



A Study on “Ideological Model for Integrated Fish Farming” at Siddipet, Telangana State

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Abstract

Azolla is used as feed for fish, poultry, piggery, and used as a manure in paddy. The spirulina is used as feed for fish, which has high protein value. Products from poultry and duckery manure gets utilized in fish production and also used as fertilizer in paddy, meat, eggs and feathers gets exported for the preparation of cocks. Eggs from poultry and duck gets utilized in minute value as a feed. Pig manure is used as a fish feed and as a fertilizer in paddy. Antibiotics such as “INSULIN” can be obtained from pancreas of pig. Products from paddy such as rice bran is used as a feed for fish. The contaminated water from the pond gets utilized for paddy production so that we can produce pest free rice (organic rice). All the crops are integrated with each other. The feed is prepared with the products in the farm.

Keywords: Snake Trapping Pit; Integrated; Animal Husbandry Poultry; Pig; Weed

Introduction

Culturing of fishes along with aquaculture or animal husbandry is called integrated fish culture. With this culture no need for artificial feeding, we can use maximum utilization of natural resources, no additional cost took place, we can get single labor double income. Historical overview: First integrated aquaculture systems (IIA/rice-fish farming): China, 2000 years ago; India: about 1500 years ago; In the fifties of the 19th century integrated fish farming practices were transferred from China to Japan; Integrated aquaculture systems have been practiced in Russia since 1850 and in Madagascar since 1914. Integrated multi-trophic aquaculture (IMTA) provides the byproducts, including waste, from one aquatic species as inputs (fertilizers, food) for another. Farmers combine fed aquaculture (e.g., fish, shrimp) with inorganic extractive (e.g., seaweed) and organic extractive (e.g., shellfish) aquaculture to create balanced systems for environment remediation (bio mitigation), economic stability (improved output, lower cost, product diversification and risk reduction) and social accept-

ability (better management practices). In this culture we can integrate with each other and get double income. The Blue Revolution has improved accessibility and availability of farmed fish in some regions, therefore potentially improving food and nutrient security, especially in low-income nations and rural populations.

Integrated fish farming

Culturing of fishes along with agriculture or animal husbandry is called integrated fish farming.

Animal husbandry cum fish culture

Rearing of fish along with cattle, pig, duck and poultry is called animal husbandry cum fish culture.

Precautions to be taken

- Maintain bird trapping around the lake and grown of insectivorous plants.

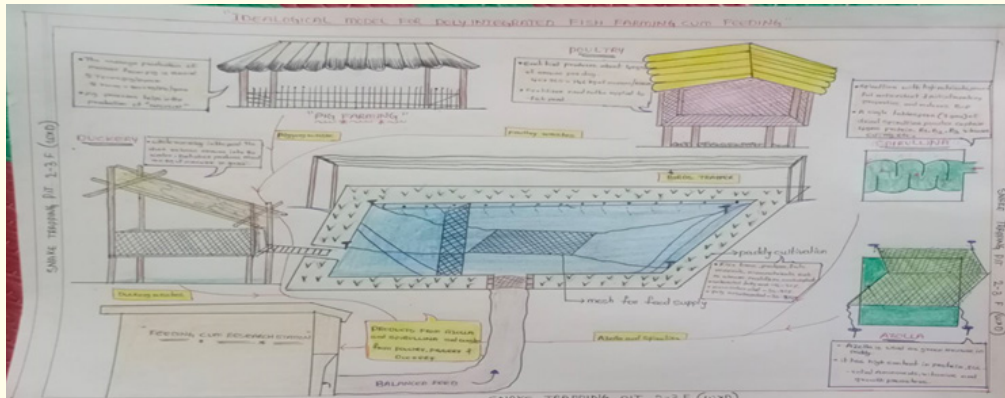


Figure 1: Overall structure of farm.

- Dig snake trapping pit all around the cultured area (2 x 3 feet) width x depth with this ratio we can control the entry of predators.

Materials and Methods

Poultry chicks, water cans, pipes, nets, egg trays, *Azolla* seeds, iron poles, grinder, pig, duck, spirulina seeds, paddles, fencing, weighing machine, mesh etc.

Procedure

This project reveals that one year study i.e. from March 2022 to February 2023

- The *Azolla* is used as feed for fish, poultry, piggery, and used as a manure in paddy.
- The spirulina is used as feed for fish, which has high protein value.
- Products from poultry and duckery manure gets utilized in fish production and also used as fertilizer in paddy.
- Meat, eggs and feathers gets exported for the preparation of cocks.
- Eggs from poultry and duckery gets utilized in minute value as a feed.
- Pig manure is used as a fish feed and as a fertilizer in paddy.
- Antibiotics such as INSULIN can be obtained from pancreas of pig.
- Products from paddy such as rice bran is used as a feed for fish.

- The contaminated water from the pond gets utilized for paddy production so that we can produce pest free rice (organic rice).

About cultures

Poultry culture

- Culturing fishes in association with poultry culture.
- The main source is the production of eggs, meat, manure and feathers.
- The droppings of birds form a good fertilizer for the fish pond. Each bird produces about 40 gms of manure per day. Poultry manure contains both organic and inorganic contents.
- 17% inorganic matter.
- Nitrogen-2%
- Phosphoric acid-1.25%
- Potash-0.75%
- Magnesium-0.5-0.73%
- Calcium-4.52-8.15%, 83.72% of water
- Cu, Zn, Fe, Mn etc. contents are present.

Advantages of fish cum poultry farming

- Pollution free environment.
- Fertilizer need not be applied to fish ponds.
- Soil fertilizer is increased.
- Increase fish production.



Figure 2: Poultry farm.



Figure 3: Poultry waste.



Figure 4

Disadvantages

Chicks should be examined for time to time and diseased one should be isolated, otherwise they will destroy the entire stock.

Pig farming

- The pigsty has a system of channels for discharging. The faeces and urine of pig into a tank.
- In the tank, the waste is allowed to undergo sedimentation and fermentation.
- Pork is also a good source of vitamins and minerals like phosphorous, selenium and thiamine.
- Good source of protein, niacin, vitamin B6, B12, iron etc.
- The average production of manure is around 8 tons/pig/annum.
- The pig manure contains organic and inorganic mater.
- The pig urine contains most of the nitrogen and potassium. while, phosphorous is mainly found in solid manure.

Nitrogen - 0.5 -0.85%
 Phosphoric Acid - 0.2 -0.3%
 Potassium - 0.4-0.5%
 Sc, Cr, Co etc. are present.



Figure 5: Pig farming.



Figure 6: Pig manure.

Advantages of pig farming

The pig dung and urine form manure for the fish pond.

- Some fishes eat away the excreta as food.
- Supplementary feeding is not required.
- Pond water is used for bathing the fishes.
- The water plants collected from the fish pond can be used as fodder for the pig.

Disadvantages

- Integrated fish farming with pigs and poultry may be cause if “Influenzas’-pandemic”.
- Pigs would be act as mixing vessels for avian and human influenza viruses.

Duck farming

Culturing fish in association with duck is called fish cum duck farming.

- The ducklings are fed two in a day-morning & evening.
- The ducks must be given “plague vaccine”. they must be de-warmed by piperazine adipate solution once in six months, the also collect natural feed from the pond. These includes insects, insects larvae, snails, frogs, tadpoles, aquatic weeds etc.
- Duck meat is an excellent source of protein and iron, providing 50% of the iron we need in a day.

- While roaming in the pond the duck release manure in to the water, each duck produces about 70KG of manure in a year.

The duck manure contains

- 57% water
- 26% organic matter.
- 17% Inorganic matter.

100 kg of duck manure contains

- 10 Kg of carbon, 83.72 kg of water.
- 1.4 Kg of phosphoric acid, 0.1 kg of potash
- 1.08 kg of calcium, 2.8 kg of other minerals

Advantages

- Duck manure fertilizes the pond.
- No need for artificial fertilization of pond.
- Duck feed wasted in the pond is used as feed by the fish.
- Duck controls aquatic weeds, insects, leeches etc.



Figure 7: Duck farming.



Figure 8: Duck By-Product.

Spirulina

- Spirulina is a biomass of Cyanobacteria {blue green algae}.
- Belongs to photo synthetic bacteria.
- Spirulina is extremely high in many nutrients.
- A single table spoon (7 gms) of dried spirulina powder contains

4 gms protein, B1 thiamine, B2 riboflavin, B3 niacin

Copper, iron, magnesium, potassium and manganese.

It provides a small amount of fat around 1 gms including both omega-3 and omega -6 fatty acids in an approximately 1.0:1.5 ratio.

Spirulina may reduce B.P (blood pressure), and it has anti cancer properties.

Advantages

- It can be produced locally and so has social as well as economic benefits
- Cheap to produced and uses simple technology and locally available material.
- Requires much less water to grow than vegetables, very easy to digest.
- Can be combined with other product (eg: Rice) to made in to locally acceptable food product all around world.
- Very safe, it is resistant to most contamination due to highly alkaline environment.

Disadvantages

- Initially more expensive cumber some to implement than for food fortification programs.
- Cooking destroys vitamins and nutrients, spirulina does not combat iodine or folic acid deficiency.

Azolla

- *Azolla* is a highly productive plant.
- *Azolla* floats on surface of water by means of numerous small, closely overlapping scale-like leaves, with their roots hanging in the water.
- *Azolla* form a symbiotic relationship with the cyanobacterium *Anabaena azollae*, which fixes atmospheric nitrogen.
- The plant can readily colonize areas of fresh water.
- The fern appears as a green mat over water.

Azolla constituents

Nitrogen, phosphorous, calcium, potassium, Iron.



Figure 9: *Azolla* culture.

Advantages

- It can fix atmospheric carbon-dioxide and nitrogen to form carbohydrates and NH₃ respectively.
- After decomposition it adds available nitrogen for crop uptake and organic carbon content to soil.
- It solubilizes Zn, Fe, Mn and make them available to the rice.
- It releases plant growth regulators and vitamins; it can be grown under controlled conditions.

Disadvantages

- Temperature more than 35 degrees is not suitable.
- Initial cost of cultivation is high.

Paddy culture

- Rearing of fishes along with paddy fields is called paddy cum fish culture. It is an example for agriculture cum fish culture.
- Organic rice-helpful in protecting the body from cancer, dysentery and heart diseases.

Synchronous paddy cum fish culture

In this culture fishes are cultured along paddy. It is an extensive culture.

Advantages

- Single labor double income.
- No need for artificial feeding.
 - Recycling of wastes.
 - No additional cost.
 - Weeds are controlled by fishes.



Figure 10: Paddy culture

Constituents of organic and inorganic contents

| Type of farm | Vitamin | (N) Nitrogen | (H ₃ PO ₄) Phosphoric acid | (K) Potassium | (Mg) Magnesium | (Ca) Calcium | Others |
|--------------|----------------------------------|--------------|---|---------------|----------------|--------------|--|
| Poultry | Vit. A, D, E, K, biotin, niacin. | 4.5-5.4% | 2.4-2.8% | 2.02-2.32% | 0.5-0.7% | 4.52-8.15% | Cu, zn Fe mn etc., |
| Piggery | Vit. A, D, E, K Pantothenic acid | 0.5-0.8% | 0.2-0.3% | 0.4-0.5% | 0.12-0.15% | 0.66-0.68% | Sc, cr, co etc., |
| Duckery | Vit. A, B(complex) C,D,E | 0.6% | 1.4% | 0.5% | 1.54% | 1.55-7.0% | Co, sc. |
| Spirulina | Vit. E, K, B(complex). | 20% | 08% | 04% | 10% | 07% | Carbohydrates, glutamic acid, protein. |
| Azolla | Vit. A, B12. | 33.8% | 0.26% | ---- | 0.5-0.65% | 2.58% | Fe, mg, cu. |

Table 1

Requirements that are suitable for fish feed

- Protein;- 18-50%
- Lipid;- 10-25%
- Carbohydrates;- 15-20%
- Ash: <8.5%

For every 1 Kg feed

| ----- | Poultry | Pig | Duck | Spirulina | Azolla |
|-----------------|---------|------|-------|-----------|--------|
| Nitrogen | 40% | 10% | 01% | 30% | 09% |
| Phosphoric Acid | 55% | 15% | 2.5% | 22.5% | 05% |
| Potassium | 36% | 12% | 08% | 44% | 00 |
| Magnesium | 07% | 21% | 17% | 49% | 06% |
| Calcium | 37% | 0.5% | 3.55% | 45% | 14% |

Table 2



Figure 12: Fish feed prepared by ingredients.

Result and Discussion

By culturing these crops we can integrate them with each other, we can prepare fish by using the above compositions mentioned in table 1 with that compositions the fishes shown high growth rate compared than the other feed ingredients. By using poultry waste, duck waste, Pig waste in paddy the production of crop rate is increased. With this project we can get double income.

The study reveals the potential of Annamalai integrated Rice + Fish + Poultry farming system designed and implemented, in enhancing the nutritional status of resource-poor rice farmers [1].

- Besides increasing the yield of rice, the infestation of weeds and insect pests is controlled through integration of *Azolla* and fish in the rice-duck farming system. Consequently, labour and pesticide costs for controlling weeds and insects decreased are eliminated. As it is eco-friendly in nature the long-term adverse effects of insecticides, herbicides and chemical fertilizer use were also substantially reduced [2].

Conclusion

With this we conclude that integrated farming brings single labor double income to farmers, and we can get more income in low spawn of time, throughout the year we can get crop such as poultry, Pig, Duck and their products. Fishes contribute to the enhancement of paddy production by destroying weeds, causing tillering and mineral enrichment by their digging activity, and for the fertilisation of soil by their excrement and also by the unutilized artificial feed. Due to fish cultivation paddy production gets increased by 5 to 15% [3-23].

Benefits by this project

- No need for artificial feeding.
- Recycling of wastes.
- Rice production is increased.
- Pesticides use can be reduced.
- Soil fertility is increased.
- Pollution free environment.

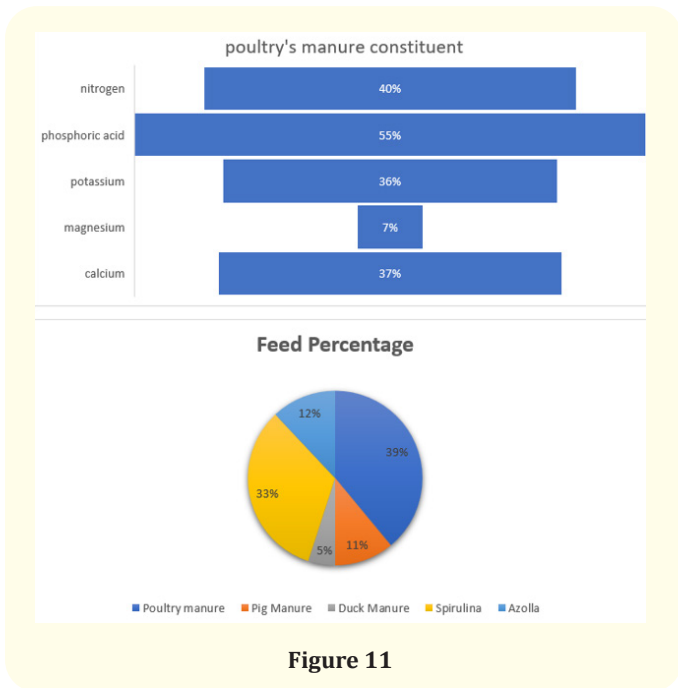


Figure 11

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