APICULTURE AND AQUACULTURE WEEK 8: INTRODUCTION TO FISH FARMING: DEFINITIONS AND SCOPE OF AQUACULTURE

BY

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ETIMOLOGY OF AQUACULTURE

- The word Aquaculture comes from two Latin words, that is, “aqua” and “culture”

Where:

- the prefix aqua means water.
- The suffix culture means cultivation.

Definitions of aquaculture

- Aquaculture is the production of aquatic organisms under controlled conditions throughout part or all their lifecycle (USA Depart of Agriculture, 2024).

- The EU (2020)currently defines aquaculture as: ‘the rearing or cultivation of aquatic organisms using techniques designed to increase the production of the organisms in question beyond the natural capacity of the environment; the organisms remain the property of a natural or legal person throughout the rearing or culture stage, up to and including harvesting’.

Definitions of aquaculture continue ..

- According to the FAO (2015), aquaculture is defined as: 'The farming of aquatic organisms in both inland and coastal areas, implying some form of intervention in the rearing process to enhance production and individual or corporate ownership of the stock being cultivated'.

- Farming aquatic organisms– to fill the gap between nature's bounty and the hunger of people (Asfina and Duckworth, 2013).

Definitions of aquaculture continue ..

- The term aquaculture broadly refers to the cultivation of aquatic organisms in controlled aquatic environments for any commercial, recreational or public purpose. The breeding, rearing and harvesting of plants and animals takes place in all types of water environments including ponds, rivers, lakes, the ocean and man-made “closed” systems on land (National Oceanic and Atmospheric Administration, 2016).

IMPORTANCE OF FISH FARMING

1. Prevent over reliance and depletion of fish in the natural water bodies such as lakes.
2. It is a form of diversification of farming enterprises.

IMPORTANCE OF FISH FARMING

3. **Fish provides food to the farmer if grown on a small scale or natives if on commercial scale.**

4. It allows utilization of the, would be idle land e.g. parts of the farm that are water logged, low land or swamps.

IMPORTANCE OF FISH FARMING

5. It is a source of employment opportunities.

6. It earns foreign exchange to the country if the products are exported.

IMPORTANCE OF FISH FARMING

7. It can provide a compensation for the diminishing fish catches from the natural waters.

8. Ensures proper utilization of resources on mixed.

ADVANATGES OF FISH FARMING

1. Fish products have ready demand on the world market i.e. have ready market.
2. They are highly profitable fetching high income from a small area of land.
3. Fish growth can be regulated by the farmer e.g. giving extra feeds, safety etc.

ADVANATGES OF FISH FARMING

4. Provides an easy and cheap source of fish.
5. Reduces dangers associated with fishing in lakes and rivers.
6. Requires a small piece of land.
7. Less affected by pests and diseases compared to other livestock.

LIMITATIONS OF FISH FARMING IN UGANDA

- 1.nadequate research into commercially valuable fish species.
- 2. Limited experience among farmers in fish farming thus, poor management of fish farms.
- 3. High rates of pollution of the environment, including the sources of water for fish farming.

LIMITATIONS OF FISH FARMING IN UGANDA CONTINUE ….

4. Poor quality of fish seeds for commercial farming.
5. Inefficient equipment used in fish farming due to low levels of technology.
6. Competition with fish from natural water bodies for market.

LIMITATIONS OF FISH FARMING IN UGANDA CONTINUE ….

7. Inadequate supply of fish seeds to local farmers.
8. Strict environment regulatory laws that prohibit farming in swampy areas.
9. Poor storage and marketing facilities for fish and fish products leading to spoilage.

LIMITATIONS OF FISH FARMING IN UGANDA CONTINUE ….

10. Cultural beliefs which prohibit consumption of fish among some tribes.
11. Inadequate quality fish feeds in the market.
12. Inadequate funding for construction of ponds that are quite expensive for local farmers.
13. Diseases and predators that attack and kill fish reducing fish stock in the ponds.

History of aquaculture
(a) 500 B.C. - 500 A.D.

- This period can be considered the Golden Age of common carp culture which has continued to develop in China as well as in neighboring countries where the Chinese people migrated or have some form of foreign relations. Not only is actual progress attained in the techniques of culture but also scattered records of the culture systems were made during this period. At about this time in the Indian sub-continent, specifically during the period 321 to 300 B.C., the use of reservoirs to hold fish was first described.

History of aquaculture
(b) 618 to 906 A.D. (Tang Dynasty in China)

- The reign of the Tang Dynasty is particularly significant in the history of world aquaculture. The Tang emperor in China had the family name of Li which happened to be the common name of the widely-cultivated common carp.
- The Chinese people who were then at the time very much engrossed in fish culture as a source of food and livelihood, looked for other species of fish for pond culture. This resulted in the discovery of the silver carp, the big-head carp, the grass carp and the mud carp, all very suitable pond culture species.
- It was also found that when raised in poly-culture in the same pond, these species complement each other by eating different types of food and staying in different environmental strata within the pond. This led not only in the discovery of new species for culture but also in maximizing the productivity of freshwater pond culture.

History of aquaculture
(c)1906 to 1120 (Sung Dynasty)

- The initiative to collect fry of cultivable species seasonally along the rivers was started during the Tang Dynasty as a result of the prohibition decree on the common carp.
- Systematic fry collection and dispersal in natural waters was highly developed during following period under the Sung Dynasty, At about this time in India, the published work Namasollasa presented a compilation describing the fattening of fish in reservoirs.

History of aquaculture (d)1368 to 1644 (Ming Dynasty)

- It was during the Ming period that works describing the complete aquaculture process were detailed. Methods for culturing fry to adult, the structure of ponds, rearing density, polyculture, stocking/catching rotation, application of food and fertilizer and disease control were dealt with in aquaculture works during this period. In the year 1400 brackishwater aquaculture was recorded as having been started in Indonesia.

History of aquaculture
(e)1644 to 1911 (Ching Dynasty)

- During this period, further detailed description of fish culture methods were emphasized. This included fry production, season of occurrence of fry, differentiation and separation of fry and transport.

History of aquaculture continues…

- In Europe, aquaculture first began in Ancient Rome. The Romans, who loved sea fish and oysters, created oyster farms and adopted the Assyrian vivarium, a kind of ‘swimming pool’ where fish and crustaceans caught in lagoons were kept alive until it was time to eat them. These vivaria were built inside wealthier homes, where guests could choose the fish they wished to eat.

History of aquaculture continues …

- In the Middle Ages, throughout feudal Europe, the monastic orders and the aristocracy were the main users of freshwater fish vivaria, since they had a monopoly over the land, forests and water courses. Mussel farming was invented in the 13th century and the technique remained largely unchanged until the 1960s. As with hunting, poaching was severely punished and the less well-off would have to wait a few centuries before fresh fish was served on their plates.

History of aquaculture continues …

- Freshwater fish farming was further developed during the Renaissance. Several treatises were published, providing details on pond construction and management techniques, the choice of species to farm, their diseases and their diet. Carp dominated the artificial ponds of Eastern Europe. Emperor Charles IV ordered many such ponds to be built in Bohemia, what is now the westernmost region of the Czech Republic.

History of aquaculture continues …

- Artificial breeding was discovered in Germany during the Enlightenment, but it was not until the 19th century, an era of rapid industrialisation, that anyone paid much attention to it. In a hundred years, industry changed the European landscape. Pollution caused fish populations to diminish and dams and irrigation canals obstructed the migratory paths of some species, such as salmon.
- To combat this dramatic decline, artificial breeding research focused on trout farming, and researchers managed to master all stages of the process, from fertilisation to egg storage and transportation, pond farming and releasing fish into the wild.

History of aquaculture continues …

- During the first five decades of the 20th century, colonists introduced and then farmed other species of fish in the Anglo-Belgian colonies in Africa, whether forleisure fishing , to prevent the spread of malaria (using insect-eating species), or as a food source (tilapia for example).

- In the kibbutzim of Israel, farmers adapted traditional methods imported from Eastern Europe to the arid environment and developed new techniques, enabling them to achieve self-sufficiency in fish products.

History of aquaculture continues …

- In the late 1950s, the invention of artificial granulated food revolutionised fish farming, which until then had relied on products from agriculture and livestock farming (raw meat, for example), to feed the fish.

History of aquaculture continues …

- During the 1970s, marine species aquaculture enjoyed a revival, thanks to new, lighter, more hard-wearing and less expensive building materials (fibre glass, plastic tubes) and the use of floating cages rather than expensive glass and cast iron saltwater ponds. However, these new facilities turned out to be commercially non-viable and the optimisation and stabilisation of marine fish production was a major concern in the following decade.

History of aquaculture continues …

- The start of the 21st century saw aquaculture take on great importance worldwide. According to a report on fishing and aquaculture by the Food and Agriculture Organization of the United Nations (FAO) in 2016, “In terms of global production volume, that of farmed fish and aquatic plants combined surpassed that of capture fisheries in 2013”.

Status of the aquaculture sector in Uganda

- Uganda produces up to 15 000 tonnes of fish from aquaculture, including production from small-scale fish farmers, emerging commercial fish farmers and stocked community water reservoirs and minor lakes (FAO, 2024).
- There are an estimated 20 000 ponds throughout the country with an average surface area of 500 m^2 per pond. Production ranges between 1 500 kg per hectare per year for subsistence farmers to 15 000 kg per hectare per year for emerging commercial fish farmers.

Status of the aquaculture sector in Uganda

- With improved market prices for fish, government intervention for increased production and stagnating supply from capture fisheries, aquaculture has begun to attract entrepreneurial farmers seeking to exploit the business opportunity provided by the prevailing demand for fish. This recent expansion in aquaculture has also resulted in the transformation of 20 percent to 30 percent of the smallholder subsistence ponds into profitable small-scale production units through developments in management as well as scale of production. It is estimated that there are 2 000 such farmers who own nearly 5 000 ponds, with an average pond size of 1 500 m^2 per pond (FAO, 2024).

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