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Integrating Nutrition and Livelihood through Rajasri Backyard Poultry in Semi-Arid Telangana

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Abstract
Backyard poultry is contributing to about 19.50% of poultry production in India. It is playing a pivotal role in providing livelihood and income to rural poor by utilizing natural food base available in scavenging with "Rajasri" bird. A total of 2200 day old chicks (Rajasri) were reared in deep litter up to 6 weeks of age. At 7 weeks of age, 2000 grower birds were distributed to 100 women beneficiaries covering Ailapoor, Joganpalle, Porumalla, Katlakunta, and Mythapur villages in the Jagtial district of Telangana state. The birds were distributed 20 numbers per each beneficiary which were reared with nominal supplementary feeding. The female bird attaining an average body weight of 2.10 kg by 52 weeks. Egg production commenced between 174 and 183 days of age, with 50% hen-day production achieved by 198–207 days. Peak egg production reached 61.24% at 48 weeks and remained above 56% until 52 weeks. Egg weight improved consistently from 41 to 55 g as birds matured. Despite the absence of brooding behaviour in Rajasri, local hens were utilized for natural incubation to sustain flock multiplication. Economically, the model proved viable and replicable. Each beneficiary, rearing 20 birds, generated a net annual income of approximately ₹5,950 after accounting for feed, vaccination, and chick costs. The intervention not only improved access to high-quality animal protein but also offered a reliable microenterprise option for rural women and marginal farmers. This study reinforces the role of backyard poultry as a low-investment, high-return model for improving food security and household resilience in underserved areas.

Keywords: Backyard, Rajasree birds, Performance, Nutritional Security, Economics and Sustainable Livelihood

Introduction
Poultry farming has increasingly become a cornerstone of rural livelihoods in India, particularly among smallholder and landless communities. It contributes not only to household nutrition through the provision of high-quality animal protein but also serves as a vital source of supplementary income. As per the Department of Animal Husbandry and Dairying (DAHD, 2024), over 20% of India's poultry population is reared under backyard systems, with indigenous and improved native breeds playing a significant role in sustaining the nutritional and economic well-being of rural families.

Among the improved dual-purpose breeds, the Rajasri chicken, developed by the Poultry Research Station, PVNRTVU in Hyderabad, has gained recognition for its high adaptability, moderate egg production, good body weight, disease tolerance, and ability to thrive under low-input, semi-scavenging conditions. Unlike exotic breeds that often underperform in rural contexts due to feed, climate, and health constraints, Rajasri birds are tailored for backyard rearing, combining traits of rusticity and productivity (ICAR-DPR, 2023).

In socio-economically marginalized regions, especially in dryland districts like Jagtial, Telangana, backyard poultry plays a dual role. It enhances dietary diversity by providing affordable sources of eggs and meat and offers liquid income to meet day-to-day household needs such as health, education, and transport (Jha & Dey, 2025) [6]. Moreover, as a gender-inclusive enterprise, it empowers women and elderly farmers who can manage small flocks with minimal land and capital investment.

Against this backdrop, the present study was undertaken to evaluate the on-field viability of

Rajasri birds reared under decentralized, semi-intensive backyard conditions across five selected villages of Jagtial district. The objective was to assess the breed's growth performance, reproductive efficiency, mortality, and economic returns, while also exploring its potential to improve household food security and livelihood resilience.

Materials and Method

A total of 2000 seven-week-old Rajasri growers were distributed among 100 rural beneficiaries across five village of Ailapoor, Joganpalle, Porumalla, Katlakunta, and Mythapur villages in the Jagtial district of Telangana State. Each beneficiary distributed 20 numbers of birds and the project spanned from July 2023 to June 2024.

The birds were managed under a semi-intensive backyard rearing system, utilizing locally available feed resources with partial supplementation. No intensive brooding or feeding was enforced beyond six weeks of age, aligning with cost-effective rural poultry practices.

The study parameters of growth performance (weekly and bi-weekly body weights), egg production and egg weight trends, supplementary feed ingredients and associated costs, mortality and economic returns per bird and per household were collected up to 52 wks of age.

Results and Discussion

The backyard rearing of Rajasri birds under semi-intensive systems demonstrated commendable performance in terms of growth, egg production, survivability, and income generation. The body weight of grower birds increased progressively from 516.2 g at 8 weeks to 1216 g by 20 weeks (Table 2), and further reached an average of 2696 g by 52 weeks of age (Table 3). These gains align with the known genetic potential of Rajasri birds and reflect their adaptability to low-input systems. The steady weight gain is attributable to the breed's inherent foraging behaviour, efficient utilization of fibrous village-level feed resources, and gradual muscle accretion typical of dual-purpose birds. Physiologically, these birds exhibit enhanced gastrointestinal efficiency, particularly in gizzard grinding and cecal microbial activity, aiding digestion of coarse and unprocessed grains (Etches, 2021; Scanes, 2020) [3, 9]. The feed conversion ratio (FCR) ranged from 1.294 in the 1st week to 3.434 by the 6th week (Table 1), indicating an increase in maintenance energy requirements with age and weight, which is expected in slower-growing indigenous breeds (ICAR-DPR, 2023).

Egg production parameters were also satisfactory under backyard conditions. The birds began laying their first eggs between 174 to 183 days of age and reached 50% hen-day production by 198 to 207 days across the five villages (Table 4). This reproductive milestone correlates with the onset of physiological maturity marked by activation of the hypothalamic–pituitary–gonadal axis. The increasing secretion of gonadotropins stimulates follicular development and initiates ovulation, while oestrogen prepares the oviduct and promotes medullary bone formation for calcium mobilization (Etches, 2021) [3]. The hen-day egg production steadily increased from 0.49% at 22 weeks to a peak of 61.24% at 48 weeks, maintaining above 56% till the 52nd week (Table 5). This consistency in lay reflects the breed's reproductive resilience, and the absence of broodiness in Rajasri further enhances laying persistency by preventing prolactin-induced ovarian suppression (El Halawani & Rozenboim, 2022) [2].

Egg weight also showed a gradual increase, from 40.50 g at 24 weeks to nearly 55.76 g by 52 weeks (Table 6). This trend is typical in poultry and is influenced by the increasing size and functional capacity of the magnum and shell gland as the bird ages. The maturation of reproductive organs facilitates greater deposition of albumin and shell content, driven by rising plasma oestrogen levels. Differences in egg weight among villages were possibly influenced by local variations in feed supplementation, ambient temperature, and micro-nutritional availability.

Fertility and hatchability were observed to be modest, at 65–70%, which is common in decentralized backyard setups where natural mating is unsupervised and male-female ratios may be suboptimal. Moreover, the Rajasri birds, being selectively bred for productivity, exhibited little to no broodiness—a behavior essential for natural hatching in rural systems. While native hens with high prolactin levels effectively incubated 12–15 eggs per clutch, the absence of maternal behavior in Rajasri necessitates the use of artificial incubation methods to ensure flock multiplication. This trade-off, though biologically driven, supports consistent egg availability for consumption or sale, as broodiness often halts ovulation (FAO, 2023).

Mortality remained within acceptable limits (<10%) during both grower and laying phases, reflecting the efficacy of the prophylactic health program and the natural hardiness of Rajasri. The semi-scavenging environment possibly contributed to improved immunity due to diversified antigen exposure, enhancing both humoral and cell-mediated responses, as documented in indigenous poultry breeds.

Economically, the project showed significant potential. The total cost incurred per bird, including standard brooding (₹90), supplementary feed (₹18/kg), and health care, amounted to ₹3,06,744 for 2000 birds (Table 7). Revenue was primarily derived from the sale of table and fertile eggs (₹528,080), hatched chicks (₹51,325), and sale of cockerels and spent hens (₹322,500), yielding a gross income of ₹9,01,905 (Table 8). Net returns per bird were calculated as ₹297.58, and each beneficiary earned approximately ₹5,951.61 annually, which translated to ₹16.35 per day (Table 9). These findings resonate with previous studies from Odisha and West Bengal, which also highlight backyard poultry as a source of nutritional and financial resilience in marginalized households (Jha & Dey, 2025) [6].

Table 1: Rajasri birds mean body weights from 0- 6 wk at farm level

Age in weeks	Body weight(g)	Weight gain	Feed intake(g/bird)	FCR
DOC*	35	-		
1	52	17	22	1.294
2	91	39	72	1.846
3	148	57	104	1.824
4	225	77	161	2.090
5	298	73	239	3.273
6	374	76	261	3.434

*day old chick

Table 2: Rajasri grower birds biweekly mean body weights from 8- 20th weeks at field level

Age in weeks	Body weights (gms)
8th	516.2
10th	608.9
12th	723.9
14th	840.3
16th	862.9
18th	1028
20th	1216

Table 3: Field Level Rajasri birds Bi weekly mean body weights from 22nd to 52nd weeks

Age in weeks	Body weights (gms)
22nd	1286
24th	1355
26th	1424
28th 28th	1492
30th	1576
32nd	1682
34th	1766
36th	1846
38th	1942
40th	2036
42nd	2210
44th	2298
46th	2406
48th	2493
50th	2594
52nd	2696

Table 4: Age at first egg (AFE) and at 50% hen-day egg production of Rajasri birds

Villages	Age in days	
	First egg	50 per cent production
Ailapoor	174	198
Joganpalle	181	203
Porumalla	175	201
Katlakunta	179	207
Mythapur	183	206

Table 5: Hen day egg production (%) of Rajasri from 24 to 52 weeks of age

Weeks	Hen day egg production (%)
22	0.49
24	1.22
26	13.28
28	22.36
30	23.10
32	29.21
34	33.68
36	36.98
38	43.85
40	46.98
42	53.48
44	59.21
46	60.59
48	61.24
50	57.25
52	56.89

Table 6: Egg weight (g) of Rajasri birds from 24 – 52 weeks of age

Village	24	28	32	36	40	44	48	52
Ailapoor	41.14	46.93	48.26	50.75	51.50	53.11	55.10	55.76
Joganpalle	40.56	46.78	48.11	50.18	51.13	52.51	53.63	54.23
Porumalla	40.83	45.17	47.91	50.12	50.95	53.31	54.80	55.15
Katlakunta	40.50	45.61	46.99	49.91	51.05	53.09	53.97	54.33
Mythapur	41.24	46.43	48.44	50.19	51.09	52.14	53.80	54.65

Mortality
The mortality was within the limitation.

Incubation Of Eggs
Native chickens are good brooders and mothers, therefore used for propagating the stock. Farmers set @ 12-15 eggs per broody hen for incubation. The fertilitywas however found to be low in backyard poultry rearing (65& 70%). It was observed that the Rajasree birds did not exhibit the brood nature.

Table 7: Expenditure of Rajasri birds reared from 7 to 52 weeks under beneficiary level

S. No.	Item	Qty. of feed / bird (Kg)	No. of birds	Amount (Rs.)	Remarks
1	* Pullet feeding (7-23 weeks)	1.28	1000	23,040	
2	* Cockerel feeding (7-23 weeks)	1.28	1000	23,040	
3	* Layer feeding (24-52 weeks)	4.20	970	73,332	
4	* Cock feeding (24-52 weeks)	4.20	970	73,332	
5	Total feeding cost by farmers			1,26,744	
6	Farm level Expenditure (0-6 weeks) Rs. 90 per each chick production cost from 0-6 weeks of age			1,80,000	Cost of Chick, Feed, Vaccines and Medication
7	Grand total			3,06,744	

* Feed cost @ Rs.18/kg (Supplementary feed ingredients like Grains/Rice polish/DORB)
3% mortality consider from 7-23 weeks of age
7% mortality consider from 24-52 weeks of age

Table 8: Receipts of Rajasri birds from 10 to 52 weeks

S. No.	Item	Quantity (No.)	Rate (Rs.)	Amount (Rs.)
1	Table eggs	68,074	5.00	3,40,370
2	Fertile eggs	12,514	15.00	1,87,710
3	Hatched chicks	2,053	25.00	51,325
4	Sub total			5,79,405
5	Cockerel sold (26th week)	485	200	97,000
6	Liquidated females (52 weeks)	902	150	1,35,300
7	Liquidated males (52 week)	451	200	90,200
8	Sub total			3,22,500
	Grand Total			9,01,905

Table 9: Economic analysis of Rajasri birds at filed level

Particulars	Amount without bird cost (rs)	Amount with bird cost (rs.)
Total Expenditure	1,26,744	3,06,744
Total Receipts	9,01,905	7,21, 905
Net Income	7,75,161	5,95,161
Income/bird	387.580	297.580
Per beneficiary (100 No.)	7,751.61	5,951.61
Per week / beneficiary	149.06	114.45
Per day / beneficiary	21. 29	16.35

Conclusion
The present study highlights the effectiveness of Rajasri backyard poultry farming as a practical and scalable model for enhancing nutritional security and supplemental income among rural households in Telangana. With minimal inputs and localized management, the birds demonstrated satisfactory growth performance, stable egg production, and acceptable survivability under semi-scavenging conditions. Beneficiaries rearing just 20 birds were able to generate an annual net income of approximately ₹5,950, underscoring the economic viability of this low-investment intervention.
Beyond economics, the consistent availability of eggs and meat contributed significantly to household dietary diversity, addressing micronutrient gaps in vulnerable communities. The integration of improved breeds like Rajasri with existing backyard practices bridges the gap between traditional systems and scientific poultry production. Moreover, the non-broody nature of the breed ensures continuous lay, and when paired with native hens for natural brooding, enables sustained flock maintenance even without artificial incubation.
Given its adaptability, cost-effectiveness, and positive socio-economic outcomes, Rajasri-based backyard poultry farming can serve as a replicable livelihood strategy for dryland areas across India. Strengthening this model through institutional support, women-focused training, decentralized hatcheries, and feed linkages could further amplify its impact under rural development, tribal sub-plan (TSP), and nutritional mission programs.

Conflict of Interest
Not available

Financial Support
Not available

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