000 kg
B. 1,000 kg
C. 100 kg
D. 10 kg
3. What do you call this preventive measure in which to increase alkalinity of the ponds and improve aquatic organism survival, optimize growth and ensure desirable water quality?
A. liming
B. feed formulation
C. sampling
D. computation
4. Mixing together various ingredients at the right proportion to produce a nutritionally balanced diet is a process called _____.
A. liming
B. feed formulation
C. sampling
D. computation
5. What is the neutralizing value of lime (NVL) for agricultural lime?
A. 1.73
B. 1.35
C. 1
D. 1.5



What's New

One of the growing industries in our locality is aquaculture. Are they successful? If yes, how? Are preparation and construction of ponds essential in their success in farming? Do layouts of the ponds contribute to its success?

The following information will provide you basic knowledge in different layouts of the pond system.



What is It

Fishpond Layout and Design

Fishpond is an artificial body of water surrounded by dikes and with accessories such as gates, pipes and canals to facilitate water supply management.

Fishpond designs must be simple and functional. The style of compartments or units of a fishpond project should be based upon the nature and quality of water supply and the species of fish to be cultivated.

Common Units of a Fishpond

In making a fishpond lay-out, consider the following compartment units and other accessories needed.

1. **Nursery pond (NP)** – for the rearing of fish fry to fingerlings size.
2. **Transition pond (TP)** - for the storage or acclimatization of fingerlings. It is located adjacent to the nursery pond in order to have an effective and easy transfer of fry. Its pond bottom is constructed a little bit lower than that of the nursery pond.
3. **Rearing pond (RP)** – for raising fingerlings up to marketable size. It is the largest compartment in the pond system. It is also a grow-out pond.
4. **Breeding pond** – for confining breeders.

5. **Hatching pond** – for depositing eggs until these are hatched.
6. **Catching pond (CP)** – for confining and catching fry, fingerlings and fish of marketable size. It is constructed at the gate inside the pond where it is intended to be used.
7. **Head pond** – for storing reserve water.
8. **Feed pond** – for producing food such as lab-lab, lumut or plankton. In fishpond areas where natural foods do not grow well and supplementary feeding is necessary, one of the RP's or NP's could be utilized as a feed pond. It should be a separate compartment ideally located near the pond where supplementary feeding is intended.
9. **Water supply canal** – for supplying water to the different compartments

Scaling Procedure

After knowing the basic units in fishpond lay-out, one must have a knowledge on how to scale the actual measurement of the area to a piece of paper.

A scale is the relationship between the physical object and the feature that represents it on a map. It can be reduced or enlarged by a certain amount.

Examples of a scale are 1:10m, 1:100m, 1:1000m, etc.

In the scale, the value of 1 represents the ratio of map (in meter) to the 10m, 100m, or 1000m distance in the ground.

Problem 1: If 1 cm on a map represents a distance of 25 km, what is the approximate distance of a length represented by 2.7 cm?

We can set up a proportion to show:

$$\frac{1 \text{ cm}}{25 \text{ km}} = \frac{2.7 \text{ cm}}{x}$$

Solving the equation for x, we get $x = 25 (2.7) = 67.5 \text{ km}$.

Types of Improved Freshwater Fishponds Layout

1. **Conventional** – consist of one sluice gate and long water supply canal. This supplies the different compartment

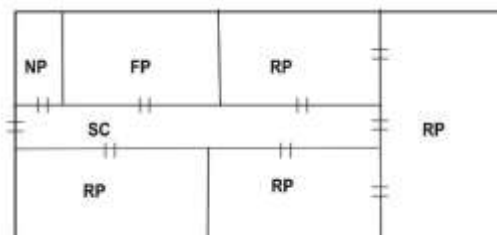


Fig. 1 Conventional Type (After

Denila,1976)

2. **Radiating** – have one sluice gate; wide and short supply canal; and secondary gates in the different compartments.

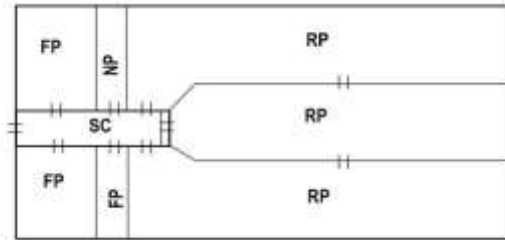


Fig. 2 Radiating Type (After Denila,1976)

3. **Progressive** – consist of one sluice gate; long supply canal and a secondary gates provided to different compartments of progressively increasing areas.

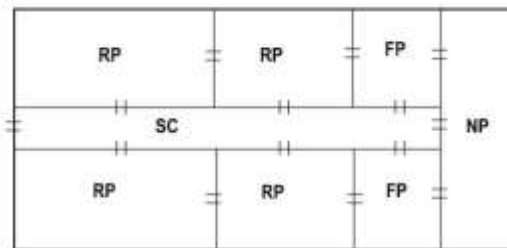


Fig. 3 Progressive Type (After Denila,1976)

4. **Specialized** – has one sluice gate; one or two drainage gates. Two secondary gates compartment; and a large supply and catching canal/pond.

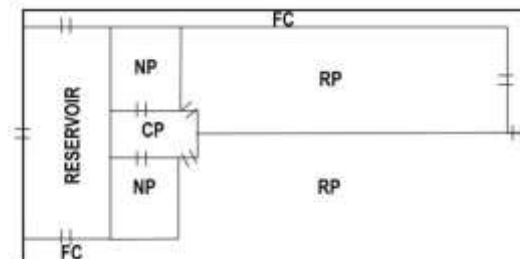


Fig. 4 Specialized type (After Denila,1976)

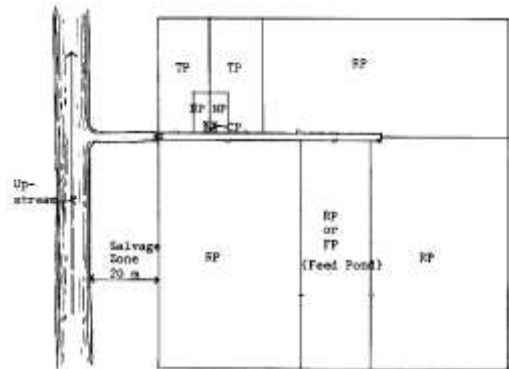
Advantages of the Improved Types of Layout

1. Easy control of pond water.
2. Easy eradication of fish pests and predators.
3. Easy means of cropping.
4. Pond bottom cultivation can be done when desired.
5. Artificial feeding can be conducted easily when resorted to after the natural food of fish has been consumed.
6. High productivity.

Lay-out Specifications for Brackish water Fishpond Systems

A. Conventional Pond System -

The NP comprises about 1% of the total production area (TPA). The TP comprises about 9% of the TPA. The RP comprises about 80% of the TPA. The CP intended for a NP and TP must be at least 2% of the compartment's watered area and 1 to 1½ if it is intended for the RP.



Source:
<http://www.fao.org>

Fig. 5 Conventional (After Alcantara, 1982)

A one hectare lay out of a conventional pond system with the following specifications:

Area = 1,000 m²

NP = 1% of the total production area

TP = 9% of the production area

RP = 80% of the production area

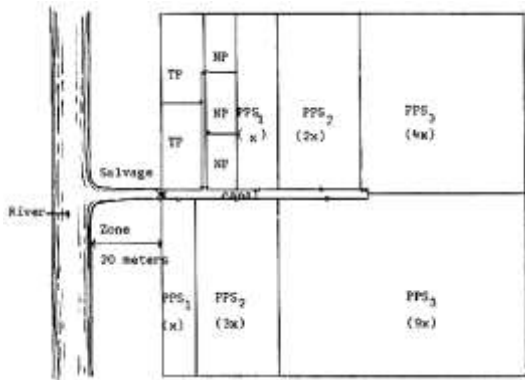
CP = At least 2% of the NP

NP = 10,000 x 1%
 = 10,000 x 0.01
 = 100 m²

RP = 10,000 x 80%
 = 10,000 x 0.80
 = 8,000 m²

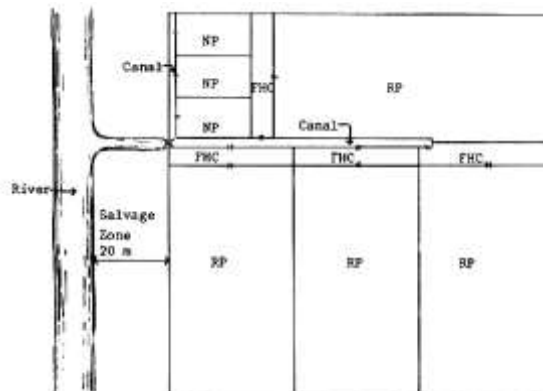
CP = 100 x 2%
 = 100 x 0.02
 = 2 m²

B. Modular Pond System. The NP comprises about 4% of the TPA. The TP covers only 6% of the TPA. The RP is divided into three Production Process Sates (PPS). The main idea is to transfer the fingerlings to the next larger module.



Source: <http://www.fao.org/3/ac061e/AC061E35.gif>

Fig. 6 Modular Pond System
(After Alcantara, 1982)

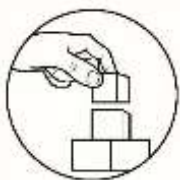


Source: <http://www.fao.org/3/ac061e/AC061E36.gif>

Fig. 7 Multiple Stock/ Harvest System
(After Alcantara, 1982)

C. Multiple Stock/Harvest system. There will be at least two (2) NP's comprising six percent of the total production area. A fish holding canal (FHC), which holds fingerlings when the rearing ponds are being prepared, covers at least 1% of each RP's area. It is connected to the RP in such a way that each RP will have a separate FHC. The RP covers up to 94% of the TPA including FHC. The general practice is to stock at different times, different size, and group of fingerlings and harvests the bigger one's selectively with the use of the gill net.

A fishpond system includes a pond water control facility such as dikes, gates and other support structures like water supply canal, drainage canal, flumes, pumps and aerators. These help regulate the flow of the water system.



What's More

Write down in your test notebook what is being asked in each item.

- Give at least five common units of a fish pond.
- List all the types of improved freshwater fish ponds layout.
- List all the layout specifications for Brackish Water fish pond system.



What I Have Learned

Answer the following items below using the skills and knowledge that you have learned.

1. Ponds layout may be grouped into:
 - a.
 - b.
 - c.
 - d.
2. Nursery pond (NP) is used for _____ the fry to fingerlings.
3. _____ is used for supplying water to the different compartments.
4. Rearing pond also called _____.
5. Parts of the water control structure are dikes, _____ and other ponds support structures such as water canals, drainage canals, flumes, etc.



What I Can Do

1. Survey an area where you can find an available space to put a possible aquaculture facility. Measure the area. With the use of a paper, pencil and ruler draw the area based on the scaling procedure.
2. From the given measurement, what possible fish pond layouts can be drawn? Illustrate your answer.



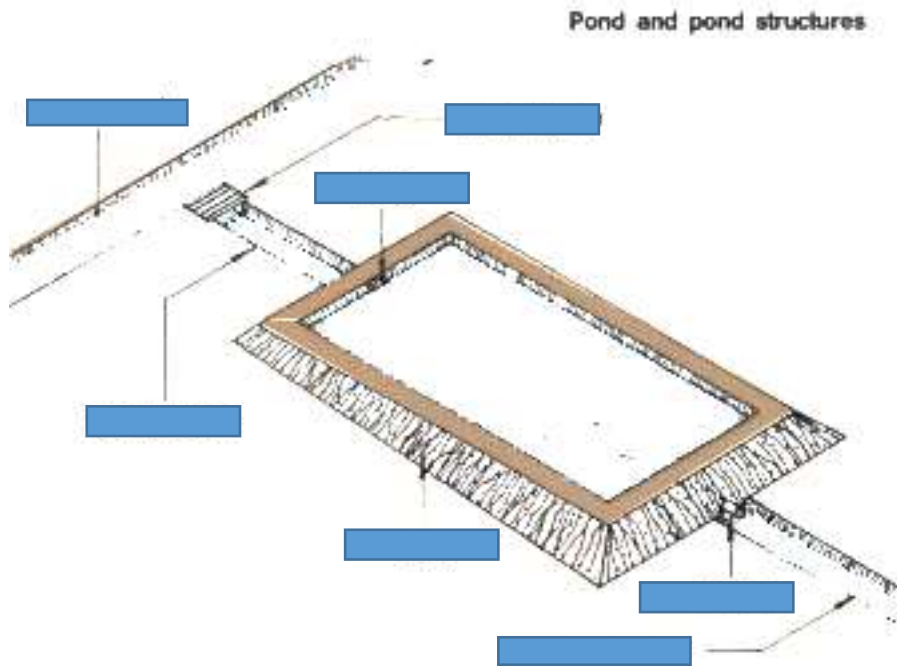
Assessment

- I. What Am I? Can you guess what I can be?
1. I am a compartment. This is where fish fry to fingerlings size can be reared. What am I?
 2. I am an artificial body of water surrounded by dikes, with gates, pipes and canals for water supply management. What am I?
 3. I am a pond lay-out where I have one sluice gate, wide and short supply canal, finally with secondary gates in different compartments. What am I?
 4. I am being reduced or enlarged by a certain amount of numbers. What am I?
 5. I am a freshwater pond lay-out with one sluice gate and long water supply canal. What am I?
- II. Identify the following terms. Write your answer on the space provided for.
- _____ 1. A brackish water pond system layout where nursery pond (NP) comprises about 4% of the transition pond area (TPA). The transition pond (TP) covers only 6% of the TPA.
 - _____ 2. What does FHC stand for?
 - _____ 3. It is where the eggs are being deposited until they hatch.
 - _____ 4. A brackish water pond layout where the general practice is to stock at different times, different size, and group of fingerlings and harvest the bigger one's selectively with the use of the gill net.
 - _____ 5. It is used for supplying water to the different compartments.
- III. Solve:
1. A rectangular pond is made using the scale of $1 \text{ cm}^2 = 10 \text{ m}^2$. If the area of the pond measures 3750 m^2 , what is the area of the rectangular pond if drawn to scale?



Additional Activities

Label the pond and pond structure.





Answer Key

What's I Know

B
A
A
A
C
A
A
A
A
A
A
A
A
B

What's In

A
B 5. A
A 4. B
A

What's More

Any five of the following:
Nursery pond
Transition pond
Rearing pond
Rearing pond
Breeding pond
Hatching pond
Catching pond
Head pond
Feed pond
Water supply canal
1. Conventional
2. Radiating
3. Progressive
4.

What I Can Do
Answers may vary

a.
conventional
b. radiating
c. modular/
progression
d. multiple
stock/harvest pond system
rearing water supply canal
grow-out pond gates
Assessmnl.
1. Rearing Pond
2. Fishpond
3. Radiating Pond
4. Scale
5. Conventional
II.
1 Modular pond
system
2. Fish Holding canal
3. Hatching Pond
4. Multiple
stock/Harvest System
5. Water Supply Canal
III.
275 m²

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