

Aquaculture sustainability

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Advantages and disadvantages of aquaculture

| SL | Advantages | Disadvantages |
|----|------------------------------|--|
| 1 | Food and nutrition security | Infrastructure affects biodiversity |
| 2 | Income generation/Livelihood | Untreated effluent adversely affects ecosystem |
| 3 | Enterprise development | Entrance of new pathogen through exotics |
| 4 | Export earning | Transfer of diseases and parasites from farm to wild |

Sustainable aquaculture

There are four conditions:

1. Technology should be sound
2. Technology should be environment friendly (less/no pollution)
3. Technology should be economically viable
4. Technology should be socially acceptable

Organic aquaculture

- Aquaculture intensification results in accumulation of high levels of antibiotics, residues of pesticides/ harmful chemicals and heavy metals causing a great damage to environment
Three 3 tons of wild fish is used to produce feed for the production of 1 ton of farmed fish which depletes the natural stock available in wild
- To increase production, fast growing exotic fish varieties are farmed which results in weakening of the native species and transfer of disease from farmed aquatic animals to wild fish
- Organic aquaculture is the only solution to increase fish production in sustainable and environment friendly manner
- This method of culture farms the aquatic organisms in condition similar to that of the natural environment
- As in case with the other forms of food production industries there is some consumer interest in organic aquaculture
- **Organic aquaculture is production of high quality foods in a stable aquatic ecosystem by managing the natural resources and environment without any negative effects and to secure the genetic diversity and richness of species in a native system**

Principles of organic aquaculture

The main principles of organic aquaculture are as follows:

- Monitoring of environmental impact
- Natural breeding procedures without use of hormones and antibiotics
- No use of inorganic fertilizers
- Integration of natural plant communities in farm management
- No synthetic pesticides and herbicides

- Feed and fertilizer from certified organic agriculture and fisheries
- Organic criteria of sustainability for fishmeal sources
- Absence of GMOs(Genetically Modified Organisms) in stocks and feed
- Stocking density limits
- Restriction of energy consumption (e.g. regarding oxygenation)
- Preference for natural medicines
- Processing in approved organic facilities

Weed based aquaculture

Concept:

- Refers to the use of some inputs from plant sources, eg., weeds or grasses or leaves or macrophytes like duckweeds, Azolla etc. as supplemental feed in fish production.
- These inputs are consumed first as feed by herbivorous fish and subsequently a part of the semi digested fecal matter of the macrophyte feeding fishes are consumed by the other fishes and the remaining part will be recycled in food chain as nutrients for primary production, thus they have potentiality to increase the total fish production of aquaculture system.
- Weed based system may be a good option as a low cost, environment friendly sustainable aquaculture technique in Bangladesh (Grover *et al.*, 2000).

| Sl. No. | Scientific name | Local name | Characteristics |
|---------|----------------------------|-------------------|---|
| 1 | <i>Azolla pinnata</i> | Azolla | The species is typically triangular measuring about 1.5 to 3.0 cm in length, 1 to 2 cm in breadth. Newly form leaves are green but aged leaves are brown in color. With roots. |
| 2 | <i>Spirodela polyrriza</i> | Sonapana | Leaves are flat or oval, 6-10.5 mm in length, 5-10 mm wide and 0.6-1.5 mm thick. Deep green above but with deep brown/reddish ventral. It contains 10-15 roots which are 10-40 mm long. |
| 3 | <i>Lemna minor</i> | Khudipana | Leaves are flat and elongated, like tamarind tree leaves, 3-4.5 mm in length, 2-2 mm wide and 0.2-0.3 mm thick. Deep green or green in color. It contains single root which is 10-15 mm long. |
| 4 | <i>Wolffia arrhiza</i> | Sujipana, Dimpana | Leaves are minute and rounded, 0.6-1.2 mm in length and 0.5-1 mm wide. Deep green in color and without roots. |