Semi-Intensive Native Chicken Farming Integrated with Pig Farming: An Economic Analysis

Abstract

A study was conducted at a native chicken cum pig farm in Kanyakumari District, Tamil Nadu, India to evaluate its economic feasibility. The native chicken unit yields regular income to the farmer, where the adult chicken, eggs, and day-old chicks are sold to the local households on a demand basis at a premium price. The poultry unit runs at a yearly BCR of 5.67, which is due to the scavenging nature of native birds, thereby reducing feed costs. The birds scavenge on maggots produced at the manure pit of the piggery unit which satisfies the protein requirement of the birds. On the other hand, the piggery unit gives a supplementary income to the farmer. The pigs are maintained in swill feed with no extra feed cost. The study shows the feasibility of similar integrated farms with large production potential.

Keywords: Native Chicken, Pigs, Integrated farm, Maggots, Economic analysis

Introduction

The Indian Poultry Industry is one of the fastest-growing segments of the agricultural sector where the production of eggs and broilers has been rising at a rate of 8 to 10% per annum. Poultry farming requires low investment and maintenance costs, making it a profitable venture for small-scale farmers. The demand for native chicken meat is also increasing, especially in urban areas where consumers are willing to pay a premium for organic and locally sourced products. However, one of the major challenges of the poultry industry is increasing feed costs. Farmers practice novel methods of feeding poultry to reduce feed costs and extract profits. One such method is maggot feeding. The maggots are naturally grown on the manure of pigs. Pig farming in India is a growing industry, with an increasing demand for pork and pork products in the country. Reared for its meat, the pig is a quick-growing animal and an important source of animal protein in the diets of many people at a comparatively cheaper cost on account of its prolificacy, shorter generation interval, faster growth rate, better feed conversion efficiency, high dressing percentage, and low maintenance cost (Singh *et al.*, 2019). This presents a dual income to the farmer.

In addition, the production and disposal of large quantities of livestock waste is a recurrent problem in many countries throughout the world, which is especially true with pig farms. It was reported that Biodegradation of swine manure by housefly larvae is a viable and ecological strategy for pig manure management (Cickova *et al.*, 2012). Maggot meal comprises 55 percent crude protein (CP), 27.65% ether extract, 8.33% Ash, 3.37 crude fiber (CF), 2.14 NFE, 94.7 percent Dry Matter, and 3955 kcal/kg metabolizing energy (Ahmad *et al.*, 2022). This study aims to record the economic feasibility of a native chicken farm integrated with a pig farm, in Kanyakumari District, Tamil Nadu State of India.

Materials and Methods

The data on economic parameters was collected through personal interview with the help of a questionnaire from the farmer in his field. The farmer has 1.5 acres of land with 4 years of farm experience. The pig cum poultry farm, under study, was located in Amman Koil Street, Thovalai Village, Kanyakumari District of Tamil Nadu, India with coordinates 8.2281483 Latitude and 77.5059996 Longitude. The district presents a tropical climate with summer temperatures (April to June) reaching up to 35°C, whereas from November to February the temperature hovers around 21°C. The average annual rainfall in the district varies from about 826 to 1456 mm.

Results and Discussion

The data on managemental parameters, and feeding parameters of pigs and poultry maintained in the farm was presented in Table 1 and Table 2, respectively.

The farmer has a poultry unit as his main enterprise. The poultry shed in the farm was constructed under Mahatma Gandhi National Rural Employment Guarantee Act, Ministry of Rural Development. Government of India. The farmer maintains around 65-75 adult birds throughout the year. Adult birds sold in the unit are replaced by young birds which are produced by natural incubation in the farm itself. The young birds are usually kept indoors, to prevent predator attack and fed with compounded feed at 1 Kg/ Bird from 0-4 weeks. After 4 weeks the birds are left for scavenging around the piggery manure pit with the supervision of the farmer. The birds scavenge on the maggots produced in the excreta of the pigs which satisfies the protein requirement of birds. The poultry unit incurs about 200 kgs of rice each month, which is

purchased at Rs. 10/ kg. This satisfies the energy requirement of the birds. Thus the birds produce an average of 12 eggs per day, where 80 % of eggs are sold to local households at the premium rate of Rs. 15/ egg. The farmer also sells adult birds and day-old chicks as per the demand of the local people. The annual income and expenditure statement are presented in Table 3 and Table 4. This shows a benefit-cost ratio of 5.67 and the business is economically feasible with BCR > 1 (Hejase et al., 2012; Rukmana, & Muslim, 2017)

Table 1: Parameters of Poultry Unit

Parameters		Observations
No birds maintained	:	65 (52 Males +13 Females)
Type of birds on the farm	:	Aseel cross
Housing of birds	:	Shed constructed through Mahatma Gandhi National Rural Employment Guarantee Act.
Feeding of birds (up to 4 weeks)	:	Compounded feed @ 1 kg/bird
Cost of compounded feed	:	Rs. 35/ kg
Feeding of birds (above 4 weeks):	:	scavenging + rice
Scavenging	:	The birds scavenge on maggots produced in the excreta of Pigs
Cost of rice	:	Rs. 10/kg
Quantity of rice used/ month	:	200 kgs
No eggs produced/day	:	10-15 eggs (12 eggs/ day, 4380 eggs/ year)
Percentage of eggs sold	:	80 % (3504 eggs/ year)
The sale price of the egg (per egg)	:	Rs. 15 /-
Percentage of eggs taken for incubation	:	20 % (876 eggs)
The hatchability of eggs incubated	:	85 % (744 chicks)
Percentage of chicks sold	:	50 % (372 chicks)
Sale of day-old chicks	:	Rs. 40-50 / chick
Percentage of chick for replacement	:	50 % (372 chicks)
Body weight at 24 weeks	:	1.8 to 2.2 kgs
Percentage of adult birds sold:	:	20 % / month (11+2)

The sale price of the male birds (24 weeks):	:	Rs. 750
The sale price of the female birds (24 weeks)	:	Rs. 500
Chick mortality	:	5 %
Adult mortality	:	Negligible

Table 2: Parameters of Poultry Unit

Parameters		Observations
No of pigs maintained	**:**	48 Nos
Type of pigs	**:**	Large white Yolkshire cross
Housing of pigs	**:**	With locally available materials
Feeding	**:**	Swill Feeding
Body weight of pigs	**:**	80-85 Kgs
Sale price of pigs	**:**	Rs. 150/ kg
Market age	**:**	6 months
Swill feed collection	**:**	Rs. 300/day
Transport of swill feed	**:**	Rs.300/ day
Market	**:**	Kerala

Table 3: Annual Expenditure from Poultry Unit

S. No	Particulars	Amount (Rs)	Percentage
1	On compounded feed (for brooding birds 1Kg/chick) for 372 chicks	13020	48.19
2	On rice (200 kg/ month)	24000	44.41
3	On overhead charges	2000	7.40
Total		**27,020**	

Table 4: Annual Income from Poultry Unit

S. No	Particulars	Amount (Rs)	Percentage

1	From sale of adult males (24 nos)	18000	11.74
2	From sale of adult females (132 nos)	66000	43.05
3	From sale of eggs (3504 nos)	52560	34.29
4	From sale of day-old chicks (372 nos)	16740	10.92
Total		**1,53,300**	

On the other hand, the farmer maintains around 30-70 pigs throughout the year. Swill feed for pigs was collected from hotels on a daily basis, where the farmer gets paid for its collection (Rs. 300 / day). However, this cost is matched by transport cost for the transport of swill feed to the farm. Whenever the overall weight of salable pigs reaches 1000 Kg, the pigs are sold out in bulk @ Rs. 150 / kg which forms the supplementary income to the farmer.

Other reports of native chicken farming integrated with pig farming could not be traced. However, reports of integrated farming with pigs and fishes yielded better results than with fish and ducks (Sarm *et al.*, 2022). It was also reported that when increasing earthworms in broiler diets from 0, 1, 3, 5, and 7% resulted in an increase in the juice and flavor of breast meat (Nalunga *et al.*, 2021). However, reports with house fly maggots show non-significant effects on carcass composition and meat quality, except numerically reduced the shear force of breast muscle (Elahi *et al.*, 2020). Further, the author stated that maggots can be used as an alternative protein source at 8% in broiler chick's diet without any adverse effect on the chick's performance. It is also reported that housefly maggot-treated pig composting can be considered sustainable alternative for pig manure management to achieve high-quality organic fertilizer and maggots as feed without bulking agents (Zhu *et al.*, 2015).

SWOT Analysis

Strengths

- Predictable local market
- Availability of inputs at low cost
- Government support
- Availability of swill feed for pigs on a payment basis
- Negligible transport cost

Weaknesses

- Poor hygiene
- Lack of awareness about scientific managemental practices
- Acceptability of public and new consumers on farm expansion

Opportunities

- Changing food habits
- High-paying capacity
- Accessible local market for pigs
- Demand supply balance

Threats

- Predator attack
- Chances of disease spread

Conclusion

Semi-scavenging backyard indigenous poultry are extremely important in providing day-to-day income and high-quality protein in the diets of rural people whose traditional foods are typically rich in carbohydrates but low in protein. Integration with pig farming can be a viable option to counteract increasing poultry feed costs where the protein requirement of the birds can be satisfied by feeding maggots produced in pig manure.

References

Abdel-Azeem, Abdel-Azeem Fahmy. "Nutritional And Health Aspects Of Earthworms (Eisenia Foetida) Supplementation In Poultry Diets." *Egyptian Poultry Science Journal* 42, No. 1 (2022): 39-57.

Sarm, M., Brahma, J., Boro, P., Sonowal, M., Bharali, D., Deka, A., & Bhattacharyya, H. K. A comparative analysis of integrated fish-pig and fish-duck farming in lower Brahmaputra valley zone of Assam. *The Pharma Innovation Journal* 2022; SP-11(5) (2022): 336-340

Nalunga, A., Komakech, A.J., Jjagwe, J., Magala, H. and Lederer, J. (2021). Growth characteristics and meat quality of broiler chickens fed earthworm meal from Eudrilus eugeniae as a protein source. *Livestock Sci.*, 245: 104394

Ahmad, Izaz, Misbah Ullah, Mohamed Alkafafy, Nazeer Ahmed, Samy F. Mahmoud, Kamran Sohail, Habib Ullah, Wafaa M. Ghoneem, Mohamed M. Ahmed, and Samy Sayed. "Identification of the economics, composition, and supplementation of maggot meal in broiler production." *Saudi Journal of Biological Sciences* 29, no. 6 (2022): 103277.

Čičková, H., Pastor, B., Kozánek, M., Martínez-Sánchez, A., Rojo, S. and Takáč, P., Biodegradation of pig manure by the housefly, Musca domestica: a viable ecological strategy for pig manure management. *Plos one*, *7*(3) 2012, 32798.

Zhu, F. X., Yao, Y. L., Wang, S. J., Du, R. G., Wang, W. P., Chen, X. Y., ... & Yang, H. Q. (2015). Housefly maggot-treated composting as sustainable option for pig manure management. *Waste management*, *35*, 62-67.

Elahi, U., Ma, Y. B., Wu, S. G., Wang, J., Zhang, H. J., & Qi, G. H. (2020). Growth performance, carcass characteristics, meat quality, and serum profile of broiler chicks fed on housefly maggot meal as a replacement of soybean meal. *Journal of animal physiology and animal nutrition*, *104*(4), 1075-1084.

Rukmana, S. H., & Muslim, M. A. (2017). Decision Support System Based on Benefit Cost Ratio Method for Project Tender. *Aptikom Journal on Computer Science and Information Technologies*, *2*(1), 26-30.Hejase HJ, Hejase AJ and Hejase HANJ Quantitative Methods for Decision Makers: Management Approach. Beirut, Dar Sader Publishers, 2012: P. 129