Short Communication

# INTEGRATED FISH FARMING (OSTRICH AND CATTLE CUM FISH) IN AN ORGANIZED LIVESTOCK FARM IN TAMIL NADU

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## ABSTRACT

*Integrated Farming System (IFS) is an efficient way of recycling farm waste or farm by-products. In present study the fishes (Catla, Common carp, Grass carp, Rohu and Silver carp) were cultivated through ostrich feed wastages and cattle manure in six month period. The average fish survival of 86% was observed and it was varied from 84% to 88%. The total weight of fishes harvested was 50.95 kg, 43.71 kg, 42.58 kg, 54.95 kg and 53.76 kg for individual varieties such as Catla, Common crap, Grass crap, Rohu and Silver carp respectively. The average weight of fish at harvesting was 386.0 g, 502.5 g, 507.0 g, 426.0 g and 632.5 g with 64.33 g, 83.75 g, 84.50 g, 71.00 g, 105.42 g average weight gain of fish per month in Catla, Common carp, Grass carp, Rohu and Silver carp respectively. The benefit cost ratio was observed as 2.35 with the net profit of Rs.21,247.50 for 6 months culture period in 0.06 Ha pond area. It was concluded that ostrich and cattle cum fish integration was a suitable and economically viable integrated system in Tamil Nadu.*

Key words: Cattle, Fish, Integrated, Ostrich and Tamil Nadu

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FAO (1977) stated that Integrated Farming System (IFS), "there is no waste" and "waste is only a misplaced resource which can become a valuable material for another product". It is an efficient recycling of farm waste or farm by-products and also an abatement of environment pollution. The IFS as an aquaculture system that is integrated with livestock and in which fresh animal waste is used to feed fish (Jitsanguan, 2001). Integrated fish farming means a process of farming where fish is cultured along with other farm products and animal husbandry wastes.

Vision 2020 (2011) suggested that the integrated fish farming is a diversified and coordinated system of producing fish and agricultural/livestock produce in fish farms with fish as the main component for maximal utilization of land/water through recycling of wastes and by-products, reduced application of fertilizers and feeds and maintenance of a balanced ecosystem. The feed waste and manure from livestock farming is provide to fish ponds, it is directly consumed by fish or release of nutrients supports the growth of photosynthetic organisms (planktons) are taken by fish. Thus, the present study has been undertaken to validate integrated Ostrich and Cattle cum Fish production in an organized multi-species livestock farm in Tamil Nadu.

The present study was carried, during the period of January, 2020 to June, 2020 at Poultry Breeding Unit, Post Graduate Research Institute in Animal Sciences (PGRIAS), Kattupakkam, Chengalpattu District, Tamil Nadu. It is an organized multi-species (cattle, buffalo, sheep, goat, pig, rabbit, poultry, ostrich etc.,) livestock farm in India. The study was planned at semi-integration model i.e. wastage feed and manure were used in fish pond for fish production.

The fish pond with an area of 0.06 Ha was used for this study. During North-East monsoon (October to December) period, the pond was received full volume of fresh water. That time, Catla (*Catla catla*), Common carp (*Cyprinus carpio*), Grass carp (*Ctenopharyngodon idella*), Rohu (*Labeo rohita*) and Silver carp (*Hypophthalmichthys molitrix*) species fish fingerlings were procured from Fish seed farm, Poondi, Thriuvallur District, Tamil Nadu stocked at the rate of 150, 100, 100, 150 and 100 numbers, respectively in that fish pond. Waste from a 40 numbers of ostriches were collected routinely and fed to the fish pond. The feed wastages were varied from 2 to 4 kg/day. The ostrich feed wastages are leftover feed near or within the feed trough, uneaten and regurgitated/spitted feed etc. The ostrich commonly waste more feed during rainy days. During the study period, totally 415 kg of ostrich wastage feed was collected and provide to that fish pond. The collected feed wastage was mixed with little amount of water to make it into a thick 'dough' rolled into balls. The balls were then thrown into the ponds. It can be directly consumed by the fishes.

Cattle manure was also collected and provide the fish pond at the rate of 150 kg per month in regular interval. The cattle manure serves as an organic fertilizer for plankton production in the fish pond which was consumed by the fishes. Liming (5 kg per month) was followed throughout the study period to maintain the pH. At the end of experiment all fishes were harvested through repeated netting, the number of fishes and weight of fishes in each species were noted. The fishes were sold as for the PGRIAS price fixation committee approved price (Rs.150/ kg). Through that data, number of fishes stocked at early, number of fishes harvested, fish survival (%), total weight of fishes at harvested (kg), average weight per fish at harvested (g) and average weight gain per fish per month (g) in each species and economics of ostrich and cattle cum fish production were calculated.

The Table 1 showed the weight of fishes and number of fishes harvested at fishing in each species in ostrich and cattle cum fish cultivation.

**Table 1. Weight of fishes and number of fishes harvested at fishing in ostrich and cattle cum fish production in Tamil Nadu**

| Sl. No | Species Stocked | Stocking Density (A) | No. of Fishes at Harvested (B) | Fish Survival (%) (B/A ×100) | Total Wt. Harvested (kg) (C) | Average Wt. (g) (D = C/B) | Average Wt. Gain/ fish/ month (g) (E = D/6*) |
|---|---|---|---|---|---|---|---|
| 1. | Catla | 150 | 132 | 88.00 % | 50.95 | 386.0 | 64.33 |
| 2. | Common carp | 100 | 87 | 87.00 % | 43.71 | 502.5 | 83.75 |
| 3. | Grass carp | 100 | 84 | 84.00 % | 42.58 | 507.0 | 84.50 |
| 4. | Rohu | 150 | 129 | 86.00 % | 54.95 | 426.0 | 71.00 |
| 5. | Silver carp | 100 | 85 | 85.00 % | 53.76 | 632.5 | 105.42 |
| | **Over all** | **600** | **517** | **86.00 %** | **245.95** | **490.8** | **81.80** |

* Six month period

The Catla, Common carp, Grass carp, Rohu and Silver carp were harvested at the number of 132, 87, 84, 129 and 85 with 50.95 kg, 43.71 kg, 42.58 kg, 54.95 kg and 53.76 kg respectively. The mean survival rate of fishes was 86% and total fish harvested was 245.95 kg during the study period. It was higher than the Paul *et al.,* 2018 reported; survival of different fish species was varied between 50 - 60%. The Silver carp fish harvesting number was below 50% when compare to other fish species. The average weight of fish at harvesting was 386.0 g, 502.5 g, 507.0 g, 426.0 g and 632.5 g with 64.33 g, 83.75 g, 84.50 g, 71.00 g, 105.42 g average weight gain of fish per month in Catla, Common carp, Grass carp, Rohu and Silver carp, respectively. The Silver carp fish recorded highest weight gain followed by Grass carp, Common carp, Rohu and Catla. The fish weight gain was more than the previous study (Paul *et al.,* 2018) in homestead poultry cum fish integrated ponds and lower than the Rahman and Rahman (1999) and Hosen *et al.* (2014) in artificial feeding with fertilizer application in fish pond.

The economics of ostrich and cattle cum fishes has been calculated in table 2. The 20% of capital cost and operational cost were Rs.450/- and Rs. 15,195/- respectively. The total expenditure cost was Rs. 15,645/-. The total income of ostrich and cattle cum fish farming was Rs. 36,892.50/-. The net profit and benefit cost ratio was Rs.21,247.50/- and 2.35 respectively. The benefit cost ratio was above 1 and positive sign indicated the ostrich and cattle cum fish integration was economically viable.

The present study demonstrated the fish yield/production with economics of ostrich and cattle cum fish integration in the livestock farm. It is one of the tools to utilization of natural water reservoirs through recycling of feed waste and manure. It concluded that the Catla, Common carp, Grass carp, Rohu and Silver carp fishes combination with ostrich feed wastage and cattle manure system is a suitable and an economically viable integrated farming system in Tamil Nadu.

**Table 2. Economics of ostrich and cattle cum fish production in Tamil Nadu**

| S. No | Particulars | Amount (Rs.) |
|---|---|---|
| **(I)** | **Capital cost** | |
| 1. | Pond construction (dyke reconstruction) | 2,000 |
| 2. | Feed tray – 2 Nos. | 250 |
| | **Total capital cost** | **2,250** |
| **(II)** | **Operational cost** | |
| 1. | Fish fingerlings: | |
| | i. Catla @Rs. 1.8 (1.8 × 150) | 270 |
| | ii. Common carp @Rs. 1.6 (1.6 × 100) | 160 |
| | iii. Grass carp @Rs. 1.8 (1.8 × 100) | 180 |
| | iv. Rohu @Rs. 1.6 (1.6 × 150) | 240 |
| | v. Silver carp @Rs. 5 (5 × 100) | 500 |
| 2. | Cost of cattle manure @Rs. 2.00/kg (900 × 2) | 1,800 |
| 3. | Cost of ostrich feed wastage @Rs. 23.00/kg (415 × 23) | 9,545 |
| 4. | Miscellaneous (liming, netting etc.) | 2,500 |
| | **Total operational cost** | **15,195** |
| **(III)** | **Total cost** | |
| | Total capital cost (20% of total capital cost) | 450 |
| | Total operational cost | 15,195 |
| | **Total cost** | **15,645** |
| **(IV)** | **Income** | |
| 1. | Income of fish harvested (245.95 kg @Rs.150.00/kg) | 36,892.50 |
| | **Total income** | **36,892.50** |
| **(V)** | **Net profit (Total income - Total cost)** | **21,247.50** |
| **(VI)** | **Benefit cost ratio (Total income/Total cost)** | **+2.35** |

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