



Research Article

PERFORMANCE OF KAVERI BIRDS UNDER BACK YARD POULTRY FARMING IN RAINFED SITUATION IN MAHARASHTRA

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Abstract: Kaveri Birds of 30 days old after vaccination and proper brooding was supplied in the year 2020 to the 205 families under Integrated Agriculture Development Project supported by Tasty Bite Foundation, Pune; Agriculture Development Trust, Baramati and implemented by Krishi Vigyan Kendra, Baramati. Under livestock component 25 vaccinated Kaveri birds supplied for Back Yard Poultry management in 3 rainfed villages viz., Khor, Deulgaon Gada and Padavi of Daund tehsil of Pune District. Present data reveals that average body weight at the 24th weeks of age of male and females was 1.85 kg and 2.21 kg, respectively and onset of laying is at the age of 22-24 weeks and it was observed that the average weight of eggs at the age of 24th week was 37.56 gm. & at the age of 52 weeks was 52.77 gm. It was higher than the eggs weight of Deshi Hen. No Diseases like Rani khet and fowl pox was observed in the Kaveri birds as Vaccinated birds was supplied to farmers and Vaccination schedule was adopted by the Farmers. In Deulgaon gada, Khor & Padavi Villages maximum total Gross income recorded was Rs. 22860, Rs.22560/- & Rs.22160/-, respectively. Therefore, Average B:C ratio observed in three villages was found to be 2.1. While recorded Maximum B:C ratio was 3.09 in Khor village. This indicates that Back yard poultry farming with improved strains Kaveri birds has doubled the family income of selected families in all three villages. Simultaneously it had provided opportunity to with stand with mal nutrition issues in the rural area through availability of 5-7 Eggs per week in a Family. Hence, Backyard poultry with improved strains such as Kaveri is a potential enterprise having capacity to improve the socio-economic status of farmers & farming community in rural rainfed areas with low initial investment with high economic return along with definite nutritional food security. So, there is need of more research, extension, financial and technical support to the framers. Mortality up to 72 weeks of age was 20 ± 0.75 recorded.

Keywords: Poultry, Kaveri birds, Improved breed, Egg production, Back yard poultry farming, Semi-arid poultry production, Impact analysis, ADT

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Introduction

Recently in Back yard poultry farming in rural area is popular for the eggs and meat production purpose in Maharashtra and can be promoted to improve the income of rural women farmers in the area. The scale commercial chicken production is still popular in urban and peri urban regions of Maharashtra, even though it shown to be a potent tool to elevating the rural poverty, eradicating malnutrition, and boosting economic development of the rural population. The Project Directorate on poultry, Hyderabad has developed many improved breeds like Wanraja, Gram Priya and Giriraj for back yard poultry farming and recommended for tribal area and rural area for back yard poultry.

According to the National Action Plan for Egg & Poultry-2022 [1], Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture & Farmers Welfare Government of India, the Eggs Nutrition values is a wholesome, it is a nutritious food with high nutrient density. Because, in proportion to their calorie count, they provide 12% of the daily value for protein and a wide variety of other nutrients like vitamins, essential amino acids and minerals such as vitamins viz., A, B6, B12, folate, iron, phosphorus, selenium, choline and zinc etc. along with various other important elements crucial for growth and good health. Eggs are now recognized as "functional foods" category because it contains Lutein and zeaxanthin. Lutein and zeaxanthin have ability to lower down the danger of Age-related Macular Degeneration (AMD) which is one of the foremost causes of blindness after 60's in humans. In addition, there is a less likelihood of cataracts.

Eggs Production

As per National Action Plan for Egg & Poultry 2022 [1] There is tremendous increase in egg production in the country from 83 billion to 88 billion from 2015-16

to 2016-17. The per capita availability of egg has been increased from 61 to 66 from 2013-14 to 2015-16 [Table-1 & 2]. Poultry meat production in the country has been increased to nearly 3.46 million tons during the year 2016-2017 from 3.26 million tonnes during the year 2015-2016 at around 6 % growth rate. Whereas improved strains were commonly practiced in commercial farms i.e., 79 per cent rather than in Back yard farming [Table-3].

Table-1 Egg production - Growth rate in India [1]

SN	Year	Egg Production (In billion Numbers)	% Annual Egg Production Growth
1	2011-12	66.45	5.40%
2	2012-13	69.73	9.94%
3	2013-14	74.75	7.20%
4	2014-15	78.48	4.99%
5	2015-16	82.93	5.66%
6	2016-17	88.13	6.28%

Table-2 Per Capita Egg Availability in India [1]

SN	Year	Per Capita Egg Availability
1	2012-13	58
2	2013-14	61
3	2014-15	63
4	2015-16	66

Table-3 Share of layer population & Contribution to Eggs Production in India [1]

Share of Layer Population		Contribution to Eggs Production	
Desi Fowl	28%	From Back yard Poultry	21%
Improved Fowl	72%	From commercial Farms	79%

It will be tedious job to feed an increasing population with alarming rate on this Globe, which is supposed to be 9 billion in the year 2050. Moreover, emerging recent issues are how to increase the food supply, particularly food of animal origin. In this context, backyard poultry systems will play a pivotal role in achieving nutritional food security of the country. In village investment, assist in pest control and provide manure for fertilizer. Major objective of livestock/poultry production is to provide safe and healthy animal food/ protein for the increasing population. However, there are many serious challenges cropping up on its sustainability.

Pune district is very rich in case of animal population. As per 20th Livestock Census 2019 [2], the district has 1144893 bovines (of which, Crossbreds In milk-322955, Breedable crossbreed cows are 420267, breedable indigenous cows-78842 and cows in milk -55530, Breedable buffaloes 195874 and buffaloes in milk are 149726), 290633 sheep, 575905 goat and Poultry population of the Pune district was 1,68,15,000 and share is 25% population of the state is in Pune district. These sectors also supplement income and enhance nutritional security. Productivity of Deshi poultry bird is very less i.e., 60 -70 eggs per year/hen compare to improved breed i.e., 160-170 Eggs per year/hen.

Generally, farmers are maintaining Deshi hens, which give 60-70 eggs per year, adult weight of cock is only 1.8 to 2 kg. Deshi Birds are not vaccinated for most deadly disease like Ranikhet and fowl pox hence there is outbreak of Ranikhet Disease and mortality is 90-100% in summer season. Outbreaks of fowl pox in winter season is common resulting in 15-20% mortality in chicks, low eggs production from the hens and there is low income, hence there is negative thinking in the rural women, marginal farmers, and small farmers regarding back yard poultry farming. KVK, Pune-I (Baramati) has assessed the different breeds like Kaveri, RIR, Vanaraja, Grampriya, Shrinidhi during the year 2006-2013 and we found that the Vanaraja is superior for its performance like eggs production 156 per year per hen and body weight at the age of 6 month 2.5 -3 kg in female and 3 to 4 kg in Male under back farming situation. Vanaraja birds have long shank, attractive shining and multi colours hence demand from the farmers. Vanaraja male at the age of 6 month sold @ Rs. 500-600 per bird. Due to increasing awareness and demand from the farmers host organization has started Vanaraja parent farm and Hatchery unit in the year 2014 [3].

In this context Agricultural Development Trust, Krushi Vigyan Kendra, Baramati has identified the need of farmers through participatory rural appraisal and decided to conduct demonstrations of back yard poultry birds in identified village's (viz., Khor, Deulgaon Gada, Padavi of Daund tehsil of Pune District) for uplifting of socio-economic status of farmers. With the help of Tasty Bite Foundation, Pune and Krishi Vigyan Kendra jointly worked together and supplied the 25 Kaveri birds to each selected family. The above characteristics have been reported from the studies under the back poultry farming system in the rainfed area of Pune districts. However, by understanding the potentiality of the Kaveri strain KVK conducted an OFT in 2012 and 2016 to assess its suitability and performance in the backyard farming system to feed into the mainstream extension. This paper is based on the results of the demonstration of Kaveri birds.

Kaveri birds' characteristics

KVK identified a new poultry strain Kaveri from Central Poultry Development Organisation (CPDO), Bhubaneswar [4]. The colour pattern of this bird is multicolour with single comb and yellow colour shank and skin. These birds have characteristic features like low early chick and laying mortality, excellent flock uniformity, early sexual maturity, withstanding predators, laying brown colour eggs etc. as reported by CPDO, 2014 [4].

Table-4 Characteristic features of Kaveri poultry listed by Central Poultry Development Organisation, Odisha, India. 2014 [4].

SN	Characteristics	Values
1	Body weight at 6 week	750g
2	Body weight at 20 week	2000-2200g
3	Age at sexual maturity	183d
4	Hen house egg production	120
5	Hen day egg production	140
6	Egg weight	55g
7	Feed consumed/bird/day	135g
8	Liveability	93%

Material and Methods

KVK, Baramati has conducted PRA Survey in Khor, Deulgaon Gada and Padavi villages of Daund Tehsil before onset of this back yard poultry demonstration. According to survey it is found that the eggs production and weight at the time of sale of birds for meat purpose was very less in local birds as compared to improved breeds of poultry for back yard poultry farming in rainfed area and tribal area. It is also recommended by Project Directorate of Poultry, ICAR. Moreover, the income from back yard poultry is very less and mortality due to Ranikhet and fowl pox is also more in deshi poultry birds.

So, KVK has identified a new strain of poultry i.e., Kaveri released from Central Poultry Development Organisation (CPDO), Bhubaneswar for Demonstration as it has increased eggs production, meat production and income from the back yard poultry & tolerance to the incidence of diseases like Rani khet and fowl pox disease [4].

The farm women having back yard poultry of Deshi Birds were purposefully selected for the present study from three village's viz., Khor, Deulgaon Gada & Padavi of Pune district. 25 improved Vaccinated Kaveri poultry birds of one month age were given to 205 farmers. Kaveri birds are provided by KVK, Baramati under Integrated Agriculture Development Project supported by Agriculture Development Trust, Baramati and Tasty bite Foundation, Pune during 2021 to 2023 as an income generating activity. Along with 25 Kaveri Birds, 25 kg poultry Feed and one Medicine kit (Enrofloxacin antibiotic, Vit. A, D3, E & C, Broton in liquid form) was supplied under the project to 205 women farmers in the years 2021-2023. Time to time guidance was provided to these farmers. After 3 years an interview schedule was developed based on objective of the study for data collection & analysis of Socio-economic status and performance of Kaveri birds under Back yard situation after 3 years of distribution in these selected rainfed villages of Pune Districts. Livestock and poultry rearing is a vibrant factor for improving the nutritional security of the rural poor in India. It is generally observed that rearing of indigenous birds with poor production performances is common phenomenon in Indian back yard farming [5-9]. However, over the period improved strains has been introduced by extension services and development agencies. In the similar way KVK, Baramati has planned the demonstrations of Kaveri birds for Back Yard Poultry farming in rural areas.

Results and Discussion

In present investigation data of 205 farmers were collected and analysed to investigate the effect of back yard poultry farming on Socio-economic profile, income generated, Sale of Male birds for Meat purpose, Age at laying, Body weights and Eggs weight, Eggs production, No. of eggs consumed per week, Total Gross and Net Income in Kaveri birds.

Socio-economic profile

KVK conducted the socio-economic status survey of 40 randomly selected backyard poultry farming farmers in Khor, Padavi & Deulgaon gada. Data from [Table-5] reveals that the education level in Khor, Padavi, & Deulgaon gada villages of Daund Tehsil is very good indicating 5 % of the farmers are illiterate, 12.5 % can read & write, 47.5 % of farmers completed Primary level education & 35% of the farmers have completed secondary level and above education. While Most of the family sizes were of medium size consisting of 5 to 6 persons i.e., 45% while larger families consisting of more than 6 members is of 40 % & small families size consisting of 4 members is only 15 %. Family types mostly of nuclear size having 67.5 %. Family land holding pattern was observed to be maximum in semi-medium type of land holding i.e., is 2-4 ha comprising of 40 % Families. While, marginal farmers less than 1 ha were observed to be 30%. Small (1-2 ha) and medium (4-10 ha) type of holding was 15 %. It was also noticed that larger land holding farmers more than 10 ha of land was not observed. Farmers from selected talukas was having the income source from agriculture and livestock & 72.5 % of the farmers were having higher annual net income of more than Rs.120000/- . So, from present study it was clear that farmers from this area were mainly having Agriculture and livestock as a main source of income with maximum semi medium type of land holding & medium type of families with Maximum level of level of education.

Table-5 Socio-economic status of 40 randomly selected backyard poultry women farmers in Khor, Padavi & Deulgaon gada

Sr. No.	Profile	Total Nos.	Percentage	
1	Education	Illiterate	2	5
		can read and write	5	12.5
		Primary level	19	47.5
		Secondary level & above	14	35
2	Family size	Small - up to 4	6	15
		Medium -Up to 5-6	18	45
		Large -More than 6-	16	40
3	Family Type	Nuclear	27	67.5
		Joint	13	32.5
4	Family holding pattern	Marginal farmer less than 1ha.	12	30
		Small -1-2 ha	6	15
		Semi medium -2-4 Ha	16	40
		Medium 4-10 ha.	6	15
		Large more than 10 ha	0	0
5	Farmers Income source	Agriculture and livestock	40	100
		Other	0	0
6	Income	Higher income group more than 120000	29	72.5
		Medium -72000-120000	7	17.5
		Lower Income - less than 72000	4	10

Similar results were observed by Bijeya, *et al.*, (2017) [5], Chakrabarti, *et al.*, (2020) [10], Chakrabarti, *et al.*, (2020) [11], and Haldar, *et al.*, (2017) [12] It might be a reason that due to higher literacy & prior essential basic knowledge of livestock, the intervention back yard poultry farming with improved Kaveri bird was emerges as an excellent source of income & daily nutrition to families in these selected areas.

Sale of Male birds for meat purpose

[Table-6] (T_2) shows that, on an average no. of male sold for meat purpose per family was observed to be 4.55 where the rate of Rs. 363.67 per Bird was received at village level where Rate for Male birds ranged from RS. 300 to 450/-.

Eggs Production

Average Eggs Production was recoded in [Table-6] (T_2) was 164.50, with the range of Max. 240 & Min. 90 eggs per family per month & yearly total eggs production per family was recorded 1974 eggs, ranging from 1080 to 2880 eggs annually among 205 Families. It was higher than the Deshi Birds. In case of Deshi Birds, it was only 180 eggs per year per family. It was also found that the eggs Production per family /year was 11 times more than the Deshi Poultry Birds. During survey it was also found that the age at laying in Deshi birds is 210-240 days where as in case of Kaveri Birds it was Min.150 days and Maximum 160 days. The eggs production was started earlier compare to Deshi Birds.

Eggs Consumption per Family

Present data reveals that selected families received opportunity to gets 5 ± 1 eggs consumption per Week /Family [Table-6] (T_2).

Total Gross and Net Income

[Table-6] (T_2) reveals that the total average gross income from Back yard poultry farming was observed to be Rs.15479.44 & Max. Rs. 22526.67 and Min. Rs. 8226.67. Among the 205 Families. On an Average in Deulgaon gada, Khor & Padavi villages Total Gross income was found to be Rs.15358 /-, Rs.15702 /-, & Rs.15376.67 respectively per year per family. While in Deulgaon gada, Khor & Padavi Villages maximum total Gross income recorded was Rs. 22860, Rs.22560/- & Rs.22160/-, respectively.

In back yard poultry farming for 25 birds estimated Annual cost of production was Rs.7300/-

Therefore, Average BC ratio observed in three villages was found to be 2.1. While recorded Maximum B:C ratio was 3.09 in Khor village and minimum of 1.13 in Deulgaon gada Village. This indicates that Back yard poultry farming with Kaveri birds has doubled the family income of selected families in all three villages. Simultaneously it had provided opportunity to with stand with mal nutrition issues

in the rural area through availability of 5-7 Eggs per week in a Family.

Body weights and Eggs weight

Present data in [Table-7] reveals that the average body weight at the 24th weeks of age of male and females was 1.85 kg and 2.21 KG, respectively and onset of laying is at the age of 22-24 weeks and it was observed that the average weight of eggs at the age of 24th week was 37.56 gm. & at the age of 52 weeks was 52.77 gm.

Table-6 Performance of Kaveri Birds under back yard situation in areas of Pune Districts.

SN	Particulars	Units	Values
1	Average weight of eggs at 24 th weeks of Age	GMS	37.56
2	Average weight of eggs at 52 th weeks of Age	GMS	52.77
3	Average Body weight at 24 th weeks of Age (Male)	KG	1.85
4	Average Body weight at 24 th weeks of Age (Female)	KG	2.21

Similar, results were witnessed for all above traits studied by Bijeya, *et al.*, (2017) [5], Chakrabarti, *et al.*, (2020) [10], Chakrabarti, *et al.*, (2020) [11], Haldar, *et al.*, (2017) [12]; Jha and Chakrabarti (2017) [13]. Moreover, [Table-5] also reveals that whatever the poultry birds used by same farmers before the implementation of T_2 Treatment *i.e.*, use of Kaveri bird for poultry where not profitable (T_1). Total Gross income & BC ratio, where comparatively lower in average of 205 families *i.e.*, Rs 8207.61 & 1.12, respectively. However, it was Rs. 15479.44 & 2.12 in T_2 . Similarly, highest income received through T_1 was Rs.10722.67 as compared to T_2 where it was Rs.22526.67 [14-16].

Conclusion

It can be concluded that the productivity of indigenous birds in terms of egg production is very less per bird per year and meat production is also very low as compared to improved strain Kaveri. Rearing of improved poultry birds in rural western Maharashtra is a popular livelihood activity and mostly owned by the marginal and small farmers. However, it was identified that the backyard poultry production can be enhanced by adopting improved strains like Kaveri of poultry birds that can assure better production of meat, egg and nutritional security of farmers. Moreover, it also be concluded that Backyard poultry with improved strains such as Kaveri is a handy and promising enterprise to improve the socio-economic status of farmers & farming community in rural rainfed areas with low-initial cost investment with high economic return along with definite for nutritional food security.

It can also be specified that Animal husbandry with aspect of back yard poultry is closely interwoven with agriculture and has potential role in the socio-economic development of the rural, state and national economy by providing substantial income to rural households.

Performance of Kaveri Birds under Back Yard Poultry Farming in Rainfed Situation in Maharashtra

Table-6 (T₁) Local practice in Deulgaon gada, Khor & Padavi villages

Table-0 (17) Local practice in Deulgaon gada, Khor & Padavi villages														
Name of village (No. Of Families)		No. of local birds available Before adoption T ₁	Male	Female	No. of male bird Sold	Rate/ Male birds (Rs.)	Eggs consumed by family/ week	Egg production per family		Amount received from selling of males (Rs.)	Amount received from selling of eggs (Rs.)	Annual Total Gross Income (Rs.)	Expenditure require per family (Rs.)	Benefit cost ratio (BC) ratio
Deulgaon gada (71)	Average	17.20	8.70	8.54	6.77	456.34	3.07	37.23	446.70	3083.10	4667.04	7550.14	7300	1.03
	max	22.00	14.00	12.00	8.00	500.00	5.00	42.00	504.00	4000.00	5040.00	9040.00	7300	1.24
	min	10.00	5.00	5.00	5.00	400.00	2.00	30.00	360.00	2250.00	3600.00	5850.00	7300	0.80
Khor (68)	Average	17.12	8.34	8.51	6.74	460.29	3.10	37.18	446.12	3095.59	3141.35	6236.94	7300	0.85
	max	20.00	11.00	12.00	8.00	500.00	5.00	42.00	504.00	4000.00	4200.00	7528.00	7300	1.03
	min	10.00	5.00	5.00	5.00	400.00	2.00	30.00	360.00	2250.00	2520.00	4770.00	7300	0.65
Padavi (66)	Average	15.00	8.00	7.00	8.00	450.00	3.00	92.27	1107.27	3084.85	7750.91	10835.76	7300	1.48
	max	16.00	8.00	8.00	8.00	450.00	2.00	150.00	1800.00	4000.00	12600.00	15600.00	7300	2.14
	min	10.00	5.00	5.00	5.00	400.00	2.00	0.00	0.00	2250.00	0.00	4000.00	7300	0.55
Total of three villages in 205 families	Average	16.44	8.39	8.02	7.17	455.54	3.06	55.56	666.70	3087.85	5119.77	8207.61	7300	1.12
	max	19.33	11.00	10.67	8.00	483.33	4.00	78.00	936.00	4000.00	7280.00	10722.67	7300	1.47
	min	10.00	5.00	5.00	5.00	400.00	2.00	20.00	240.00	2250.00	2040.00	4873.33	7300	0.67

Table-6 (T₂) Performance of Kaveri birds in Deulgaon gada, Khor & Padavi villages

Name of village (No. Of Families)		No. of birds Supplied	Male	Female	No. of male bird Sold	Rate/ Male bird (Rs.)	Eggs consumed by family/ week	Egg production per family		Amount received from selling of males(Rs.)	Amount received from selling of eggs (Rs.)	Annual Total Gross Income Rs.)	Expenditure require per family (Rs.)	Benefit cost ratio (BC) ratio
								Per month	Per year					
Deulgaon gada (71)	Average	25.00	13.56	11.42	4.83	359.15	5.41	162.25	1947.04	1729.85	13629.30	15358.87	7300	2.1
	max	25.00	19.00	17.00	9.00	450.00	8.00	240.00	2880.00	3200.00	20160.00	22860.00	7300	3.13
	min	25.00	8.00	6.00	2.00	300.00	3.00	90.00	1080.00	700.00	7560.00	8260.00	7300	1.13
Khor (68)	Average	25.00	13.18	11.82	4.21	363.97	5.62	168.53	2022.35	1546.32	14156.47	15702.79	7300	2.15
	max	25.00	18.00	17.00	8.00	450.00	8.00	240.00	2880.00	3600.00	20160.00	22560.00	7300	3.09
	min	25.00	8.00	7.00	2.00	300.00	3.00	90.00	1080.00	600.00	7560.00	8260.00	7300	1.13
Padavi (66)	Average	25.00	13.56	11.44	4.62	368.18	5.42	162.63	1952.73	1707.58	1366.09	15376.67	7300	2.11
	max	25.00	19.00	17.00	9.00	450.00	8.00	240.00	2880.00	3600.00	20160.00	22160.00	7300	3.04
	min	25.00	8.00	6.00	2.00	300.00	3.00	90.00	1080.00	600.00	7560.00	8160.00	7300	1.12
Total of three villages in 205 families	Average	25.00	13.43	11.56	4.55	363.67	5.48	164.50	1974.04	1661.16	13818.29	15479.44	7300	2.12
	max	25.00	18.67	17.00	8.67	450.00	8.00	240.00	2880.00	3466.67	20160.00	22526.67	7300	3.09
	min	25.00	8.00	6.33	2.00	300.00	3.00	90.00	1080.00	633.33	7560.00	8226.67	7300	1.13

It will defiantly help in reducing the rural poverty, but there is need of more research, extension activities, and financial support from different organizations with technical support from experts.

Application of research: Study of Kaveri Birds under Back Yard Poultry Farming in Rainfed Situation in Maharashtra

Research Category: Poultry Farming

Abbreviations: T₁ = Local practice in Deulgaon gada, Khor & Padavi villages

T₂ = Performance of Kaveri birds in Deulgaon gada, Khor & Padavi villages

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Breed name: Kaveri Poultry Breed

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