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Assessment of Improved Poultry Strain under Backyard System of Poultry Farming as an Economic Venture in Rajasthan

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ABSTRACT: Backyard Poultry farming is crucial for Rajasthan due to its contributions to food security, economic development, and employment opportunities, particularly in rural areas. The present study attempted to assess the intervention of improved poultry strain as backyard poultry as an economic venture. A total of 220 units, with 20 birds of 8 weeks old birds were supplied after compilation of early vaccination schedule, waterer & feeder each were supplied to tribal families spreading in 9 villages of tribal dominated five blocks of Sirohi and Pali districts in Rajasthan. Beside inputs, technical assistance were given to the beneficiaries in terms of skill training programs, advisory services and diagnostic field visit to enhance the knowledge level as and when necessary by the project staff. Findings of present study revealed that the average daily weight gain (ADG) in improved and Desi birds during 8th and 20th weeks of age was recorded to be 12.44 g and 10.90 g respectively. The average age at first egg laying was observed in improved and Desi birds as 142.68±2.73 and 163.87±2.17 d, respectively. In case of economic returns was recorded by keeping of a unit of 20 birds, generate a income on an average about Rs 11,280 of improved birds and Rs 6,130 in desi birds. The B:C ratio of improved birds and desi birds observed 2.0324 and 1.7589 respectively and further noticed that the earning of poultry farming mainly utilized for domestic purpose and ranked first with rank base quotient (RBQ) value 76.38. The article portrays the need for providing capacity building and extension programme to tribal households, which can go long way in making backyard poultry as a tool for socio economic upliftment.

Keywords: Arid ecosystem, Backyard, Average daily weight gain, economic venture and improved Poultry strain.

INTRODUCTION

Poultry in agriculture segment is one of the fastest growing sectors in India with an average growth rate of 6 per cent in egg production and 12 per cent for broiler production per annum. Eggs and poultry meat has emerged next to milk as a contributor to the output from livestock sector in recent years. The percentage contribution of eggs and poultry meat was 4.47 percent in 1951-52, which reached to a little over 9 per cent in 2015-16. In Rajasthan, production of eggs has increased from 710 million in 2005-06 to 1,363 million in Rajasthan (Nikita and Kumari 2022). Backyard poultry farming is type of organic farming with no harmful residue in egg and meat and advantageous and provides supplementary income in shortest possible time with very minimum capital investment. Simple in operation and ensures availability of egg and meat even in remote rural areas (Sihag *et al.*, 2020). Due to changing taste, cost and income over time, meat consumption shifted over time from beef, veal, lamb and chevon to greater consumption of poultry and fish (Lavania *et al.*, 2023). The popularity of poultry meat is on the rise during the last two decades and presently accounting for about 45 per cent of the total meat consumed. Even though, about 15-29 per cent of total poultry output derived from "backyard" production, almost 11 per cent of national egg production was from backyard poultry (Kumaresan *et al.*, 2008). In India, BPF plays a crucial role in the livelihood of millions of souls. Most of the backyard poultry production comprises of rearing indigenous birds with poor production performances (Reetha *et al.*, 2016). Backyard poultry widely accepted by the rural people is characterized by small flock size consisting of 5-20 birds predominately non - descript birds maintained in extensive system (Joshi *et al.*, 2019). It is by and large envisioned as a hobby in suburbs areas but constitutes a lifeline in rural/tribal areas; providing nutritional security particularly to the children and pregnant women or even remuneration via sale birds and eggs.

Quality of indigenous chicken and egg is better as the birds are raised in less stress environment and consumers are willing to pay higher prices. Most of the backyard poultry production comprises of rearing of

birds with poor production performances (Patra and Singh 2016). In BPF, birds are kept at minimal cost inputs in the form of kitchen waste, cheap locally available grains, worms, insects, leaves and other scavenging material during the day time while at night they are plied with some low cost shelter. Backyard poultry birds are highly adaptable and resistant to diseases. Male birds are ordinarily consumed for table purpose or used for recreation activities while as the female counterparts are typically retained for egg production. The potentiality of indigenous birds in terms of egg production is only 50 to 60 eggs/ bird/ year and meat production is also very low (Ahmad and Singh 2019). In nutshell "Backyard poultry farming acts as an 'ATM', as per family needs – the birds and eggs can be sold at anytime, anywhere for cash in hand." Quality of chicken and egg is better in terms of organic farming as the birds are raised in stress less environment with natural input (Nirmala *et al.,* 2020). For nutritional security, nutritional garden help with the consumption of freshly harvested vegetables in their daily diet, contributing for the increased nutritional status of the families (Anupama *et al.,* 2022). Presently, both ICAR and State Agriculture Universities (SAU's) have developed different improved varieties of chicken, which survive and perform well under diversified agro-climatic conditions in our country. So, backyard poultry production can be enhanced by adopting improved strains of chicken that can promise better production of meat and egg. Therefore, promoting backyard poultry in tribal areas was identified as genuine activity for income generation venture and nutritional status of family. Hence, present study was undertaken to document the information, a front line demonstration (FLD) was planned for popularizing the rural poultry farming with improved poultry "*Pratapdhan"* as backyard farming in Sirohi and Pali districts under jurisdiction in Agriculture University, Jodhpur of Rajasthan.

MATERIALS AND METHODS

To ensure the successful implementation of the Tribal Sub Plan (TSP) programme, the beneficiaries' selection was done with collaboration of different organization working in Sirohi and Pali districts Viz. CMF, Pradhan, Rajivika, Krishi Vigyan Kendra, Sirohi and College of Agriculture, Sumerpur, Pali. The criteria for selection of beneficiaries were adopted for keeping of birds, substantial knowledge in management practices of poultry birds and their active participation. A total of 220 tribal families were identified from 09 villages of 5 blocks of Sirohi and Pali districts under jurisdiction of Agriculture University, Jodhpur in Livestock based Integrated Farming System project in Tribal Sub Plan (TSP) funded by Division of Education, ICAR, New Delhi in the year of 2021-2022. Eight weeks old about 4400 improved chicks were demonstrated to 220 beneficiaries (20 chicks to each tribal family). Improved chicks (*Pratapdhan*) procured from AICRP, MPUAT, Udaipur. The improved bird is a hybrid breed of chicken developed by the MPUAT, Udaipur. It is a dual purpose breed producing meat and eggs, can live on a diet of kitchen and agricultural waste and produce around 160 eggs per year. The *pratapdhan* chick is a potential bio converter of no cost agricultural, household and natural waste abundant in villages - into human protein food and substantial incomes for rural households (Tailor, 2013). The performance of improved birds in terms of body weight gain, age at first egg production, mortality, economic analysis and income utilization by tribal farmers and data on above parameters were also recorded for desi birds also. The statistical analysis was carried out using SPSS software program, version 14.0.

RESULT AND DISCUSSION

The results obtained from the present study as well as other relevant information's have been discussed under following heads:

Average body weight. The average body weight of improved birds under field conditions at 8,12,16,20 and 40 weeks of age were recorded as 505.06±9.92, 940.58±18.14, 1372.63±41.49, 1542.87± 48.16 and 2122.13± 51.11g, respectively, whereas 466.33± 8.62, 756.30± 16.41, 1207.11± 38.94, 1327.44± 42.61 and 1837.28± 48.12g, respectively for the Desi birds at their respective age under traditional system of management. The observations for body weight of improved birds were significantly higher than ($p<0.05$) their corresponding values for Desi birds might be due to the difference in their availability of feeding material, management practices adopted by farmers and genetic makeup of the improved birds. The average daily weight gain in improved and Desi birds during 8th and 20th weeks of ages were recorded to be 12.44 g and 10.90 g respectively. These observations are in close agreement with Thakur *et al*. (2020) reported in their study Himsamridhi variety of chicken under rural poultry production in district Kangra, H.P and Balakrishna *et al*. (2023) in a sustainable livelihood option for tribal and rural women in Srikalam district, Andhra Pradesh .

Table 1: Average body weight, age of first laying and egg production of improved and desi birds.

Age of birds	Body weight of improved birds (g)	Desi birds (g)	Level of significance
8 weeks old	505 .06±9.92	466.33± 8.62	*
12 weeks old	940.58± 18.14	756.30± 16.41	*
16 weeks old	1372.63± 41.49	1207.11± 38.94	*
20 weeks old	1742.87± 48.16	1527.44± 42.61	*
40 weeks old	2122.13± 51.11	1837.28± 48.12	*
Average age at first egg laying (d)	142.68±2.73	163.87± 2.17	*
Average egg production (up to 40 weeks)	79.43± 2.19	53.18± 2.22	-
Per cent mortality from 8 to 20 weeks	10	15	-
Mean egg weight (g)	48.32±1.16	39.96±1.61	*

*Mean differ significantly ($p<0.05$)

Egg Production. The average age at first egg laying was recorded in improved and Desi birds as 142.68±2.73 and 163.87±2.17 days, respectively. Result of present study was comparable with those reported by Kumar *et al*. (2008); Malik and Singh (2010) for CARI Nirbheek and Ahmad and Singh (2019) ages at first egg lying (days) was 175.85± 2.33 in Srinidhi birds. Various egg productions trait results egg production up to 40 weeks, average egg weight and egg production were corroborated by Yadav and Bugalia (2019); Kantwa *et al.* (2022).

Mortality. The root causes of mortality in the present study were observed physical injuries, fighting, Cannibalism and predator attack. The results of study indicate that livability percentage of improved birds was well within the range as compare to desi breed which could probably be due to presence of good immune competence and disease resistance of improved chickens and proper management practices followed by farmers. This finding was in accordance with Gawanda *et al.* (2007) reported that disease and chick's mortality as major constraints in village poultry production.

Economic parameters of backyard poultry farming. A partial budget analysis measures was used in those items of expenditure and income. Therefore, the cost of chicks, feed, medicines and imputed value of family labor cost in miscellaneous. The improved breed of chicks unit consists of 20 birds were provided to the tribal beneficiaries at the age of 7-8 weeks were reared for up to 40 weeks in backyard. The selling price of eggs of either stock has been considered as Rs 10/egg and bird is sold for Rs 400/ piece. The gross income in improved poultry farming Rs 16,830/- whereas gross income in desi poultry farming was Rs 9,615/- (Table 2). The benefit cost ratio observed with improved birds was found to be 2.03 as compared to 1.7589 of Desi birds, which appears to be economical and viable for rearing under backyard farming system. These findings are in close agreement of the results reported by Balakrishna *et al.* (2023); Kantwa *et al.* (2022). It is also supported by earlier studies (Reddy *et al*., 2017; Nirmala *et al.*, 2020) that backyard poultry farming is source of livelihood support and nutritional security for the tribal people.

Table 2: Economic analysis of backyard poultry unit of 20 birds.

Parameters	Rearing cost of improved birds	Rearing cost of Desi bird
Cost of chicks at the age of 7-8 weeks (Rs)	1500	800
Cost of feeding (Rs)	2960	1840
Cost of medicines and miscellaneous (Rs)	1090	845
Total cost of rearing (Rs)	5,550	3,485
Total income from eggs (Sold and consumed)	13,230	6,615
Total income from birds (Sold and consumed)	3600	3000
Gross income (Rs)	16,830	9,615
Net income (Rs)	11,280	6,130
B:C Ratio	2.0324	1.7589

Income utilization by tribal farmers. The utilization of income generated from backyard poultry farming by the tribal farmers was studied and analyzed by using Rank Based Quotient (Table 3). The income mainly utilized for domestic purpose and ranked first with RBQ value 76.38 followed by further expansion of poultry flock size (35.67), agricultural and livestock expense (30.27) and savings for emergency purpose (22.93). The results of present study was in line with the findings of Chaturvedani *et al.* (2015). They also revealed that majority (87.15%) of the respondents utilized the income generated from backyard poultry rearing for household purpose followed by poultry production(77.50%), recreational purpose (74.20%), medical expenses (43.30%), children education on (29.20%), agriculture (10.0%) and livestock purchase (5.80%).

Table 3: Income Utilization by tribal farmers.

Sr. No.	Purpose	RBQ value	Rank
1.	Domestic purpose	76.38	I
2.	Expansion of poultry flock size	35.67	II
3.	Agricultural and livestock expense	30.27	III
4.	Savings for emergency purpose	22.93	IV

CONCLUSIONS

The present study was undertaken to assess the improved poultry strain under backyard system in tribal dominated blocks of Sirohi and Pali districts under jurisdiction of Agriculture University, Jodhpur. The higher returns from backyard poultry revealed that it can generate income to develop self-employment and nutritional security. Advancement of the backyard poultry through introduction of improved breeds can definitely contribute to poverty alleviation and nutritional improvement. Therefore, it is necessary to impart capacity building programs, Front Line Demonstration on improved practices of poultry production practices for larger adoption and self-employment venture. Government should provide constant support to find organizational solutions to minimize public-health risks and provide appropriate extension support on issues like disease prevention, predation and improving hatchability to the producers.

FUTURE SCOPE

Looking the importance of backyard poultry farming, research into backyard poultry strains focuses on optimizing productivity and resilience in smaller-scale, low-input farming systems, often involving indigenous breeds or improved crosses. Studies analyze various aspects including growth rates, egg production,

mortality, and disease resistance across different breeds and management practices. While developing improved strain /breeds, focus should be given on the competitive advantage of rural poultry egg consumption. Financial support for establishing multi locational poultry seed production of the developed or improved varieties in participating shall be needed.

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Conflict of Interest. Nil.

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