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Economic Analysis of Kamrupa Compared to Local Chicken Production in Assam under Backyard System of Rearing

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Authors' contributions

This work was carried out in collaboration among all authors. Author AKS designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors GG and MN managed the analyses of the study. Author AKS managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Aims: The programme was undertaken to study the economic analysis of *Kamrupa* and local chicken in Dhemaji district of Assam under backyard system of rearing.
Study Design: The data on various expenses and returns thus collected were tabulated and subjected to statistical analysis as per the methods described by [1].
Place and Duration of Study: The study was conducted in *Sissiborgaon, Dhemaji* and *Jonai* development blocks of Dhemaji district during the period January, 2018 to July, 2019 by Krishi Vigyan Kendra, Dhemaji.
Methodology: For the purpose thirty numbers of farmwomen from three different development blocks, thus a total of ninety numbers of farmwomen, of Dhemaji district were selected on the basis of their early experience in keeping local poultry along with *Kamrupa* chicken at backyard system.

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Items of cost included fixed cost e.g. land and building, equipments and variable costs e.g. cost of day-old chick, cost of feed, vaccine, medicine, labour, depreciation in poultry shed and miscellaneous cost. Return items included eggs, cocks and spent hens.

Results: The cost of labour accounted for 72.44 percent of the total cost of production of *Kamrupa* chicken followed by feed cost (9.79%), chick cost (7.21%) and depreciation of poultry house (6.44%) up to 18 months of age. The total cost of production up to 72 weeks of age was found to be higher in *Kamrupa* (Rs. 3,882.48) than its local counterpart (Rs. 3,512.48). The maximum amount of income was contributed by selling of eggs (46.60%) followed by sale of cocks (26.76%) and sale of spent hens (26.64) in case of local chicken. The benefit-cost (B:C) ratio in *Kamrupa* and local chicken were recorded as 2.64 and 2.14, respectively, in the present study.

Conclusion: From the study, it can be concluded that the small scale *Kamrupa* rearing is a profitable venture for farmwomen in the state of Assam.

Keywords: Kamrupa; local chicken; benefit-cost ratio; income; returns.

1. INTRODUCTION

Poultry keeping is an age old practice among the rural farmers in Assam as secondary source of income. For the marginal farmers and landless workers the income from poultry and livestock rearing has become a major source of income. Most women and children are involved in village poultry rearing. They have been rearing the Desi varieties of chicken traditionally in backyard system of rearing for household consumption as well as to meet the day to day household expenses to some extent. However, the productivity of native indigenous fowls is very low due to their inherent low genetic potential, thus making the backyard poultry less remunerative. To meet the growing demands of the populations and to improve the per capita consumption of eggs and meat among rural people, backyard poultry farming with improved varieties of poultry like Kamrupa is one of the available alternatives and such practices have been gaining popularity among farmwomen of the state. 'Kamrupa' is a multi-coloured bird for rural poultry production developed under All India Coordinated Research Project on Poultry Breeding at Assam Agricultural University, Khanapara, Guwahati, Assam. It is three way cross developed using Assam local ecotype (25%), Coloured Broiler (25%) and Dalhem Red (50%) population. However, no major systematic studies have been made so far to know the cost of rearing of such small scale backyard poultry with Kamrupa and local chicken. Keeping this fact in view a study was planned with following objectives:

- To assess the comparative economic parameters under backyard rearing system of improved varieties of poultry Kamrupa and local chicken up to 18 months of rearing
- To appraise the gross and net income
- To evaluate the profitability under backyard rearing system

2. MATERIALS AND METHODS

The study was conducted in Sissiborgaon, Dhemaji and Jonai development blocks of Dhemaji district during the period January, 2018 to July, 2019 by Krishi Vigyan Kendra, Dhemaji. These three blocks were selected purposefully as they had higher poultry population as compared to others. Thirty numbers of farmwomen from each block and thus a total of 90 farmwomen from various self help groups (SHGs) were selected randomly on the basis of their experience in keeping indigenous as well as Kamrupa birds in their household. The farmwomen, who kept a minimum of 10 numbers of indigenous chickens along with 10 numbers of Kamrupa chickens of either sex, were selected for the study.

The birds were reared under backyard system of rearing as they do traditionally. The birds were vaccinated with Ranikhet and Gamboro disease vaccines as per standard vaccination procedure and schedule. The farmwomen were provided with a register to record all the expenses and returns from day old to 18 months of age of the birds. They were also trained and helped in doing so and monitored by KVK personnel from time to time to record all the relevant data in the register. Under the backyard system of rearing, both egg and meat were considered as a source of income and all the produced eggs were considered as table eggs. The eggs and birds were sold directly to the consumers at the prevailing market rates. Items of cost included fixed costs e.g. land and building and equipments and variable costs e.g. cost of day-old chick, feed cost, vaccine and

medicine cost, labour cost, miscellaneous cost and depreciation cost. Feed cost was calculated by the following formulae:

In case of Kamrupa chicken-

Feed cost= Quantity of broiler starter feed offered up to 30 days of age X market price of per kg of feed

In case of Local chicken-

Feed cost= Quantity of broken rice offered up to 30 days of age X market price of per kg of broken rice

The return items included eggs, live cocks and spent hens. Data were collected from the selected farmwomen recorded in the register. The net returns were calculated by deducting the net cost of production from the total returns from eggs and birds. The cost-benefit ratio was calculated by dividing the total gross return by net cost of production. The mortality rates in Kamrupa and local chicken were recorded as 20 and 10%, respectively during the whole experimental period. The data on various expenses and returns thus collected were tabulated and subjected to statistical analysis as per the methods described by [1].

3. RESULTS AND DISCUSSION

The fixed and variable costs for rearing a small unit of backyard poultry of 20 numbers (10 numbers of *Kamrupa* and 10 numbers of local chicken) are presented in Table 1. The labour cost alone accounted for 80.07 percent of the total cost of production in case of local chicken followed by depreciation on poultry house (7.12%), chick cost (6.26%), feed cost (3.13%) and so on. Similarly, in case of *Kamrupa* birds also labour cost was the highest (72.44%) among the cost of production followed by feed cost (9.79%), chick cost (7.21%) and depreciation cost on poultry house (6.44%). There were reports of similar results that human labour cost comprised the highest percentage of total production cost in backyard system of rearing of Kamrupa and Assam local chicken [2], [3]. In contrast to the present findings, it was reported that feed cost alone contributed 90.95% of the total cost of production followed by chick cost, medicine cost and vaccine cost in backyard system of poultry rearing in Sikkim [4]. The cost of vaccine and cost of medicine and feed supplements accounted for 1.14 and 1.42 and 1.03 and 1.80% of the total cost of production in case of local and *Kamrupa* chicken, respectively. However, [5] reported that the cost of medicine was only 0.81% of the total cost in backyard poultry in Nigeria. The lower cost of medicine and other feed supplements in local chicken as compared with *Kamrupa* chicken might be due to lesser incidence of disease outbreak in local chicken because of their higher adaptability in backyard system than *Kamrupa* birds. In the present study, the total cost of production up to 72 weeks (18 months) of age was found to be higher in *Kamrupa* (Rs. 3,882.48) than its local counterpart (Rs. 3,512.48). The higher production cost in *Kamrupa* might be due to higher feed and chick cost. The cost of production per bird was estimated as Rs. 351.25 in local and Rs. 388.25 in *Kamrupa* chicken. Similar trends of production costs in case of local and *Vanaraja* chicken were observed while keeping them in backyard system of rearing [3]. In contrast to the present findings, some researchers reported higher cost of production per bird as Rs. 729.50 under scientific backyard rearing of high yielding chicken in Sikkim [4].

While studying the income from poultry rearing, it was found that maximum amount of income was contributed by selling of eggs (46.60%) followed by sale of cocks (26.76%) and sale of spent hens (26.64%) in case of local chicken (Table 2). Similar trends of share were also recorded for *Kamrupa* birds under backyard system. Some reports were also there that the highest amount of income in backyard poultry farming was coming from selling of eggs (65.96%) in Sikkim [4]. Other researchers also observed that the income from *Vanaraja* chicken by selling of eggs was much higher (57.26%) than its local counterparts, which was due to production of more numbers of eggs by *Vanaraja* birds, might be because of their better genetic makeup [3]. The total gross income in *Kamrupa* chicken was also 36.35% more than the local chicken under backyard rearing system. Similar type of increment (37.56%) in gross income was observed by [3] in *Vanaraja* birds in comparison to indigenous chicken. Likewise, the net income from *Kamrupa* birds was also increased by 59.04% compared to the local chicken. The benefit-cost (B:C) ratio in *Kamrupa* and local chicken were recorded as 2.64 and 2.14, respectively, in the present study. The higher benefit cost ratio in *Kamrupa* birds was due to more egg production and attainment of better body weight and early maturity in the given period of time compared to local chicken. There

Table 1. Estimated cost of rearing for small unit of local and *Kamrupa* chicken

Particulars		Local	Amount (Rs.)	*Kamrupa*	Amount (Rs.)
A	Fixed cost				
A	Land	Existing	-	Existing	-
B	Poultry shed made of locally available materials	L/S	750.00	L/S	750.00
C	Equipments	Not required	Nil	Not required	Nil
B	Variable cost				
A	Cost of day old chicks 10 nos.	@ Rs. 22/- per chick	220.00 (6.26)	@ Rs. 28/- per chick	280.00 (7.21)
B	Cost of feed up to 28 days				
	i) For local chick 5 kg of broken rice for 10 nos. chicks				
	ii) For *Kamrupa* chick 10 kg of broiler starter feed for 10 nos. chicks	@ Rs. 22/- per kg of broken rice	110.00 (3.13)	@ Rs. 38/- per kg of feed	380.00 (9.79)
C	Cost of vaccine	@ Rs. 2.00/ chick	40.00 (1.14)	@ Rs. 2.00/ chick	40.00 (1.03)
D	Cost of medicine, feed supplements *etc.*	@ Rs. 2.50/ bird	50.00 (1.42)	@ Rs. 3.50/ bird	70.00 (1.80)
E	Cost of labour @ 10 hrs. per month=1.25 Man-days, Total Man-days: 22.5 for both flock (*Kamrupa* and local)	@ Rs. 250/- per Man-day	2,812.50 (80.07)	@ Rs. 250/- per Man-day	2,812.50 (72.44)
F	Miscellaneous cost	L/S	30.00 (0.85)	L/S	50.00 (1.29)
G	Depreciation on poultry shed @ 33.33 per year	-	249.98 (7.12)	-	249.98 (6.44)
Total variable cost		-	3,512.48	-	3,882.48
Total cost of production			3,512.48	-	3,882.48
Cost of production per bird			3,51.25	-	3,88.25

**Figures in the parenthesis indicate percent of total cost of production*

Table 2. Estimated returns from various components

Particulars	Local birds	Amounts (Rs.)	*Kamrupa*	Amount (Rs.)
a) Income from sale of eggs (5 nos. of local and 4 nos. of *Kamrupa* hens)	Av. annual egg production: 70 eggs/ hen, Total egg prod.: 350 nos. @ Rs. 10/ egg	3,500.00 **(46.60)**	Av. annual egg production: 150 eggs/ hen, Total egg prod.: 600 nos. @ Rs. 10/ egg	6,000.00 **(58.59)**
b) Sale of cocks (4 nos. of local and 4 nos. of *Kamrupa* cocks)	Av. weight: 1.675 kg, Total wt.: 6.70 kg @ Rs. 300/ kg	2,010.00 **(26.76)**	Av. weight: 2.20 kg, Total wt.: 8.80 kg @ Rs. 300/ kg	2,640.00 **(25.78)**
c) Sale of spent hens (5 nos. of local and 4 nos. of *Kamrupa* hens)	@ Rs. 400/- per hen	2,000.00 **(26.64)**	@ Rs. 400/- per hen	1,600.00 **(15.63)**
Total gross income	-	7,510.00	-	10,240.00
Net income		3,997.52		6,357.52
Net income per bird		399.75		635.75
Benefit :Cost ratio		2.14		2.64

**Figures in the parenthesis indicate percent of total returns.*

were reports of 2.60 and 2.27 B:C ratios in *Vanaraja* and local chicken, respectively, in backyard system of rearing[3]. Some poultry workers also reported a much higher benefit cost ratio (5.57) in native poultry reared in the coastal region of Bangladesh [2]. However, [6] reported much lower benefit cost (B:C) ratio as 1.73 in Rhode Island Red chicken reared in backyard system in West Bengal. Some reports of less amount of benefit cost ratio as 1.73 was also observed in scientific backyard poultry farming in Sikkim [4]. Researchers were also assessed that there was profitability in rearing indigenous chicken under backyard with a benefit cost ratio of 1.60 and 1.61 in two of the study areas [7]. The average cost benefit ratios of layer and broiler farms were 1.15 and 1.10 under intensive system of management in Bangadesh as observed by [8]. The higher B:C in *Kamrupa* chicken compared to local chicken indicated that *Kamrupa* rearing was much more profitable in the study areas than the local chicken. There is also reports of similar type of B:C ratio (2.40) in Kamrupa birds reared under backyard system [9]. The B:C ration for Kamrupa chicken in extensive system of rearing was reported higher (3.10) compared to the observed value in the present study [10]. However, the B:C ratios are subject to alter and go up and down based on market demand, consumer preference and social and festive seasons. It was also observed that consumer preference and selling prize of egg and meat was similar in both Kamrupa and local chicken. The result of the present study will help farmers during choice of type of chicken for rearing and the policy makers to adopt strategies to enhance livelihood of rural populace.

4. CONCLUSION

There is ample scope with immense potential of Kamrupa alongside local indigenous chicken for undertaking them as component of backyard poultry farming by rural women for subsidiary income. A flock size 20-30 of these multi-coloured birds per household would provide a handsome return to the village poor and landless and marginal farmers who rear poultry along with other livestock such as pigs and goats traditionally for their livelihood. Provision of scavenging in natural vegetation would provide excellent source of food supplemented with agri and kitchen wastes would render low or no expenditure on their maintenance. From the present study, it is revealed that the benefit cost ratio of *Kamrupa* chicken is better than the local chicken under backyard system of rearing, which indicates that the small scale *Kamrupa* rearing is a profitable venture for farmwomen in village condition. Therefore, subsistence poultry keeping could be encouraged in Assam as an effective means of income and employment generation particularly for women which will ultimately reduce the poverty and improve protein nutrition and the overall livelihood. The study may be replicated in bigger flock size and may be an option for enhancing livelihood of rural populace of Assam.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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