

Enhancement of Livelihood and Nutritional Security of Kolam and Gond Tribes through Community-based Backyard Poultry Farming in Adilabad District of Telangana, India

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Abstract

The study was undertaken to evaluate the effect of introducing improved backyard poultry in two tribal hamlets of Kolam and Gond. An initial baseline survey was conducted and the existing living conditions of the tribes were assessed. Baseline survey revealed that the chicken meat yield was 1.1 kg/bird, eggs produced was 70 per bird and number of birds per family was just four. The introduction of improved chicken varieties in tribal hamlets improved poultry productivity by 85-90% compared to the native local chicken. The income of the family as a whole increased by 32.5%. The income from poultry increased significantly by 86% as the flock size increased from 4 birds to 24 birds. Rearing of improved backyard chicken varieties motivated tribal communities of nearby villages to initiate backyard poultry farming. Consequent to the current intervention, the backyard poultry farming with the improved chicken varieties was expanded to 22 other tribal villages. The intervention of backyard poultry among the tribal communities enhanced nutritional security, besides providing the subsidiary source of income, employment and women empowerment.

Keywords: Backyard Chicken, Livelihood, Primitive Tribes

Introduction

Scheduled tribes constitute 8.6 per cent of India's total population. The central Indian states have the country's largest tribal concentration with about 75 per cent of the total tribal population (Panduranga, 2014; Singh, 2019) of India. The Kolam and Gonds are the two important tribes of India and are at the bottom of the livelihood pyramid. Forest and its produce are the main sources of livelihood (Prakash, 2016). Further, they are losing the basic support of life as forest cover is reducing over the decades due to obvious reasons (Banerjee and Madhurima, 2013). These vulnerable primitive tribal groups are characterized by extreme backwardness, low or nil literacy rate and stagnate or declining population numbers day-by-day. The resource poor primitive tribal groups (Kolam, Chenchu and Thoti) are living in the Dandakaranya forest region of Adilabad district of Telangana, India.

The major problem among the tribal population is the poor nutritional status, especially the protein malnutrition. The incidence is quite alarming in Kolam tribe as they resist mingling with the society in general and depend mostly on their agricultural and forest produce. Over a period of time, the living standards and nutritional security are at stake, particularly in the Kolam tribe of the area. In spite of many interventions by different agencies to improve the livelihood standards and bring these tribes into the mainstream, the two tribal communities are still at the bottom of the growth pyramid.

Rural poultry farming with native breeds is being practised among these tribal communities since time immemorial. However, desi or indigenous chicken are generally poor performing in terms of egg and meat production. The chickens reared traditionally in backyard are mostly indigenous type with low egg and meat production (Rajkumar *et al.*, 2021) and there is a need of introduction of improved dual-purpose improved birds having capacity to lay more eggs and gain heavier body weight than the local or indigenous birds. Therefore, the study was carried out in two villages of the aforementioned tribal inhabitants by imparting training on poultry rearing, and introducing improved chicken variety in the backyards of these tribal communities.

Majority of the tribal households have been traditionally rearing the native chickens with low productivity. Low genetic potential of the native chicken varieties for growth and egg production is the primary attribute responsible for making the traditional rural backyard chicken production a non-viable economic activity in villages. The ICAR-Directorate of Poultry Research, Hyderabad, India has evolved Vanaraja, an improved germplasm of chickens with the suitable package of practices of feeding and health care, which yields 2-3 times higher egg production and body weight gain (Rajkumar *et al.*, 2021) compared to indigenous chicken varieties. Kadaknath, a native breed of chicken, which is popular for its unique black meat (Haunshi and Leslie, 2021) and fetching a premium price over the other native breeds and commercial broiler chickens, has been genetically improved through pedigree selection at the Institute. These two birds were selected to infuse among the tribal villages for evaluating their possible benefits and the resulting impact on the tribal community. Therefore, after an initial assessment, it was decided to implement the backyard poultry with the improved chicken germplasm with the aim to prevent the protein malnutrition and provide subsidiary income leading to livelihood improvements in the Kolam and Gond tribes in Utnoor division, Adilabad district, Telangana, India.

Materials and Methods

In the present study Adilabad district of Telangana was selected purposively due to majoritarian population are scheduled tribes and two tribal hamlets i.e., Kolamguda (Thatiguda) for Kolam tribe and Mankapur for Gond tribe of Integrated Tribal Development Agency (ITDA), Utnoor Region, was selected randomly for assessing the impact of backyard poultry intervention on livelihood and nutritional status of the tribal populations. The villages selected in such a way that no recognised indigenous breeds of chicken were being reared in the respective villages and villages nearby.

A total of 40 Kolam farmers and 60 Gond farmers from the above mentioned two hamlets were selected randomly and they were given in-house training at ICAR-Directorate of Poultry Research, Hyderabad on scientific rearing of birds with basic management practises. Each of the Kolam farmers was provided with 20 *Vanaraja* birds of 6 weeks age while, each of the Gond farmers was provided with 16 *Vanaraja* and 4 *Kadaknath* birds of 6 weeks age. Brooding facility were not available to farmers that is why grown-up birds were given to them. In addition, the inputs like feed (40 kg), feeder, waterer, night shelter and medicines for the initial adaptation to free range conditions were provided to all the farmers along with the birds.

A progressive farmer in each village served as the nodal contact point for all the activities. Periodically, the team of experts from the Institute visited and supervised the poultry rearing activities in the villages, besides regularly monitoring them through the nodal contact person. The farmers were sold the cocks at 3 months of age and the money thus obtained encouraged the farmers to continue the backyard poultry rearing with the remaining birds. Technical advisories were extended and follow-up with the farmers was maintained throughout the production cycle, up to one and half years from the date of distributing the birds. During this period, a provision of getting necessary advisory services from the experts at the Institute regarding the health of the birds was also made.

The linkages were also created with the local bodies such as ITDA, village Panchayat, Zilla Parishad, self-help groups, non-governmental organizations etc. The village headman was taken into confidence for initiation of activities. The data pertaining to chicken meat yield, eggs produced and number of birds per family was collected before and after introducing the improved backyard chicken varieties in the study area. The variations in data of different parameters were analyzed using the independent group t-test procedure of SAS version 9.2 (SAS 2008).

Results and Discussion

Socio-Economic Profile of Tribal Farmers

The baseline survey revealed that the houses of Kolam and Gond tribes were made up of timber, bamboo and other forest-based materials and their living conditions were very much primitive by any standards. The age-old traditional agricultural practices were their regular activities and the forest produce (such as leaves, roots, honey, wild animals and fish) was their source of livelihood. The use of herbs and medicinal plants to cure diseases (ethnomedicine) is popular practice among these tribes, which is continued over generations and folklore are woven around the spirits of the forests. Both the tribes were dependent on agriculture and forest for their daily livelihoods. The survey revealed that the annual income was about Rs. 30,000-40,000 (Approx. Rs. 70 = 1 USD) per annum, making about Rs. 3000/- average income for month for the family. The average family size ranged from 4-6 people and it ranged from 3-12 people.

The study also revealed that the backyard poultry were managed by women to a large extent among tribal household, which is substantiating the earlier reports of Diweni (2013), Kusina *et al.* (2012); Jha and Asit (2017). This led to the women empowerment as they could contribute to the family income. In the study area feed availability for the backyard scavenging was found insufficient therefore, feed supplements were provided to the farmers to feed the birds once in a day during the initial acclimatization period with the advice to continue the supplementary feeding with the local available feed ingredients like grains, broken rice, rice bran etc. during the rest of the life of birds. Prakash *et al.* (2020) indicated that energy, protein and minerals deficiency is quite common among the four different geographical regions of India.

Performance of Introduced Chicken

Chicken germplasm with higher genetic potential for body weight gain and egg production were inducted among the selected tribal hamlets. The male birds attained a body weight of 1.2-1.5 kg and females weighed about 0.8-1.0 kg at 3 months of age. The farmers sold some of the cocks at Rs. 500-800 per bird based on the weight and plumage patterns. Some farmers reared the cocks beyond 3 months of age. The sale or consumption of cocks continued up to six months. The body weight of cocks at one year and 72 weeks of age was 3.0-3.5 kg and 3.5-4.0 kg, respectively. The females were maintained for egg production up to 72 weeks of age. The average annual egg production of Vanaraja was about 95 eggs in one of the tribal hamlets (Kolamguda). The birds produced as high as about 130 eggs with one farmer, who offered substantial supplementary feeding to the birds. The eggs were sold at Rs. 5-10 depending on the season and price of the commercial table eggs and in general these eggs were sold at a premium price compared to the commercial white eggs. The eggs produced were used for both table purpose and for hatching with the help of local broody hen. Backyard poultry farming with the improved chicken variety fetched higher income, food security and nutritional status among the rural people (Jha and Asit, 2017). The average mortality of the improved varieties observed in the hamlets was less than 1.3% per month (22.0% during 7 to 72 weeks of age). The mortality was marginally higher in the initial 4 weeks of adaptation period (7-10 weeks) and reduced once the birds adapted to the free-range conditions. However, the mortality observed in the current study was considerably lower than the values reported (up to 30-40%) by Hitchner (2004) under similar free-range conditions.

Economic Analysis

Economics of the Kolamguda (Table 1) and Mankapur (Table 2) hamlets as a whole were calculated based on the input and output cost incurred by the farmers. The average profit in Kolamguda was Rs. 12,258 per each farmer from a unit of 20 birds of Vanaraja and Rs 15,000 per farmer from a unit of 16 Vanaraja and 4 Kadaknath birds. The above calculation was made taking in to account the eggs and chicken meat consumed and sold by the family. On an average, about 50% of the cocks were utilized for their own household consumption. The input cost of rearing bird under backyard is generally Rs. 80/cock and Rs. 220/ hen including cost of chick, feed, medicines etc. The farmer had to spend about Rs. 300 on pair of birds towards complete expenditure till the end of the production cycle. The profit per pair (male and female) of birds after deducting the input cost is about Rs. 1320 per pair of birds, which is higher than the reported net profit of Rs. 400-500 on a pair of Vanaraja birds (Rajkumar *et al.*, 2010) and 550-670 on a pair of Gramapriya birds (Rajkumar and Rama Rao, 2015). The higher profit margins recorded in the present study over our previous reports might be due to the higher egg production premium prices realised for the backyard poultry produce.

Table 1: Economics of Vanaraja chicken rearing in tribal hamlet (Kolamguda)

Input			Out-put		
Sex	Age of the bird	Cost (Rs)	Particulars/details of the bird	Receipt (Rs)	Profit (Rs)
Male	12-15 wks (3 months)	Nil	2.0 kg @ Rs. 300/kg	600	600
Female	72 wks	Nil	Eggs: 95 @ Rs. 6/egg	570	1,020
			Birds: 3 kg @ Rs. 150 kg	450	
Total profit from a pair of birds				1,620	1,620
Total birds/village@20 birds/family			800 birds		
Average mortality@22%			176 birds		
Survived birds			624		
Males			348 @600	2,08,800	2,08,800
Females			276 @1020	2,81,520	2,81,520
Total profit/village				490320	490320
No. of farmers			40		
Profit/farmer				12258	12258

Income Enhancement

Backyard poultry intervention in tribal hamlets enhanced the income of the family significantly. The income of the family as a whole increased by 33% due to the introduction of backyard poultry with improved chicken varieties (Table 3). The income from poultry birds alone increased by 86% after the adoption of the technology. The income generated out of the sale of eggs and birds was used for the health and education of children and also towards the purchase of household items. The similar study was reported by Islam *et al.* (2015), who recorded the livelihood improvement by income and employment generation among the small farmers through family poultry in rural areas of Bangladesh. Generally, family poultry contributes 13% of the income from animal production (Sonaiya *et al.*, 1999). However, the native chicken production contributes very less to the village economy as these birds were poorly managed for feeding and healthcare measures (Shumba and Whingwiri, 1988). Nevertheless, the introduction of improved chicken varieties fetched better price for meat and egg in the local market.

Table 2: Economics of Backyard Poultry (Vanaraja and Kadaknath) in tribal hamlet (Mankapur)

Sex	Input		Out-put		
	Age of the bird	Cost (Rs)	Particulars/details of the bird	Receipt (Rs)	Profit (Rs)
Vanaraja					
Male	12-15 wks (3 months)	Nil	2.0 kg @ Rs. 300/kg	600	600
Female	72 wks	Nil	Eggs: 100 @ Rs. 6/egg	600	1,050
			Birds: 3.0 kg @ Rs. 150 kg	450	
Total profit from a pair of birds				1,650	1,650
Kadaknath					
Male	6 months	Nil	1.8 kg @ Rs. 500/kg	900	900
Female	72 wks	Nil	Eggs: 85 @ Rs. 10/egg	850	1,350
			Birds: 2.0 kg @ Rs. 250 kg	500	
			Total	1,350	
Total profit/ pair of birds				2,250	2,250
Vanaraja					
Total birds/ hamlet @ 16 birds/family			960 birds		
Average mortality@18%			173 birds		
Survived birds			787		
Males			380 @600	2,28,000	2,28,000
Females			407 @1,050	4,27,350	4,27,350
Profit from Vanaraja birds				6,55,350	6,55,350
Kadaknath					
Total birds/ hamlet @ 4 birds/family			240 birds		
Average mortality@8%			19 birds		
Survived birds			221		
Males			120 @900	1,08,000	1,08,000
Females			101 @1,350	1,36,250	1,36,250
Profit from Kadaknath birds				2,44,350	2,44,350
Total profit/Income				8,99,700	8,99,700
No of farmers			60		
Profit/farmer				14,995	14,995

Table 3. Income enhancement with intervention of backyard poultry

S. No.	Particulars	Farmers (n=100)		
		Kolamguda (40) and Mankapur (60)		
		Present*	Baseline	Difference
1	Gross income, Rs.	53,000	40,000	1,300 (32.5%)
2	Income from Poultry birds	13,023	1,820	11,203 (86%)

*Backyard poultry intervention

Nutritional Improvement

Poultry products are a very good source of animal protein. The resource poor tribes were deprived of taking optimum nutrition and protein malnutrition was very common, especially in women and young children. Backyard poultry

intervention led to the availability of the chicken meat and eggs in their house itself (Fig. 1 and 2). The study showed that 405 of cocks were consumed by the farmers. At the same time, about 20% of eggs were also consumed by the farmers. Backyard chicken rearing with the improved chicken varieties is promising as this approach is to increase access to eggs and chicken (Fig. 3), both of which are rich sources of animal protein and alleviated malnutrition among the tribes of Maharashtra (Mahesh *et al.*, 2019), India.

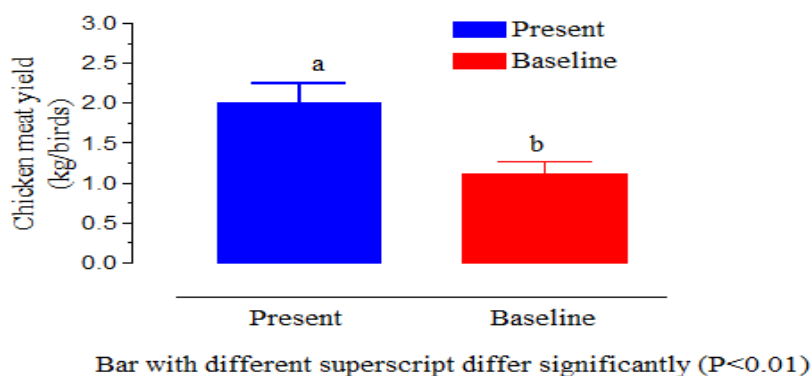


Figure 1: Variation of chicken meat (kg/bird) yield due to introduction of improved backyard chicken

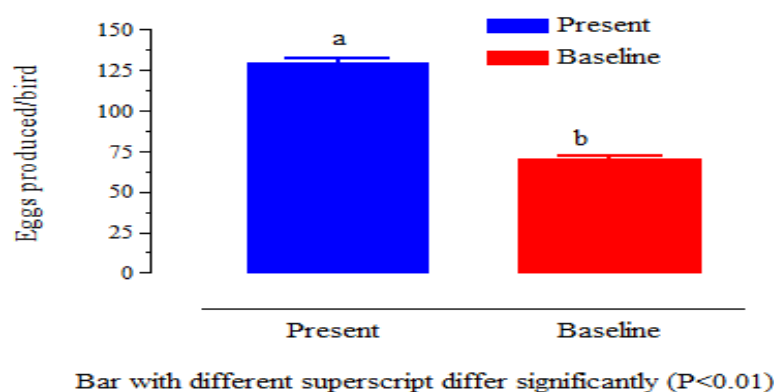


Figure 2: Variation in egg produced per birds at village level due to introduction of improved backyard chicken

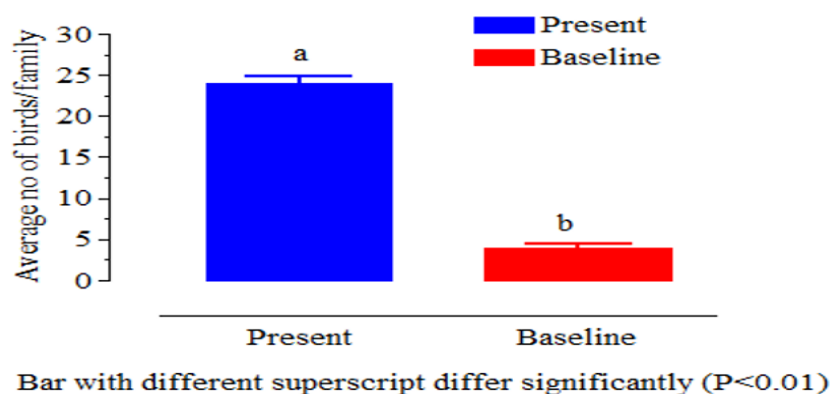


Figure 3: Variation in average number of birds per family (n=100; Kolamguda 40 and Mankapur 60) due to introduction of improved backyard chicken

Productivity Enhancement

The introduction of improved chicken varieties in tribal hamlets improved the availability by 85-90% compared to the native local chicken (Fig. 4). The productivity of local chicken, which are reared traditionally in hamlets was very low. These birds, though preferred by the tribes, have very low production potential. The improved chicken varieties (Vanaraja: 100 eggs and Gramapriya: 160 eggs) produce (Rajkumar *et al.*, 2021) an average of about 130 eggs, almost double the production compared to the native birds and the birds resemble quire similar to the native

varieties. At the same time, number of birds was also increased per family from 4 birds to 24 birds. It was observed that the income levels enhanced, which was an ideal model of rearing backyard chicken among the farming tribal community for doubling the income.

Spill Over Impact of Intervention

The backyard poultry intervention in tribal hamlet significantly changed the socio-economic profile of the tribes of Utnoor area. In Mankapur village, women farmers started rearing day old improved chicks in a nursery facility established by their own contributions. This small intervention under Tribal Sub Plan Project has led to the empowerment of tribal women, which was one of the significant achievements of the project. Simple scientific intervention increased the income of the family, changed the living conditions by rearing improved germ plasm of backyard chicken compared to those farmers, who reared desi or less productive backyard chicken and followed age-old managerial practices. Backyard poultry rearing helps in not only overcoming poverty among the tribes but also achieving nutrition security for their families. A similar outcome was reported by Mahesh *et al.* (2019), where tribes realized gainful socio-economic improvement through rearing of improved backyard chickens. The success of the pilot study in these two hamlets attracted other villages to adopt backyard poultry rearing, which has become a boon among the primitive tribal communities. Subsequently, the activity was expanded to 22 other tribal villages successfully.

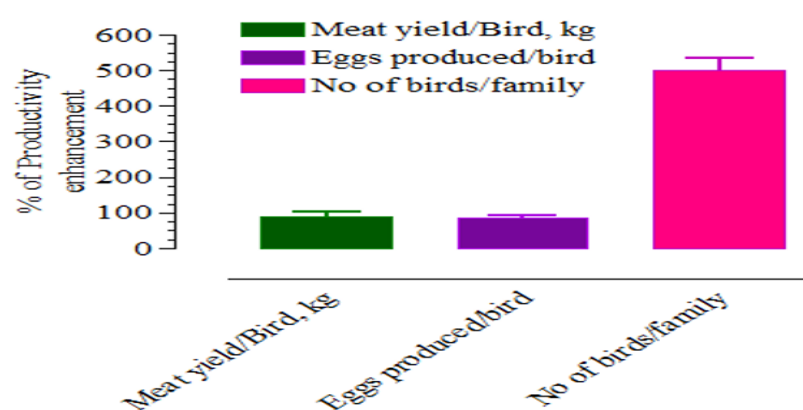


Figure 4:Percentage pf productivity enhancement with intervention of backyard poultry

Conclusion

The backyard poultry provided an opportunity for the primitive Kolam and Gond tribes as a subsidiary income source to the family with no or minimum inputs. The income of the family increased by 32.5% due to the intervention of backyard poultry among the Kolam and Gond tribal hamlets. The backyard poultry intervention improved the nutritional status, income levels, living conditions and women empowerment. Overall, this activity improved the socio-economic profile and livelihood condition among the tribes in Utnoor division of Adilabad district. The improved backyard chicken varieties were not promoted in the home tract of indigenous chicken breeds. The selected study areas did not inhabit the precious indigenous chicken breeds.

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Conflict of Interests

There is no conflict of interest.

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