


BASIC CONCEPT OF FISHERIES

WALTER L. PACUNANA, MSc.

Faculty

Department of Fisheries Science

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- ▶ At the end of this discussion, the students are expected to:
 - ▶ Recognize Fishery and its importance
 - ▶ Discuss the history of fishery
 - ▶ Distinguish the branches of fishery
 - ▶ Identify the morphology of the fish




Test I. Multiple Choice

Direction: Write the correct answer before the number.

1. A science that deals with the study of fishes is called _____.
 - a. Aquaculture
 - b. Ichthyology
 - c. Biology
 - d. Fish culture

2. The human effort of raising the maximum productivity of fish and other fishery products to satisfy human needs is _____.
 - a. Fish Culture
 - b. Fish Capture
 - c. Fish Cultivation
 - d. Fish Propagation

- 
3. When fishes are imported or introduced into the country they are classified as _____.
 - a. Endemic or Indigenous
 - b. Native
 - c. Wild
 - d. Exotic

 4. A fishpond which is used by students in school is intended for:
 - a. commercial or business
 - b. recreational or enjoyment
 - c. educational and cultural or scientific pursuit

5. _____exists when the pond is overstocked and has lesser growth of natural food, a rivalry for food, space and oxygen.
 - a. Spawning
 - b. Competition
 - c. Fighting
 - d. Cannibalism

6. When is the event of evident regular eating of fresh water fish?
 - a. 41,000 years ago
 - b. 42,000 years ago
 - c. 37,000 years ago
 - d. 38,000 years ago

7. Carved painting in the _____ was supported the evidence that fishing was occurring in the early ages.
 - a. Stone
 - b. Cave
 - c. Wood
 - d. Artefacts

8. In what ancient country is famously known as the sea-side settlers and heavily dependent to fishing?
- a. Egypt
 - b. Macedonia
 - c. Persia
 - d. China
9. In ancient times, for a larger catch of fish, fishermen used _____.
- a. Fish Net
 - b. Small Net
 - c. Gill Net
 - d. Fin Net

10. Except primarily for food, fishing is used as _____ activity.

- a. Leisure
- b. Professional
- c. Physical
- d. Recreational

11. It deals with the scientific method of catching fish.

- a. Fish Catching
- b. Fish Capture
- c. Fish Harvesting
- d. Fish Hunting

12. It deals with the scientific method of preserving fish and other aquatic products to prevent spoilage.

- a. Fish Preservation
- b. Fish Conservation
- c. Fish Reservation
- d. Fish Protection

13. It is defined as natural or artificial method of promoting or enhancing reproduction and survival of fish and other aquatic products.

- a. Fish Cultivation
- b. Fish Culture
- c. Fish Propagation
- d. Fish Reproduction

14. It is the rearing of fish and other aquatic products from very young stage like fry and fingerlings up to the marketable size.

- a. Fish Cultivation
- b. Fish Culture
- c. Fish Propagation
- d. Fish Reproduction

What is Fishery?

- ▶ An organized effort by humans to catch fish or other aquatic species
- ▶ Includes the processing and marketing as well protecting and conserving fish and other fishery product for sustainable use.

Fishery (Fisheries)

- ▶ Has a vital role in the life and progress of an economy.
 - ▶ Provide food which is the basic needs of mankind, yet not only sustain food and raw material but also employment opportunities
 - ▶ Source of livelihood which contribute to micro and macro community ;
 - ▶ supplying, sustaining food and fodder that are necessities of human to live,



Fishery (Fisheries)

- ▶ Has a vital role in the life and progress of an economy.
 - ▶ promoting the diplomatic relationship facilitated by trading system in local, national and international marketable surplus products,



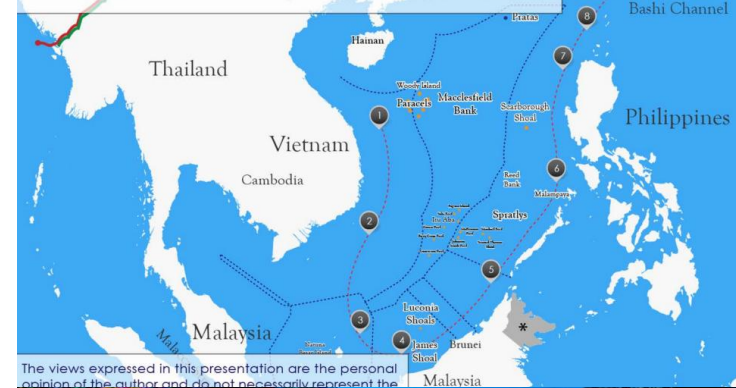
Fishery (Fisheries)

- ▶ Has a vital role in the life and progress of an economy.
- ▶ protect our environment and natural resources,



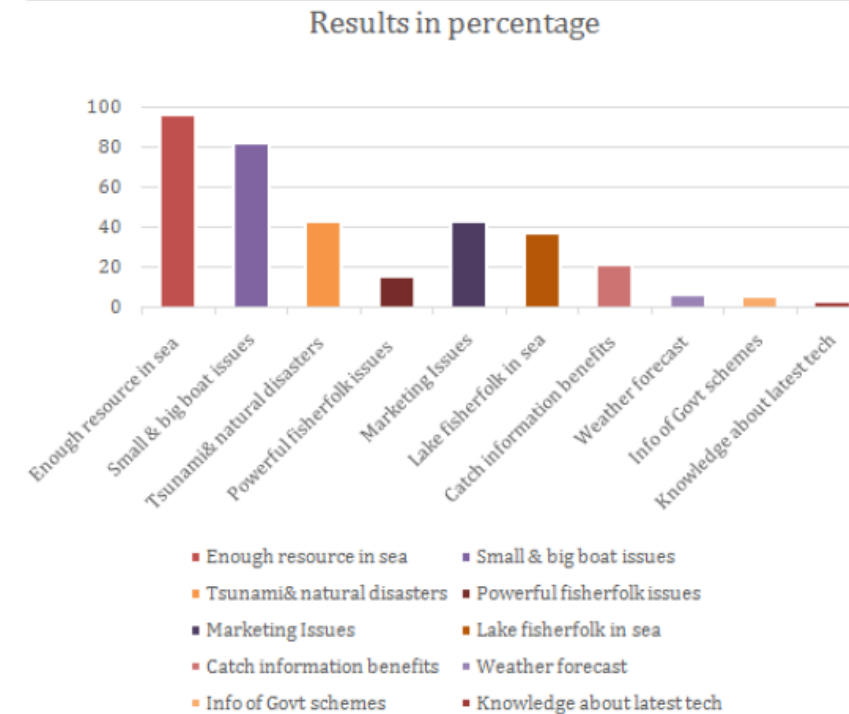
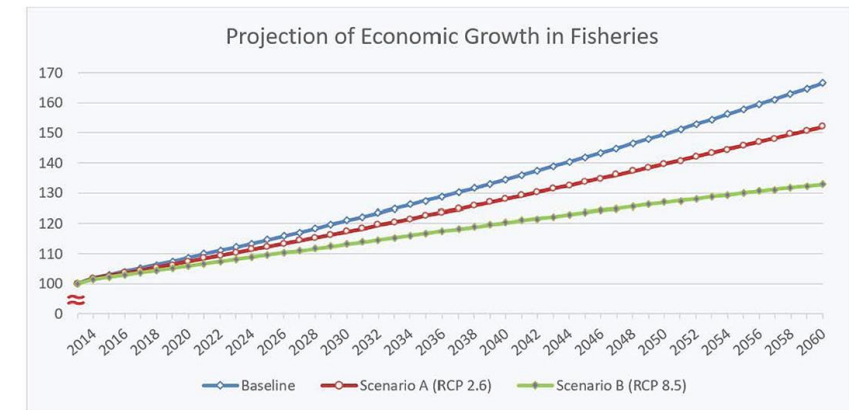
Defending Philippine Sovereign Rights in the West Philippine Sea

JUSTICE ANTONIO T. CARPIO



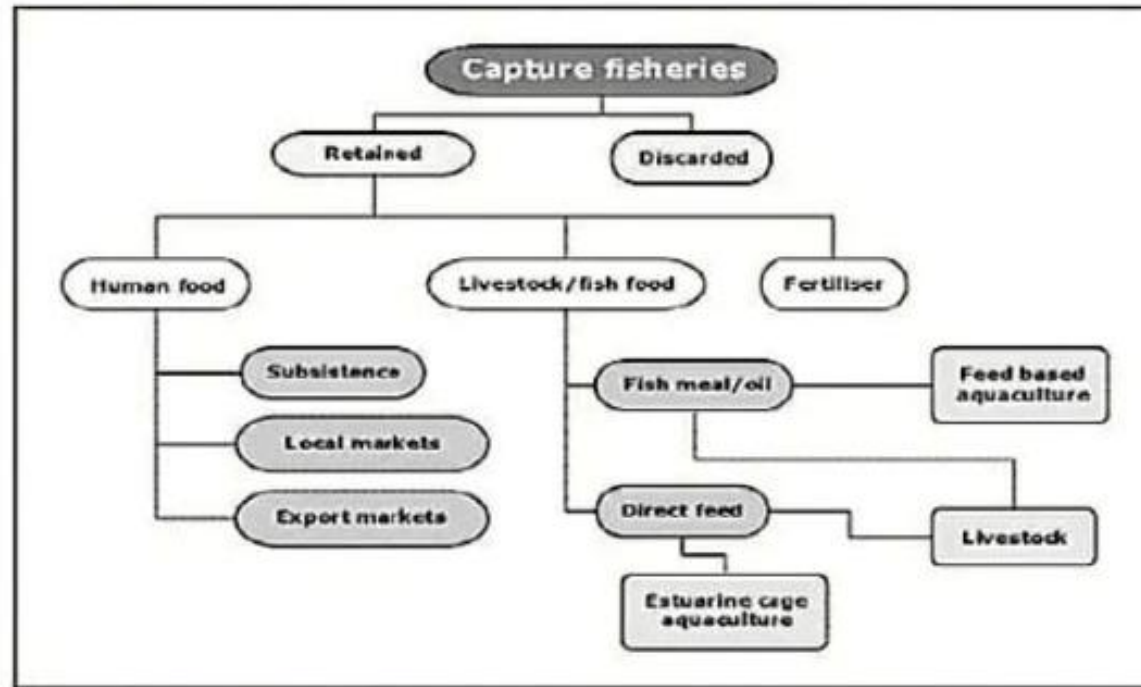
Fishery (Fisheries)

- ▶ Has a vital role in the life and progress of an economy.
- ▶ another source of savings of the entire national budget and basis of economic development of a country.



Value of Fisheries

VALUE OF FISHERY




WITHOUT FISHERIES.....

- ▶ Economy will be at high risk to food security

FISHERY (FISHERIES)

- ▶ The business of catching, handling, taking, marketing and preserving of the fish and other fishery products.

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- ▶ Fisheries are a cornerstone of global stability in 2026, serving as a critical pillar for food security, economic growth, and environmental resilience
 - ▶ Their relevance is defined by their role in feeding billions, providing millions of livelihoods, and acting as a primary indicator of ocean health

Global Food Security and Nutrition

- ▶ Fisheries are essential for meeting the nutritional needs of a growing global population, which is expected to reach approximately 9 billion by 2030
- ▶ **Protein Source:** Fish accounts for about 17% of global animal protein intake. In some developing and island nations, this figure can exceed 50%.
- ▶ **Essential Nutrients:** Beyond protein, aquatic foods provide critical micronutrients such as omega-3 fatty acids, iodine, zinc, and vitamins A, B, and D, which are often inaccessible through other affordable food sources.
- ▶ **Affordability:** For many low-income and coastal populations, fish remains the most accessible and affordable high-quality protein

Economic and Social Impact

- ▶ The sector is a major driver of the "blue economy," contributing significantly to national GDPs and individual livelihoods
- ▶ **Employment:** Fisheries and aquaculture directly or indirectly support the livelihoods of approximately **800 million people** worldwide.
- ▶ **Economic Value:** The total first-sale value of fisheries and aquaculture production reached an estimated **USD 472 billion** in recent years, with aquaculture now surpassing capture fisheries as the primary producer of aquatic animals.
- ▶ **Small-Scale Importance:** Small-scale and artisanal fisheries are vital for rural stability, contributing nearly half of the global catch and supporting 90% of the capture fisheries workforce

Environmental and Climate Relevance

- ▶ Fisheries are deeply integrated with ecosystem health and climate mitigation
- ▶ **Carbon Sequestration:** Sustainable fisheries management helps maintain fish biomass, which contributes to "blue carbon" sequestration, helping to mitigate climate change
- ▶ **ecosystem Indicators:** Healthy fish stocks are indicators of thriving marine ecosystems. Conversely, overfishing of top predators (like sharks or tuna) can trigger cascading negative effects throughout the food web.
- ▶ **Habitat Restoration:** Modern fishery initiatives increasingly focus on restoring critical habitats like mangroves, seagrasses, and coral reefs, which protect coastlines from storm surges and support biodiversity

Key Challenges

- ▶ **Overexploitation:** Approximately 37.7% of monitored marine stocks are fished at biologically unsustainable levels as of the most recent global assessments.
- ▶ **Climate Change:** Rising water temperatures and ocean acidification are shifting fish distributions and threatening the productivity of traditional fishing grounds, particularly in tropical regions.
- ▶ **Pollution and Habitat Loss:** Destructive fishing practices (e.g., bottom trawling, blast fishing) and plastic pollution (ghost gear) continue to degrade the essential fish habitats (EFH) that sustain populations

Aquatic Organisms

- ▶ Primarily categorized based on their habitat, mobility, and biological characteristics into three main ecological groups: **plankton**, **nekton**, and **benthos**.

Plankton (Drifters)

- ▶ organisms live in the water column but lack the ability to swim against currents. They typically inhabit the **photic zone** where sunlight is abundant.

Planktons

- ▶ **Phytoplankton:** Microscopic plant-like organisms (e.g., algae, diatoms, and cyanobacteria) that use photosynthesis to produce food, forming the base of most aquatic food webs.
- ▶ **Zooplankton:** Tiny animal-like organisms (e.g., protozoans, krill, and larval stages of larger animals) that feed on phytoplankton

Nekton (Swimmers)

- ▶ active swimmers capable of moving independently through water currents. They can be found in both sunlit and deep, dark zones of the water.

Nekton (Swimmers)

- **Vertebrates:** Including fish (sharks, salmon, tuna), marine mammals (whales, dolphins, manatees), and reptiles (sea turtles, crocodiles).
- **Invertebrates:** Including shrimp, squid, and octopuses

Benthos (Bottom-Dwellers)

- ▶ live on or near the bottom (benthic zone) of oceans, lakes, or rivers. Many are specialized scavengers or decomposers that feed on organic matter (detritus) sinking from above

Benthos (Bottom-Dwellers)

- **Sessile Organisms:** Animals attached to the floor, such as sponges, corals, and sea anemones.
- **Mobile Benthos:** Animals that crawl or burrow, such as crabs, lobsters, clams, and sea stars

Other Specialized Groups

- **Neuston:** Organisms that float or live directly at the water's surface, such as water striders or the Portuguese man o' war.
- **Periphyton:** Complex mixtures of algae and microbes that cling to submerged surfaces like rocks and plants.
- **Aquatic Plants (Hydrophytes):** Plants adapted to live in water, ranging from submerged (e.g., seagrass) to floating-leaved (e.g., water lilies) or emergent (e.g., cattails)

FISH

- ▶ Fish is approximately 34,000 species of vertebrate scaly-skinned animal, which swims and found in the fresh and salt waters of the world.
- ▶ Breathes under water because of their gills, absorbing the oxygen from the water to suffice the needs of body to live.
- ▶ Considered vertebrae being because they have a skeleton with a spine.



Relevance of fish and other aquatic organisms to humans

- ▶ **Human Nutrition and Health**
- ▶ **Economic and Social Impact**
- ▶ **Ecosystem Services**
- ▶ **Cultural and Scientific Importance**

Human Nutrition and Health

- ▶ **Essential Nutrients:** Fish are a primary source of high-quality animal protein, essential amino acids, and minerals like iodine, selenium, zinc, and iron. They are the most abundant dietary source of omega-3 fatty acids (EPA and DHA) and vitamin D.
- ▶ **Brain and Development:** Omega-3 fatty acids are critical for fetal and infant brain and eye development. In adults, regular fish consumption is linked to slower cognitive decline and a lower risk of Alzheimer's disease.

Human Nutrition and Health

- ▶ **Disease Prevention:** Eating fish twice a week can lower cardiovascular mortality by 36%. It also helps prevent asthma in children and reduces the risk of stroke, depression, and type 1 diabetes.
- ▶ **Global Food Security:** Over 3 billion people rely on aquatic foods for at least 20% of their animal protein. They are often the most affordable animal protein for low-income populations

Economic and Social Impact

- ▶ **Employment:** The fisheries and aquaculture sectors support the livelihoods of approximately 800 million people globally.
- ▶ **Trade:** Fish are among the most highly traded food commodities globally. They generate significant foreign exchange for many developing nations.
- ▶ **Recreation and Tourism:** Activities like angling, scuba diving, and fish watching contribute billions to local economies

Ecosystem Services

- ▶ **Climate Regulation:** Aquatic organisms like phytoplankton and certain fish contribute to carbon sequestration by storing carbon dioxide in the ocean floor or through excretion
- ▶ **Nutrient Cycling:** Aquatic microbes and animals recycle essential nutrients like nitrogen and phosphorus, maintaining the productivity of water systems.
- ▶ **Biological Control:** Some fish are used to control pests, such as those that eat mosquito larvae to reduce the spread of diseases like malaria

Cultural and Scientific Importance

- **Heritage:** For many coastal and indigenous communities, fish are symbols of prosperity and central to spiritual life and traditional practices.
- **Industrial Materials:** Aquatic by-products are used for diverse non-food materials, including jewelry (from scales/bones), lubricants (from liver), and medical treatments like burn dressings (from fish skin).
- **Research:** Aquatic organisms are essential for biological studies and scientific research

Branches of Fishery

- ▶ Fish Culture
- ▶ Fish Capture
- ▶ Fish Preservation

Fish Culture

- ▶ The human effort of raising the maximum productivity of fish and other fishery aquatic products and maintaining supply of these products to satisfy human needs.
- ▶ An art and science of raising, rearing and propagating of fish and other aquatic organisms under controlled or semi-controlled
- ▶ Primarily practice to support and sustenance of human needs for consumption.

Fish Culture

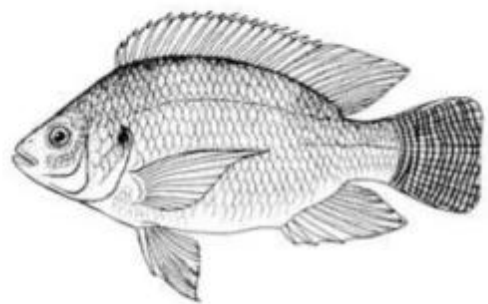
- ▶ Different confinements being used in aquaculture activities:
 - ▶ Pond
 - ▶ Pen
 - ▶ Cage
 - ▶ Tank
 - ▶ Aquarium

Three major phases of Fish Culture

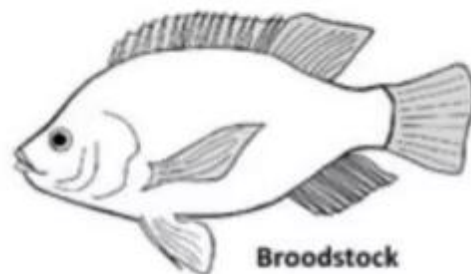
- ▶ Fish Propagation
- ▶ Fish Cultivation
- ▶ Fish Conservation

Fish Proagation

- ▶ The natural or Artificial Method of promoting or enhancing reproduction and survival of fish and other aquatic organisms.
- ▶ It includes keeping and maintaining and spawning breeders in tanks or ponds, hatching the eggs in hatchery facilities, and nursing the delicate larvae up to size suitable for stocking in the grow-out or rearing areas.



Adult tilapia (4 to 8 months)



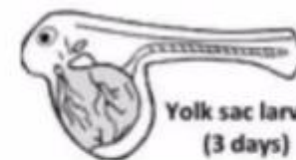
Brood stock

Broodstock



Fingerling

Fingerlings (10 – 20 g)



Yolk sac larvae (3 days)

Yolk sac Larvae (3 days)



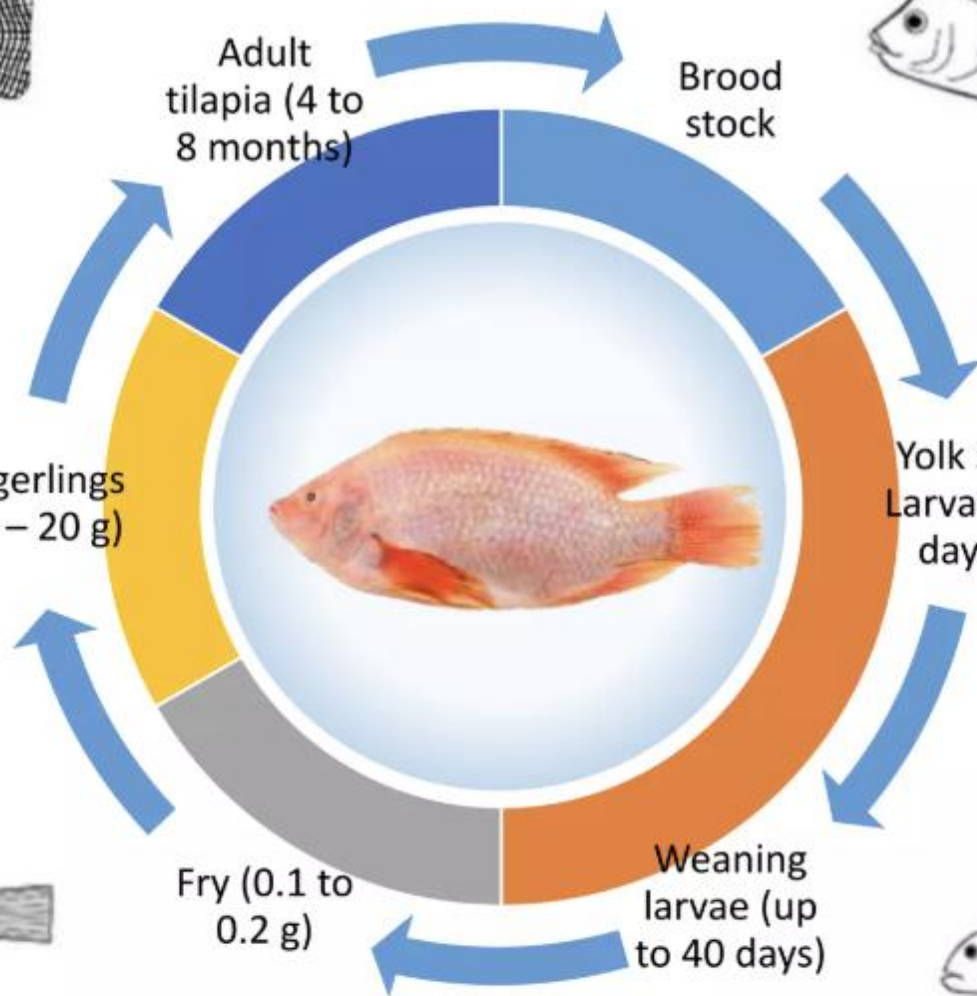
Fry

Fry (0.1 to 0.2 g)

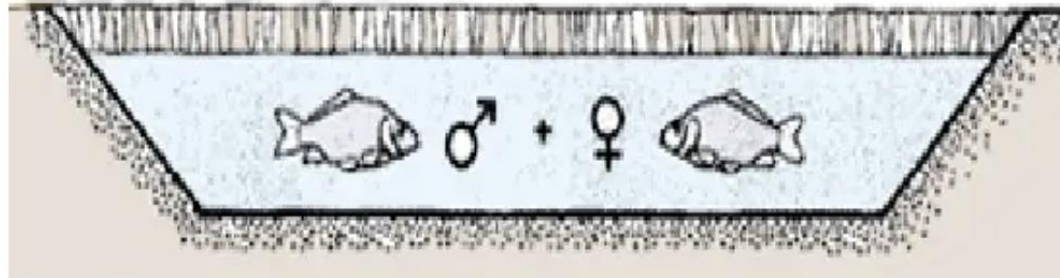
Weaning larvae (up to 40 days)



Weaning larvae

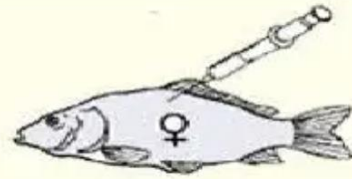


Male and female fish
are placed together
in a breeding area

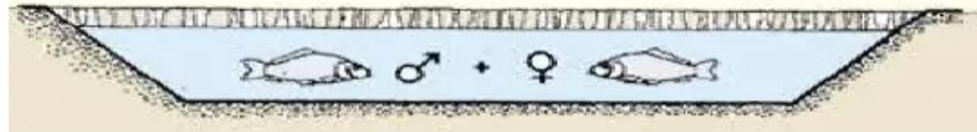


Natural Method

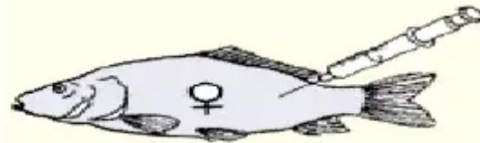
Female fish are given one chemical injection to induce spawning and then...



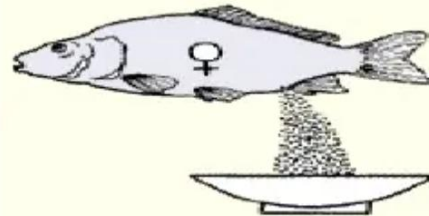
... both male and female fish are placed together in a breeding area



Female fish are given one or more injections to regulate the ripening of eggs



Ripe eggs are stripped from the female fish



Eggs are artificially fertilized with sperm from male fish



Artificial Method

Fish Cultivation

- ▶ The rearing of fish and other aquatic organisms from very young stage like fry and fingerlings, to marketable size.
- ▶ Done in fresh, brackish and marine waters in any of the rearing structures.

Fish Cultivation

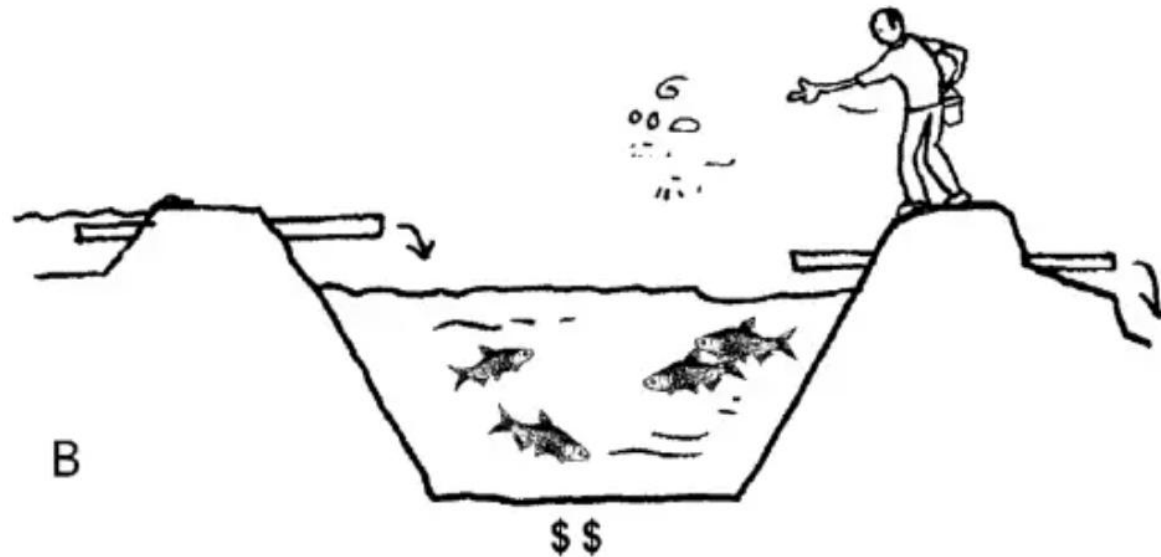
- ▶ Based on techniques and financial investments:
 - ▶ Extensive
 - ▶ Semi-intensive
 - ▶ Intensive

Extensive Fish Farming

- ▶ The fish feed is entirely dependent from the environment, which may be enhanced by the addition of the fertilizer or manure.

Semi-Intensive Fish Farming

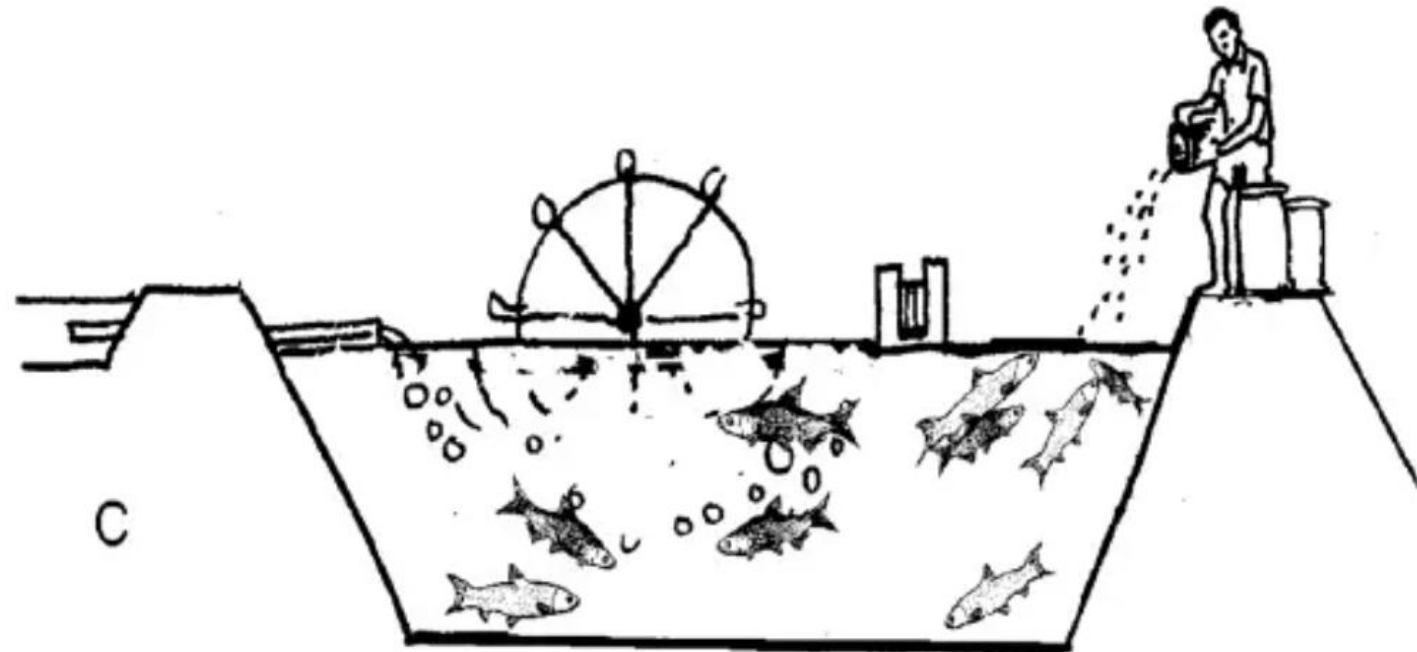
- ▶ The fish still obtain significant nutrition in the environment but they are also given supplementary feeds.



- Semi-Intensive Fish Farming

Intensive Fish Farming

- ▶ The fish are kept at too high stocking density to obtain significant amount of nutrition.



Fish Capture

- ▶ Branch of Fishery Science that deals with the scientific method of catching fish as well and the type of fishing gear used

Fish Preservation

- ▶ Branch of Fishery Science that deals with the scientific method of preserving fish and other fishery products to prevent spoilage.