



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

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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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 chickens, eggs, and day-old chicks are sold to local households on a demand basis at a premium prize. The poultry unit operates at a yearly benefit-cost ratio (BCR) of 3.92, which is attributed to the scavenging nature of the native birds, thereby reducing feed costs. The birds scavenge on maggots produced in the manure pit of the piggery unit, which satisfy the protein requirements of the birds. On the other hand, the piggery unit provides supplementary income to the farmer. The pigs are maintained on swill feed with no additional feed cost. The study demonstrates the feasibility of similar integrated farms with significant production and economic potential.

Keywords: Native chicken; pigs; integrated farm; maggots; economic analysis.

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1. 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 in the poultry industry is the increasing cost of feed. Farmers employ novel methods of feeding poultry to reduce feed costs and maximize profits, such as maggot feeding of the birds. The birds are given the opportunity to scavenge on maggots that naturally develop on pig manure.

Pig farming in India is also a growing industry, with an increasing demand for pork and pork products in the country. Pigs are reared primarily for their meat and serve as an important source of animal protein in many people's diets at a comparatively lower cost due to their prolificacy, shorter generation interval, faster growth rate, better feed conversion efficiency, high dressing percentage, and low maintenance cost [1]. This presents a dual income opportunity for the farmers.

In addition, the production and disposal of large quantities of livestock waste, particularly in pig farms, pose recurring problems in many countries worldwide. Biodegradation of swine manure by housefly larvae has been reported as a viable and ecological strategy for pig manure management [2]. Maggot meal has been found to contain 55% crude protein, 27.65% ether extract, 8.33% ash, 3.37% crude fiber, 2.14% nitrogen free extract, 94.7% dry matter, and 3955 kcal/kg metabolizing energy [3]. This study aims to assess the economic feasibility of integrated native chicken farm cum pig farm in Kanyakumari District, Tamil Nadu, India.

2. MATERIALS AND METHODS

The data on economic parameters were collected through personal interview using a questionnaire administered to the farmer in their field. The farmer owned 1.5 acres of land and had 4 years of farming experience. The pig cum poultry farm being studied is located in Amman Koil Street, Thoivalai Village, Kanyakumari

District, Tamil Nadu, India, with coordinates 8.2281483 Latitude and 77.5059996 Longitude. The district experiences a tropical climate, with summer temperatures (April to June) reaching up to 35°C, while the lower temperature hovers around 21°C from November to February. The average annual rainfall in the district varies from about 826 to 1456 mm.

3. RESULTS AND DISCUSSION

Table 1 and Table 2 present the data on managerial parameters, feeding parameters, and financial parameters of the poultry and pigs kept on the farm.

The farmer's primary enterprise is poultry farming. The construction of the poultry shed on the farm was done under the Mahatma Gandhi National Rural Employment Guarantee Act, Ministry of Rural Development, Government of India. Throughout the year, the farmer maintains approximately 65-75 adult birds. As the adult birds are sold, they are replaced by young birds that are naturally incubated on the farm itself.

The young birds are typically kept indoors to protect them from predator attacks. They are fed compounded poultry feed (brooder mash) at a rate of 1 kg per bird from 0-4 weeks. After 4 weeks, the birds are allowed to scavenge around the piggery manure pit under the supervision of the farmer. The birds scavenge on the maggots produced in the pigs' excreta, which fulfils their protein requirements.

The primary monthly expense of the poultry unit is for 200 kg of rice, which is purchased at Rs. 10 per kg, to fulfill the birds' energy needs. Consequently, the birds produce an average of 12 eggs per day, with 80% of the eggs being sold to local households at a premium rate of Rs. 15 per egg. The farmer also sells adult birds and day-old chicks based on the demand of the local community.

On the other hand, the farmer maintains around 30-70 pigs throughout the year. Swill feed for pigs was collected from hotels on 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.

Table 1. Parameters of poultry unit

Parameters	Observations
Number of birds maintained	65 (52 Males +13 Female)
Type of birds in the farm	Aseel cross
Housing of birds	Shed constructed through Mahatma Gandhi National Rural Employment Guarantee Act.
Feeding of birds (upto 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	200 kgs/ month
Number of eggs produced	12 eggs/ day (4380 eggs/ year)
Percentage of egg sold	80 % (3504 eggs/ year)
Sale price of the egg	Rs. 15/ egg
Percentage of eggs taken for incubation	20 % (876 eggs)
Hatchability of eggs incubated	85 % (744 chicks)
Percentage of chick sold	50 % (372 chicks)
Sale price of day-old chicks	Rs. 45/ 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)
Sale price of the male birds (24 weeks):	Rs. 750/ bird
Sale price of the female birds (24 weeks)	Rs. 500/ bird
Overhead Charges	Rs. 2000/ year
Chick mortality	5 %
Adult mortality	Negligible

Table 2. Parameters of poultry unit

Parameters	Observations
Number of pigs maintained	48 Nos
Type of pigs	Large White Yorkshire 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 rice (200 kg/ month for 12 months @ Rs. 10/kg)	24000	61.5
2	On compounded feed (1 kg/chick for 372 chicks/ year)	13020	33.4
3	On overhead charges	2000	5.1
Total		39020	

Table 4. Annual income from poultry unit

S. No	Particulars	Amount (Rs)	Percentage
1	From sale of adult females (132 birds/ year @ Rs. 500/ bird)	66000	43.05
2	From sale of eggs (3504 / year @Rs. 15/ egg)	52560	34.29
3	From sale of adult males (24 birds/ year @ Rs. 750 / bird)	18000	11.74
4	From sale of day-old chicks (372 / year @Rs. 45/ chick)	16740	10.92
Total		153300	

The annual income and expenditure statements are presented in Table 3 and Table 4, respectively. The analysis reveals a benefit-cost ratio of 3.92, indicating that the business is economically feasible (BCR > 1) [4].

No information could be traced on the integration of native chicken farming with pig farming, where the pig manure was used for maggot production. However, Various types of substrates have been reported to produce maggots for poultry feeding. The most utilized substrates for maggot production by farmers, were soy, maize bran, pig manure and chicken manure [5]. Although, the kitchen wastes are directly fed to the birds, maggots can be a superior protein source for birds even under backyard system of rearing.

Number of controlled experiments on maggot feeding of poultry has been done by various authors [6,7,8] and have reported satisfactory results. In a trial [9], Feeding broiler chickens with diets containing 10% or 15% maggots resulted in a significant increase in live weight with notable enhancements in lysine and tryptophan levels in the breast muscle. The authors attributed it to the exceptional protein digestibility of maggots which may have positively influenced the deposition of amino acids in chicken meat. Conversely, research involving house fly maggots revealed insignificant effects on carcass composition and meat quality, although it numerically decreased the sheer force of the breast muscle [10].

It was also reported that the maggot meal supplementation in broiler diet substantially impacted gross return and net profit, because of the significant bodyweight rise compared to control group [11]. It was also claimed that the cheap cost of a maggot meal compared to a fish meal lowered the cost of feeding and have improved the profits [12].

Consequently, incorporating maggots into the diet of chickens can serve as a cost-effective approach to produce high-quality carcasses and enhance growth performance. Additionally, it was reported that composting pig manure with maggots can serve as a sustainable solution for manure management, producing high-quality organic fertilizer and maggots as feed without the need for bulking agents [13]. Hence, it can contribute to the reduction of environmental pollution associated with manure production.

3.1 SWOT Analysis

Strengths

- The local market is predictable.
- Farm inputs are available at a low cost.
- Government support is available.
- Swill feed for pigs is locally available, with additional income for its collection.
- Transport costs are negligible.

Weaknesses

- Poor hygiene practices.
- Lack of awareness regarding scientific management practices.
- Concerns about public acceptance and expanding the farm to a large scale.

Opportunities

- Changing food habits provide new opportunities.
- Consumers have a higher paying capacity.
- The local market for pigs is accessible.
- There is a potential opportunity due to high local demand.

Threats

- The risk of predator attacks.
- The possibility of disease spread.

4. CONCLUSION

Semi-scavenging backyard indigenous poultry play a vital role in rural communities, providing a crucial source of daily income and high-quality protein in the diets of people who traditionally consume carbohydrate-rich but protein-deficient foods. To address the rising costs of poultry feed, integration with pig farming offers a viable solution. By incorporating pig farming into the system, the protein requirements of the poultry can be met by feeding them maggots derived from pig manure. This symbiotic relationship between the two farming practices presents an opportunity to optimize resource utilization and reduce feed expenses while ensuring the nutritional needs of the poultry.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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