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Livelihoods promotion and nutritional security of tribal through backyard poultry in Banka district of Bihar, India

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Abstract
To supplements the livelihoods and nutritional security of tribal's through Agro-technological interventions in the district, under Tribal Sub Plan supplied Vanraja birds. 17,500 vanraja birds (vaccinated against Ranikhet) have been distributed among around 700 beneficiaries. A total 63 backyard poultry farmers were selected for the study and visited 63 units personally with a pre tested interview schedule to collect data from tribal farmer by using a well structured and pre-tested questionnaire. Mortality of poultry was 61% in which major cause of mortality was predators which was 75% of total mortality. Body weight at the age of 6 month age was 880g in desi chicken but vanraja breed having 2.260 g hence performance significantly (P<0.05) increased to 3 times. Total poultry meat produce was increased to 24kg/year/family which were approx 8 times more than previous. Consumption of poultry meat was increased by 6 times and it was 64% of total production. Poultry meat selling % of produce was increased to 36% from 19%. Average productivity of vanraja was 83 eggs/year but in desi was 42eggs/ year, the productivity of egg was increased significantly (P<0.05) by 2 times but total production increased by 6 times because of less mortality and more poultry reared for egg purpose. Total egg production per family in the tribal village of banka was increased from 26-336 to 65 - 876 eggs per annum. The egg consumption % of produce was increased from 37 to 81 and egg sold increased from 7 to 14%. The egg used for hatching was decreased from 35 to 20 eggs/ year. The protein produce % of protein required/family was 6% but protein intake was 4% of protein required per family. Increased in income through backyard poultry was Rs. 2458 increased from 151Rs. So, the backyard poultry farming with Vanraja birds is one of the best unique livelihood opportunities for the tribal women farmers in the district. It provides round the year nutritional security and can generate subsidiary income.

Keywords: Vanraja poultry, tribal, nutrition security, vaccination

Introduction
Banka is one of the tribal populated districts in Bihar state. The Scheduled Tribe (ST) population in the State of Bihar is 758,351 as per 2001 census, constituting 0.9 per cent of the total population (82,998,509) of the State. The tribal population of the district was 4.7 percent of the district population. In rural area 63,457 people and urban area 65 people are living. The Banka district of Bihar is having a total 3,67,997 household and population 23,44,480; out of which 1,10,191ST population, female is 54400 and male 45,791 (District level socioeconomic statistical data of India). The Climate of this district includes summer temperature up to 45 ^{0}C and in winter months 15 ^{0}C.The main occupation of the people of Banka District is agriculture and animal husbandry. Out of eleven Blocks the land of seven blocks is plain and fertile and four Blocks are Hilly Blocks covered by Sakhua and Palas forest. Dependency of ST population is on Agri-allied sectors. It has some of the unique characters *viz*. low rainfall, uneven topography, less irrigation facilities, uneven rainfall distribution, 14.2% forest area and 15.9% Barren uncultivable and fallow land. During kharif season, agriculture provides about 100 to 120 days employment to the tribal farmers and seasonal agriculture is not able to provide full employment to the workforce. Vulnerability of the tribes in the district comes from a high level of dependence on rain fed agriculture, which is least diversified, a paddy dominated monocropped system that does not give enough income to farmers. A small land holdings, low agricultural productivity and low incomes have led to rising indebtedness and also leading to migration to cities for their livelihood. The life of the tribals is increasingly vulnerable due to a lack of awareness on sustainable income generation activities to their resource base.

Rearing of poultry birds in the backyards, one of the age old practices in India and is a promising option for rural livelihoods and also provides valuable animal protein source through egg and chicken meat. Poultry industry in India has transformed itself from the age-old backyard farming into a dynamic agri-based industry. India is currently producing 2.75 million tones of chicken meat and 65.48 million (2.86 million tones) of hen eggs/year (ICAR-DPR, 2012) [4]. Market driven backyard poultry enterprises are being recognized as a stepping stone for the poorest households enabling them to take the first step towards breaking out of the vicious circle of poverty and deprivation (Chaturvedani *et al.*, 2015) [2]. Protein energy malnutrition is a common phenomenon in the diets of tribal people as their diets are predominantly based on cereals and millets which contain low quality protein. Thus, need of animal protein with high biological value can be met through eggs and chicken meat. Backyard poultry farming not only meets the nutritional security of tribes but also generates self employment to tribal women and provides supplementary income (Praveen Kumar *et al*., 2018) [5]. There is also growing evidence to demonstrate the role of rural poultry farming in enhancing the food and nutrition security of the poorest households, reducing the livelihood vulnerability, insecurity and promotion of gender equity (Ahuja and Sen, 2007) [1].

Rural farmers rear Desi type chicken with low egg and meat production in backyard system. Tribals are well aware of taste of desi chicken and accept it widely and are in much demand. From commercial point of view, good egg yielding capacity, negligible feed cost, gains fine body weight and very easy to manage are few of its unique features of Vanraja poultry breed was selected for backyard poultry in the district Banka., 2016. These improved birds can rear in both intensive and free ranging system. Birds can be reared for egg production in small numbers (10 -20) in free range conditions if plenty of natural feed resources are available. Chicks need brooding during initial 6 weeks of age to maintain the required body temperature and to protect from predators. At 42 days of age, the birds can be let out under backyard free-range conditions. Birds should be vaccinated specifically against the Newcastle disease and Infecrious bursal disease. The backyard poultry farming with improved birds provide a solution to food security to the needy villagers paving a way for sustainable agriculture in rural areas of India.

In view of the above gaps, to supplements the livelihoods and nutritional security of tribal’s in the district, Krishi Vigyan Kendra, Banka under project Enhancement of Livelihood Security of Scheduled Tribe Communities through Agro-technological Interventions in Tribal Sub Plan (TSP) supplied backyard poultry (Vanraja birds) units to enhance subsidiary income of tribals.

Materials and Methods

Based on socioeconomic level of tribal women farmers, who are interested and having rearing knowledge on backyard poultry were chosen for Vanraja backyard poultry farming intervention in the adopted villages and other tribal hamlets. The Krishi Vigyan Kendra, Banka organized off and on Campus training and demonstration programmes on “Backyard Poultry Rearing” for tribal farmers. During 2016-17 to 2018-19 more than 17,500 vanraja birds (vaccinated against Ranikhet) have been distributed among around 700 beneficiaries of 23 villages.

Performance of backyard poultry was assessed in order to understand the role of backyard poultry farming in sustaining poor people’s livelihoods. This study also focused on its supplementation to livelihoods, household nutrition, and empowerment. A total 63 backyard poultry farmers were selected for the study and visited 63 units personally with a pre tested interview schedule to collect data on mortality rate, number of birds sold in market, body weight, number of eggs laid per annum per bird, revenue generated from eggs sold in the market, hatching of eggs, expected income and income generated by tribal farmer by using a well structured and pre-tested questionnaire. The collected data were statistically analyzed by independent sample t-test by IBM SPSS statistics 21 software to draw inferences.

Results and Discussion

A unit of 25 Vanraja poultry birds was supplied to the tribal women and regular vaccination followed against Ranikhet disease and Infectious bursal disease. The beneficiaries were trained on rearing of bird, selection of eggs, pre-incubation storage method of eggs and vaccination of birds. The results presented in table 1 revealed that through backyard vanraja poultry farming every tribal women farmer in the tribal village of banka having average 11 poultry which was increased significantly ($P<0.05$) by 4 times than earlier, it was mainly due to distribution of chicks. Mortality of poultry was 61%. Major cause of mortality after vaccination was predators which was 75% of total mortality. This mortality was higher than reported by 15% by Saikia *et al*., (2017) [8] and 27% by Pathak and Nath (2013) [7]. This higher mortality was mainly due to more predators present in forest area. The poultry population increased by 246.4% in which laying poultry increased by 313.2% because of demonstration of high yielder Variety of backyard poultry and also due to vaccination, survivability of birds increased so farmers reared for egg purpose. Previously due to outbreak of Ranikhet disease large no. of mortality of poultry, farmers were not take risk for egg production.

Body weight at the age of 6 month age was 880g in desi chicken but vanraja breed having 2.260 g hence performance increased significantly ($P<0.05$) to 3 times but it was lower than reported value. Growth was at par reported by Mahal *et al*., (2017) [6] for East Sikkim (2379g) and south Sikkim (2329g) but more than west Sikkim (1779g) and north Sikkim (1734g) tribal family for backyard farming of vanraja bird. Total poultry meat produce was increased to 24kg/year/family which were approx 8 times more than previous. Consumption of poultry meat was increased by 6 times and it was 64% of total production previously they were consume 81% of production it was due to less production. Poultry meat selling % of produce was increased to 36% from 19%. This data showed that when production increased they were first focus on self consumption then on marketing. It was because of smaller size of poultry there was more use for home purpose as per wish. Poultry meat sold as percent of produce was only more than 2 times because tribal more interested in consumption than marketing, also less thinking for business purpose. They only sold when requirement of money. So for income purpose it may be required large scale backyard poultry farming.

Average productivity of vanraja was 83 eggs/year but in desi was 42eggs/ year, the productivity of egg was increased significantly ($P<0.05$) by 2 times but total production increased by 6 times because of less mortality and more poultry reared for egg purpose.. In contrast Saikia *et al*., (2017) [8] reported much higher egg production in vanraja (181 eggs) and desi bird (76eggs/year) in Assam. The difference in findings may be due to better nutrition and management of birds. Total egg production per family in the tribal village of banka was increased from 26-336 to 65 - 876 eggs per annum. The present findings were comparable with the findings of Praveen Kumar *et al*., (2018) [5] of eggs production per family by improved variety of backyard poultry was 750 to 1190 eggs per annum.

The egg consumption % of produce was increased significantly ($P<0.05$) from 37 to 81 and egg sold increased from 7 to 14%. This shows that they were not having business purpose of rearing. Also production was not to much that for marketing and unavailability of marketing channel. Egg used for hatching was decreased because of having more no. of laying hen. The egg used for hatching was decreased from 35 to 20 eggs/ year, it was due to increased in no. of poultry. The present findings of eggs used for hatching for chicks was comparable with the findings of Praveen Kumar *et al*., (2018) [5] two seasons beneficiaries incubated 20 to 24 eggs under desi birds for the production of chicks. For nutrition security protein produce % of protein required/family was 6% but protein intake was 4% of protein required per family. So, with increase in no. of poultry with almost no or meager investment was emerged as important benefit and given highest priority for domestic consumption of eggs to combat against protein energy malnutrition among tribes.

The next most important mentioned benefit was additional source of income through selling of eggs and birds per annum per beneficiary was Rs. 2458 increased from 151Rs (Table 2). This finding was lesser than reported by Praveen Kumar *et al*., (2018) [5] that the average income from the desi poultry birds was Rs. 1100 to 2200. Per annum an average income generated through a backyard poultry unit of 10 Rajasri birds is from Rs. 5860 to 9458. It may be due to lower egg production and more use for self consumption by Banka district tribal farmers. Poultry contributes 10.7% of total income from animal husbandry in which more than 80% from meat and 20% from egg. Apart from this Backyard poultry farming can be efficiently convert waste material (insects, ants, fallen grains, green grass, kitchen waste, vegetable waste etc. in the backyard of house) in to egg and chicken meat for human consumption. It was further considered that it alleviates protein energy malnutrition in vulnerable groups, aids in enhancing the soil fertility and integrates well with other agricultural operations.

Vaccination in Poultry:

Timely vaccination of backyard poultry by Ranikhet disease 5th, 21th days, 3rd, 6th, 9th, 12th and 15th month and IBD on 12th, 28th days and 3rd month of age decreases the mortality by 18% which decrease the losses by 1565Rs/ family (Table 3). The costing of vaccination was 8Rs/bird. So, through low investment we can save large economical losses. But main losses were due to predators (Large cat, Bird and dog), which were major challenges for backyard poultry farming.

Table 1: Impact on productivity of backyard poultry

Impact on productivity		
	Before Project	**After Project**
Poultry	3^a	11^b
Cock	1.93^a	5.76^b
Hen	1.37^a	5.67^b
Mortality %		61
Mortality by Predator (% of total mortality)		75
Poultry Meat (Kg/year)	0.88^a	2.26^b
Total poultry meat (Kg/year)	3.17^a	24^b
Poultry Meat consumed (Kg/year)	2.56^a	15.54^b
Poultry meat Consumed % of produce	81	64
Poultry Meat sold (Kg/year)	0.61^a	8.55^b
Poultry meat sold % of produce	19	36^b
Total egg/family/year	63^a	381^b
Egg/Year/hen	42^a	83^b
Total egg/year	63.2^a	380.6^b
Egg consumed/Year	23.6^a	308.6^b
Egg consumed % of produce	37.33^a	81.08^b
Egg sold/Year	4.6^a	52.0^b
Egg sold % of produce	10.85	62.98
Egg hatched/Year	35.1	20.0
Protein produce % of Req.		6
Protein intake% of Req.		4

$^{a,.b}$ Values with different superscripts in arrow differ ($p<0.05$)

Table 2: Effect on income from backyard poultry (Rs /Annual)

	Meat	**Egg**	**Total**	**% of livestock income**
Before Project	134	18	151	1.1
After Project	2042	416	2458	10.7
Diff	1908	398	2307	
% change			1524	

Table 3: Effect of vaccination on mortality of Backyard poultry

	Vaccination in Poultry	
	Mortality %	**Loss due to Mortality**
Before TSP	79±1.50	5825±201
After TSP	61±1.18	4260±57
Cost (Rs/bird)	8	
Diff	18	1565

Conclusions

In conclusion, backyard poultry farming with Vanraja birds is one of the best unique livelihood opportunities for the tribal women farmers in the district. It provides round the year nutritional security and can generate subsidiary income.

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