

INTEGRATED FISH-CUM-DUCK FARMING SYSTEM (LPM-610)



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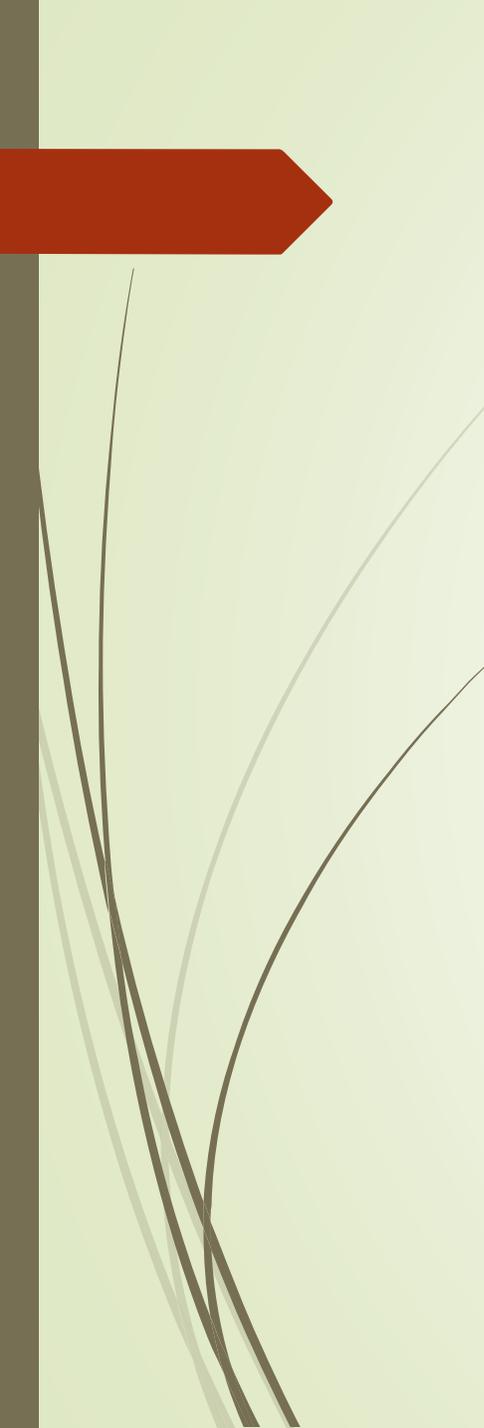
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Integrated Fish-cum-Duck Farming System

- The integrated fish farming practices can utilize the waste from duck farming for fish production.
- Animal wastes and waste feed particles that enter the food web of a pond ecosystem are utilized as a source of nutrients required for primary production.
- In an integrated fish culture animal wastes and undigested and spilt food particles are directly consumed by the fish and some portion of waste acts as nutrients and organic substrates for many micro-organisms consumed directly by fish or by invertebrate fish food organisms.

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- ▶ A fish pond being semi-closed biological system with aquatic animals and plants provide disease free environment for ducks.
 - ▶ Ducks are habituated to consume juvenile frogs, tadpoles and dragonfly etc. and thereby make a safe environment for fish.
 - ▶ Duck droppings provide essential nutrients go directly into the pond.
 - ▶ Droppings are good sources of carbon, nitrogen and phosphorus, which in turn stimulate growth of natural food organisms.

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- For fish-cum-duck integration, Khaki Campbell species of duck is recommended.
 - Local indigenous variety of duck from disease-free population a farmer can rear.
 - Pond bottom racking and swimming activity by ducks help in aerating the pond water.
 - Duck dropping contains 0.9% nitrogen and 0.4% phosphorous.
 - About 250-300 ducks are enough to fertilize a one hectare water spread.

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- Advantage: No loss of energy & fertilization is Homogenous.
 - Ducks move freely in screened places above water.
 - The fish-cum-duck integration system provides meat, eggs in addition to fish.
 - It generates production of additional food and income to the farmer.
 - Approximately 40-50 kg of organic wastes is converted into one kg of fish. .



Advantages of integrated fish-cum-duck farming:

- Ducks fertilize the pond by their droppings when given free range over the pond surface.
- Ducks have been termed as manuring machines for their efficient and labor-saving method of pond manuring, resulting in complete savings on pond fertilizer and supplementary fish feed which accounts for 60 percent of the total cost in conventional fish culture.
- Ducks keep water plants in check.

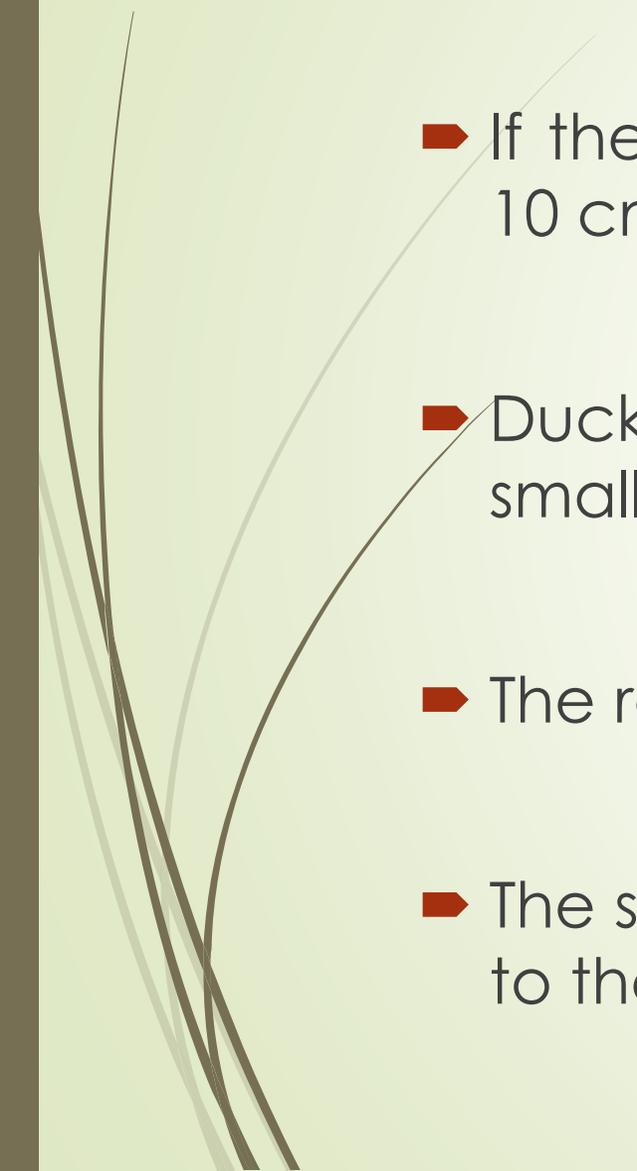
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- Ducks loosen the pond bottom with their dabbling and help in release of nutrients from the soil, which increase pond productivity.
 - Ducks aerate the water while swimming; thus they have been called biological aerators.
 - Duck houses are constructed on pond dikes; hence, no additional land is required for duck farming activities.
 - Ducks get most of their total feed requirements from the pond in the form of aquatic weeds, insects, larvae, earthworms, etc. They need very little feed and farmers normally give kitchen wastes, molasses and rice bran, for the purpose.



Selection and stocking of fish species

While selecting fish species following point are to be considered:

- The species combination ratio should be adjusted according to the amount of feed stuff and manure that are expected to be made available.
 - The species should be able to tolerate low oxygen levels and high organic content in the water.
 - Selected fish should be hardy and resistant to common diseases and parasites.
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- ▶ In a well prepared pond, fingerling of the size of 5–10 cm may be stocked.
 - ▶ If the pond is not poisoned or dewatered, larger size fingerlings 10 cm should be stocked.
 - ▶ Duck allowed in pond when fingerlings over 10 cm size, as the smaller ones are likely to be consumed by the ducks.
 - ▶ The recommended rates of stocking is 600 fingerling per 1000 m².
 - ▶ The species combination and stocking ratio may vary according to the condition of pond, local demand and possibilities.

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- A combination of six species viz, Catla (20%), Silver carp (20%), Rohu (20%), Mrigal (15%), Grass carp (10%) and Common carp (15%) may be stocked.
 - Grass carp should be feed with aquatic vegetations regularly before ducks are allowed to come out of the night shelter.
 - Four species combination of Rahu and Catla @ 30% each and Mrigal and Common carp @ 20% each or
 - Three species combination of Indian Major Carps Catla 40%, Rahu 30% and Mrigal 30% can also cultured.
 - Some alterations can be made on the stocking density and species ratio depending upon the pond conditions and availability of fish seed.

Recommended fish species combinations and stocking

| Trophic niche | Fish species | Stocking ratio (%) |
|---|--------------|--------------------|
| Surface feeder | Silver carp | 20 |
| | Catla | 20 |
| Column feeder | Rahu | 20 |
| Vegetative feeder | Grass carp | 10 |
| Bottom feeder | Mrigal | 15 |
| | Common carp | 15 |
| Total stocking | | 100 |
| Expected Fish yield (kg/acre/year) | | 500 |

Preparation of pond

- A productive pond is preferred for integrated fish culture.
- Considering rural conditions in our country, the smaller ponds can be used for integrated fish culture.
- Homestead ponds are suitable for this purpose.
- A pond of 0.5–1.5 bigha size is easily manageable by small farmers.
- Any ponds that retain 1.5 to 2 m water depth in dry season are considered as suitable.

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- If water depth goes below 1.5 m, the operation may face the danger of organic over-loading which may cause fish kills in the summer months.
 - At first pond selected for integrated fish culture is drained out and dried, then for basal fertilization cattle dung is used @ 500 kg per 1000 m².
 - After application of cattle dung to eliminate unwanted weed fish and other creatures poisoning done with application of mahua oilcake.
 - Then lime is applied @ 250-300 kg/ha for correction of pH and to make the pond favourable for fish culture.
 - After a gap of ten to fifteen days, fingerlings can be released after filling up the pond with water.

Selection of duck and their rearing

- ▶ Indian Runner, Khaki Campbell or their cross with indigenous local ducks are preferred for fish duck integration.
- ▶ To get a disease-free and good stock of duck, it is better to collect Khaki Campbell or Indian Runner duck from a Government Farm.
- ▶ Under intensive rearing system Khaki Campbell is able to lay above 300 eggs per year, weight of the eggs varies between 60 and 70 g.
- ▶ The female start to lay at the age of 24 - 28 weeks and able to continue laying until 360–380 days old.

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- 250-300 ducklings are stocked per hectare area of water body.
 - Annual manure production from duck excreta will be around 45-55 kg/duck/year, apart from that about 10-20% of feed offered to ducks is wasted which is directly utilized as fish food.
 - Duck dropping contains 81% moisture, 0.91% N and 0.38% P, which is good for fertilization of pond.
 - A pond receives 10,000 – 15,000 kg duck excreta per year when 250- 300 ducklings stocked per hectare.

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- Ducks are allowed free range in the pond in sunny part of day from 9.00 am to 5.00 pm.
 - Swimming and dabbling activities of ducks will mix voided excreta with pond water and it will sufficiently fertilize the water body.
 - Duck droppings voided in night at the night shelter can be collected and applied directly in different corner of fish pond in the morning hours.
 - If phytoplanktonic bloom is observed due to overloading of organic manure then application of duck droppings to the pond have to be suspended immediately.
 - Ducks get its required quantity of water from the fish pond and it keeps water plants in check.

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- Ducks act as a self manuring machine which helps in saving the expenditure involved in labour for applying manure in the pond.
 - Ducks get 50-75% of their total feed requirement from the pond itself in the form of aquatic weeds, insects, mollusks, etc.
 - One duck voided about 125-150 gm excreta per day.
 - So application of any type of organic or chemical fertilizer and feed to pond is not required for producing fish, which in turn cuts the fish production cost by 60-70%.



Duck night shelter

- Duck requires night shelter on the pond dyke or over the pond surface.
- It should be made with the help of locally available material such as bamboo cane, thatches etc.
- If duck night shelter is made over the pond surface, a small bamboo bridge is constructed from the duck house to dyke for feeding the ducks as well as for collecting eggs and duck from the house.
- Another bridge is constructed from the duck house to the pond surface.
- Duck house should be well ventilated and it should be exposed to direct sunlight.
- Peripheries of the pond are to be fenced for protection of ducks.

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- Ducks are kept in duck house providing about 0.3-0.5 m²/bird.
 - One male duck should be kept in every 5-6 female ducks to get fertilized eggs.
 - Duckling especially up to 3-4 weeks old are very susceptible to disease, hence, care should be taken during this period.
 - Day-old ducklings require brooding up to 2-3 weeks with a desirable temperature, feed, drinking water and space, after which they can be housed near the pond.

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- ▶ During the first week, 50–55 ducklings can be reared per sq.m. within a room having facility of heating, with a screen floor of 1–5 cm mesh, 2 mm gauge to allow manure and uneaten food to fall through it in the fish pond.
 - ▶ Pelleted starter feed can be provided in feeders, with supply clean water in water troughs which are designed to allow access to the beak only to prevent the ducks from getting wet.
 - ▶ Room temperature should be maintained around 30–32°C.
 - ▶ After the third or fourth day, ducklings are released in a small enclosure when weather is good weather.

Feeding of Ducks

- Mostly fine rice bran and poultry feed (layers mash etc.) are used as duck feed at the rate of 100-120 gm feed/day/duck.
- Duck feed should be stored at cool and dry environment to avoid growth mould producing aflatoxin.
- Inclusion of maize in duck feed may be avoided as it is rich in magnesium which will favour mould growth in moist environment.
- Apart from that Duck weeds (Lemna, Wolfia, Azolla etc.) are also fed to the ducks.

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- Duck also consume tadpoles, juvenile of frogs, dragon fly larvae and various other organic materials.
 - Further protein content in natural food organisms of the ponds consumed by duck is high.
 - Duck reared in fish ponds save the cost on protein substantially in duck feeds and gives more eggs in comparison to duck which are not allowed in fish ponds.
 - The left over feed given to the ducks and duck dropping fulfill 60- 65% of food requirements of farm fishes.
 - Sometime algal bloom may increase and then duck dropping should be stopped periodically by using plastic sheet at the bottom of the duck house and removed.

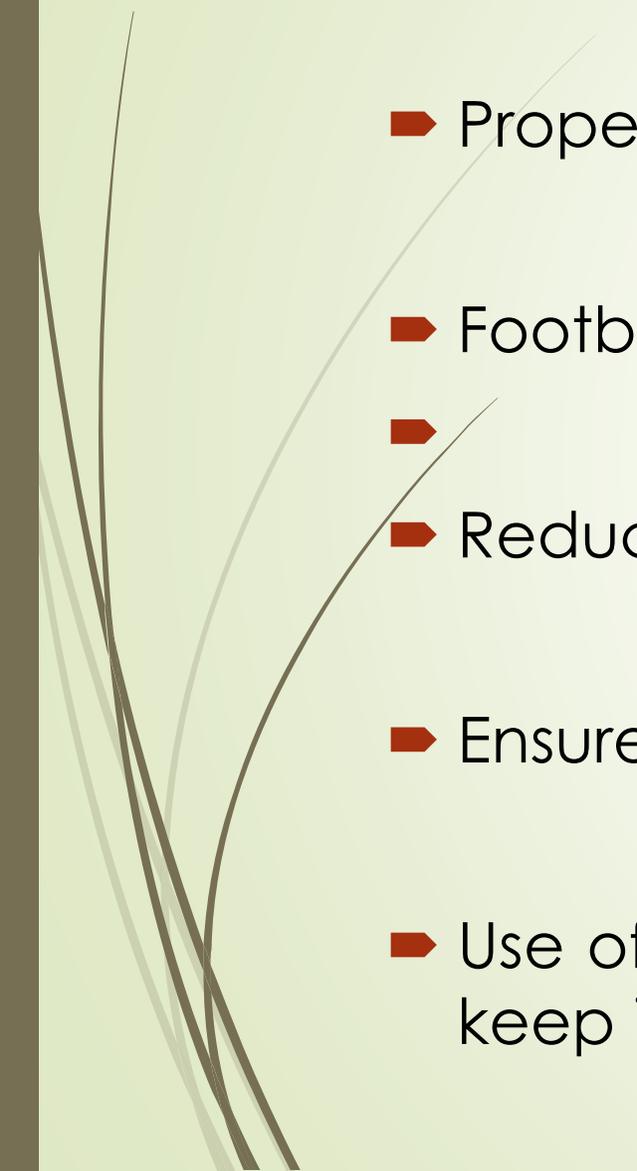
Health Cover

Means of disease spread through:

- Wet litter, Feed and water, Close contact, Contaminated equipment, Attendants and visitors, Air, External parasites, Free moving birds and Rodents and flies.

General Principles for Prevention of Diseases.

- Procure day old ducklings from disease free flock.
- Maintain proper hygienic conditions.
- Provide adequate feed, water and floor space etc.
- Rodents and wild birds etc should be prevented to enter the houses.

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- Follow regular vaccination schedule.
 - Proper disposal of dead birds.
 - Footbaths should be provided at the entrance of each shed.
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 - Reduce stress effect.
 - Ensure clean and adequate water supply.
 - Use of suitable litter material and periodical turning is essential to keep it dry.
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Feeding of Fishes

- In integrated fish-cum-duck farming, supplementary feeding to the cultured fish is not required as duck excreta helps in fertilizing the pond water to produce fish food organism - phytoplankton and zooplankton.
- 60% of operational cost of farming goes for feed alone. So, local availability of feed ingredients as well as their cost is important.
- Apart from that some fish like- common carp take duck dropping directly as their feed.
- But supply of feed to the herbivorous fish like- grass carp is required.
- They need to be fed with grasses like- Para grass, Napier or Hybrid Napier, banana leaves, chopped green cattle fodder etc.

Production of fish, egg and meat

- ▶ Through this integration, a production of 3500-4000 kg of fish, 17000-18000 eggs and 450-600 kg duck meat from a hectare of pond area in one year without any supplementary feed and chemical fertilizers can be obtained and the cost is turned down to 60% lesser than traditional practices.
- ▶ The system results in a net handsome amount of income in a year per hectare.



THANKS

