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VIABILITY AND ECONOMICS OF BACKYARD POULTRY FARMING IN WEST SIANG DISTRICT OF ARUNACHAL PRADESH, INDIA

***M. S. Baruah and C. S. Raghav**

ICAR-KVK, ICAR-Research Complex for NEH Region, Arunachal Pradesh Centre, Basar, India - 791101

*Author for Correspondence

ABSTRACT

Sixty numbers of poultry farmer having early experience of backyard poultry farming from randomly selected 12 villages of West Siang District, Arunachal Pradesh, India were selected for the present study to investigate the viability and economics of backyard poultry rearing both with local chicken and improved strain Vanaraja. The estimated cost of rearing was calculated by adding the variable cost *i.e.* cost of day old chicks, feed cost, vaccine cost, medicine cost, labour cost and fixed cost *i.e.* land, poultry shed and equipment cost and the return was calculated by adding the incomes from the sale of eggs, sale of cocks and spent hens. From the study it was found that the backyard Vanaraja chicken rearing is very much profitable with an estimated benefit cost (B: C) ratio of 2.84 while for local chicken it was recorded as 2.25.

Keywords: Backyard Poultry, Vanaraja, Local Chicken, B: C Ratio, Viability

INTRODUCTION

The poultry industry is one of the profitable enterprises which can be taken up by the unemployed rural youth to tackle the unemployment and under-employment problem in rural areas.

This industry has transformed in to a new face in most parts of the country, and India has emerged on the world poultry map as the 3rd largest egg (56 billion eggs) and 5th largest poultry meat (2.6 million tons) producer.

Total chicken population in India has registered an annual growth of 7.3% in the last decade. Though the land and capital investment is not large, but it always ensures a regular flow of income through the selling of poultry products.

The native chicken varieties adopted in free- range backyard conditions for centuries contribute about 11 % of total egg production in India (Kumaresan *et al.*, 2008). This poultry farming is possible in widely different agro-climatic environment (National Commission on Agriculture (NCA), 1997), as the fowl possesses marked physiological adaptability.

Requirements of small space, low capital investment, quick returns from outlay and well distributed turn over throughout the year make poultry farming remunerative in both rural and urban areas.

Poultry meat and eggs are highly nutritious; the meat is rich in proteins and is a good source of phosphorus and other minerals and of B- complex vitamins.

Poultry meat contains less fat than most cuts of pork and poultry liver is especially rich in vitamin A (Saha, 2003).

But in the state of Arunachal Pradesh of India, the transformation could not occur till date because of inadequate availability of improved breeds, hatchery, concentrate feeds, veterinary health care facility, awareness in all the corners of the state.

So, to meet the requirement of high quantity and quality of meat of this state, as an alternative backyard farming with suitable strain of bird such as Vanaraja which having more growth rate and egg production than *desi* /local birds with the existing feed resources is necessary.

However, till now no systemic studies have been conducted in respect to their productivity performance and benefit cost ratio in comparison to the local chicken reared by the rural farmers of this region. Keeping in view the present study has been undertaken to explore the economics of rural backyard poultry rearing with both improved strain Vanaraja and local chicken up to 18 months of age.

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MATERIALS AND METHODS

The study was conducted from August, 2015 to January, 2017 at 12 randomly selected villages of West Siang district of Arunachal Pradesh, India, namely Sago, Lipunamchi, Gori I, Gori II, Gori III, Regi, Pagi, Disi, Bam I, Bam II, Nyodu and Dali covering 5 farmers from each village.

Thus, a total of 60 farmers having experience of poultry rearing for more than two years and having minimum 20 numbers of indigenous poultry birds were selected for the study. However, while selecting the farmers, preference was given to those farmers who are trained for poultry farming by the Government organization.

The existing 20 numbers of indigenous chicken and 20 numbers of Vanaraja chicks of either sex provided from the hatchery unit of ICAR Arunachal Pradesh Centre, Basar, to each farmer were considered for the study.

Day old Vanaraja and local chicks were kept in brooding up to 6 weeks of age and simultaneously vaccinated with *Ranikhet* and *Gumboro* disease as per standard vaccination protocol.

During brooding period, Vanaraja chicks were fed with broiler chicken starter diet. After brooding, chicks were let loose at backyard environment after proper acclimatization. The primary data were collected for day old to 18 months of age of the birds.

The estimated cost of rearing was calculated by adding the variable cost *i.e.* cost of day old chicks, feed cost, vaccine cost, medicine cost, labour cost and fixed cost *i.e.* land, poultry shed and equipment cost. The return was calculated by adding the incomes from the sale of eggs, sale of cocks and spent hens. The data generated were tabulated and subjected to statistical analysis as per the method of Snedecor and Cochran (1994).

Management of Diseases of Backyard Poultry

Though the birds in backyard system are more resistant to local climatic conditions but due to exposure to wide climate variation as well as improper availability of required nutrient there is a possibility of occurrence of different diseases causing decline in production potentials of the birds.

To avoid such type of incidents frequent monitoring of the birds for the symptoms of diseases and limiting their exposure to migrating water-fowl and wild birds which can carry the viruses of different diseases were taken care off during the study.

Care for Zoonotic Diseases

Though the exposure to zoonotic diseases by the backyard poultry owner or handler is probably variable, but risk is always persist if proper hygiene practices are not followed in the farm.

General hygienic practices, such as hand washing (as per WHO standard) after handling the birds or their excrement, avoiding consumption of food or drinking within the farm were completely avoided throughout the study.

Profitability Analysis

Gross margin analysis was used to determine the cost and returns from backyard poultry production and then the Net Farm Income (NFI) of the poultry owners were estimated as per the method described by Oladunni and Fatuase (2014). The Gross Margin (GM) and Net Farm Income (NFI) were estimated with the help of following equations:

$$\text{Equation 1: } GM = TVP - TVC$$

$$\text{Equation 2: } NFI = GM - TFC$$

Where, TVP = Total value of production, TVC = Total variable cost, TFC = Total fixed cost

If $GM > 0$, then backyard poultry enterprise is considered profitable. Finally, benefit cost ratio was calculated by dividing the total net return by net cost of production.

RESULTS AND DISCUSSION

Performance of Vanaraja chicken and local chicken under backyard system of rearing are presented in Table 1.

At 6 weeks of age, the male Vanaraja birds attained 650 g and female 570 g weight and now it is ready for free range rearing system. The mortality after 21 weeks of age was recorded as 15 % in Vanaraja

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chicken and in local chicken it was recorded as 10 %. The average age at first egg of Vanaraja was found to be 155 days with a 125 numbers of average annual egg production, while in case of local chicken the average age at first egg was recorded as 186 days with an average annual production of 65 numbers of eggs.

Table 1: Performance of Vanaraja Chicken and Local Chicken under Backyard System of Rearing

S. No.	Trait	Performance			
		Vanaraja		Local Chicken	
		Male	Female	Male	Female
1	Body wt. (g)				
	Day old chicks	40	36	28	25
	6 week	650	570	380	250
	8 week	780	710	340	280
	20 week	2200	2000	1590	1250
2	Age at first egg (days)	-	155	-	186
3	Mortality up to 10 weeks	5%	5%	4%	4%
4	Mortality up to 20 weeks	12%	12%	8%	8%
5	Mortality after 21 weeks (Laying stage)	15%	15%	10%	10%
6	Average annual egg production	-	125	-	65
7	Egg color	-	Tinted	-	Tinted

The higher production of eggs and early attending of age at first egg might be due to the better genetic makeup of Vanaraja chickens than that of local chickens (Das *et al.*, 2014).

Higher mortality rate (15%) of Vanaraja chicken at laying age in comparison to the local chicken (10%) found in the present study might be due to the fact that the local chickens were better adopted in backyard system of rearing than that of Vanaraja (Islam *et al.*, 2015).

The estimated cost of rearing of 20 local and 20 Vanaraja chickens under backyard system of rearing for 18 months of age are presented in Table 2. During the study it was found that for Vanaraja, the cost of labour accounted the highest percentage (58.78%) of rearing cost followed by cost of feed (16.72%), chicks (13.93%), depreciation cost on poultry shed (8.71%), cost of medicine, feed supplement (1.31%) and cost of vaccine (0.56%).

Similarly, in case of local chicken the expenses for the labour is also highest (71.73%) among the other expenses of rearing, which is also higher than that of labour expenses of Vanaraja chicken rearing. The expenses for the cost of feed, chicks, poultry shed depreciation cost, cost of medicine and feed supplement, cost of vaccine accounted 5.31, 10.63, 10.63, 1.02 and 0.68 % respectively.

Uddin *et al.*, (2013) also reported that labour cost estimated to be the highest in backyard poultry rearing. Present finding is contradictory with the finding of Nath *et al.*, (2013), where he reported that feed cost (90.95%) constituted the highest expenditure for both Vanaraja and local chicken under backyard rearing condition.

The lower expenses in medicine and feed supplement for local chicken in comparison to the Vanaraja chicken might be due to the fact that the local chickens have better adaptability to the backyard rearing than that of Vanaraja chicken (Islam *et al.*, 2015).

In the present study the total production cost for Vanaraja chickens was found to be higher (Rs. 5741.95) than that of the production cost for local chicken (Rs.4704.95) which might be due to the higher chick and feed cost of Vanaraja chickens.

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Table 2: Estimated Rearing Cost of 20 Vanaraja and 20 Local Chickens under Backyard System

S. No.	Particulars	Cost of Rearing (Rs.)	
		Vanaraja	Local Chicken
1	Variable cost		
a.	Cost of a day old chicks @Rs. 40/- for Vanaraja and @Rs. 25/- for local chicken	800.00 (13.93)	500.00 (10.63)
b.	Cost of feed up to 42 days of age		
i	For Vanaraja chick 1.2 kg of broiler starter/bird i.e. 24 kg @ 40/- per kg	960.00 (16.72)	-
ii	For local chicks 10 kg of broken rice @ Rs. 25/- per kg for 20 nos. chicks	-	250.00 (5.31)
c	Cost of vaccine @ Rs. 1.60/ chick	32.00 (0.56)	32.00 (0.68)
d	For Vanaraja chick cost of medicine, feed supplement @ Rs. 3.75/chick	75.00 (1.31)	-
e	For local chicken cost of medicine, feed supplement @ Rs. 2.40/chick	-	48.00 (1.02)
f	For both the flock (Vanaraja and local) cost of labour @ 20 hrs. / month = 2.5 Man-days x 18 months = 45 man-days x Rs. 150/- per Man-day = Rs. 6750.00	3375.00 (58.78)	3375.00 (71.73)
	Total Variable cost	5242.00	4205.00
2	Fixed cost		
a	Land	Available with the farmers	Available with the farmers
b	Low cost poultry shed made with locally available material (L/S)	1000.00	1000.00
c	Depreciation cost on poultry shed @ 33.33 % per year	499.95 (8.71)	499.95 (10.63)
d	Drinker/ Feeder	Locally made	Locally made
	Total fixed cost	499.95	499.95
3	Total cost/value of production	5741.95	4704.95
4	Cost of production per bird (D/20)	287.10	235.25

From the study it was found that maximum amount of return in case of Vanaraja chicken was obtained from selling of eggs (48.53%), followed by sale of cocks (40.44%) and sale of spent hens (11.03%). This return trend *i.e.* highest income from the selling of eggs (46.02%), followed by sale of cock (38.90%) and sale of spent hen (15.09%) was also observed in case of local chicken (Table 3). The total gross income and net income from the Vanaraja chicken was recorded as Rs. 16320.00 and Rs. 10578.05, respectively, which is 57.15% and 46.78% higher than that of gross income (Rs. 10605.00) and net income (Rs. 5900.05) from the local chickens. The Gross Margin and the Net Farm Income from the backyard Vanaraja and local chicken rearing was recorded as Rs. 5336.05, Rs. 1695.05, Rs. 4836.10 and Rs. 1695.05, respectively which indicate that the backyard Vanaraja chicken rearing is very much profitable. The estimated benefit cost (B: C) ratio for Vanaraja and local chicken were recorded as 2.84 and 2.25 which indicated that rearing of Vanaraja was much more profitable than that of rearing of local chicken. Higher B:C ratio in Vanaraja chicken than that of local chicken might be due to better genetic makeup of Vanaraja for higher egg production and attainment of better body weight in the given period (Uddin *et al.*, 2013).

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Table 3: Estimated Return from Vanaraja and Local Chickens

S. No.	Particulars	Vanaraja (n=20)	Amount (Rs.)	Local (n=20)	Amount (Rs.)
1	Income from sale of eggs (from 9 nos. of Vanaraja and 8 nos. of local hens)	Av. annual egg production 110 eggs/hen <i>i.e.</i> 990 nos. of eggs @ Rs. 8/egg	7920.00 (48.53)	Av. annual egg production 61 eggs/hen <i>i.e.</i> 488 nos. of eggs @ Rs. 10/egg	4880.00 (46.02)
2	Sale of cocks (8 nos. Vanaraja and 10 nos. local)	Av. weight: 3.30 Kg. Total weight: 26.40 Kg @ Rs. 250/Kg	6600.00 (40.44)	Av. weight: 1.65 Kg. Total weight: 11.515 Kg @ Rs. 250/Kg	4125.00 (38.90)
3	Sale of spent hens (9 nos. of Vanaraja and 8 nos. of local)	Rs. 200 / hen	1800.00 (11.03)	Rs. 200/ hen	1600.00 (15.09)
4	Total gross income	-	16320.00	-	10605.00
5	Net income	-	10578.05	-	5900.05
6	Net income / bird	-	528.90	-	295.00
7	Gross margin (Net income – Total variable cost)	-	5336.05	-	1695.05
8	Net Farm Income (GM-Total fixed cost)	-	4836.10	-	1195.10
9	Benefit-cost-ratio (BCR)	-	2.84	-	2.25

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