



Research Article

## Poultry Production in Nepal: Characteristics, Productivity and Constraints

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### Abstract

Poultry farming is integral part of agriculture in Nepal. The objective of this research was to analyze the prevailing production constraints, characterization of poultry farming and its economic analysis using questionnaire-based survey and on-site investigation. 180 farms were selected from 3 major districts. Garrett's ranking technique was used to analyze the constraints. Highly significant difference ( $P < 0.01$ ) in size of poultry farm was found. We found significant difference in feeding, housing and drinking system for the chicken. Un-organized chicken marketing channel was observed in the study area. High chicks' mortality, wastage of feed, insecure vaccination and frequent drop in egg production were characteristic of laying hens. Newcastle disease and Chronic Respiratory Disease were acknowledged as the biggest constraint of chicken production. Government and concerned agencies need to take active part for the extension service to strengthen the health of chicken and organized marketing channel is essential for selling of poultry products which can improve the profit to the farmers.

**Keywords:** disease; Nepal; family poultry; management; Garrett's ranking

### Introduction

Poultry products like egg and poultry meat has been recognized as the fastest way to fulfill protein supply to human in shortest run. FAO has recommended the average intake of protein by an individual should be around 65 gm per day of which more than 50% should be from the animal source (FAO, 2009). Poultry industry has been increasing rapidly with well-equipped housing system in most of the developed countries. Least developing countries has many marginal poultry farmers with small scale of farming as their business for livelihood (Alders and Pym 2009). Data indicate that many poultry farming in the world follow the conventional method of rearing the poultry in developing countries (Gueye, 2009; Sonaiya and Swan, 2009). Indeed, the farmers face the problem of poor production and reproduction performance, disease and mortality (Conroy et al., 2005).

Nepal has two-third of the population directly engaged in agriculture that contributes for 34% of national GDP (Gross Domestic Products) of which 15% is from livestock sector (MOAC, 2014) In most of the developing countries livestock farming plays important roles in human food and

nutritional security, livelihood, regional balance, gender mainstreaming, and rural poverty alleviation (ILO, 2004). Nepal has biodiversity of topography of land and climates where livestock farming exists in all the regions including poultry farming however most of the farmers raise small numbers of livestock in small land holdings (Pradhanang *et al.*, 2015). There is about 47.96 million fowl population in Nepal with 28.3% laying hen, which produces 887.24 million table eggs. Average annual growth rate of hen egg production has been 2.43% during last ten years (Osti *et al.*, 2016). Chitwan, Kathmandu and Kaski are the major district with higher number of poultry farms in Nepal (MOAC, 2014), we used these three districts to characterize and evaluate the constraints of egg laying chicken farming.

No study is done to compare the flock characteristics and production constraints in Nepal. Nepal has history of poultry farming as a business since 1980 however, the expected achievements in the farming system has not yet been achieved. Finally this study was aimed to described the flock characteristics, productivity, identify the core constraints in poultry farming and marketing and overall evaluation of the poultry business in Nepal.

## Materials and Methods

### Study Area and Sampling

Three areas having high density of poultry population of Nepal viz Chitwan, Kathmandu valley and Kaski were selected for the study purpose by simple random sampling technique (MOAC, 2014). Currently livestock pattern is changing from household sustainable level to commercialization both in poultry and dairy sectors. These districts differ in terms of land topography, climate, weather and population density however holds more than 30% of total poultry population of the country (CBS, 2014). Survey was carried out in November and December 2014. A Multi-stage sampling procedure was applied for the study. 60 farmers were chosen randomly per districts irrespective of the size of the farm. This sampling frame resulted into 180 households engaged in the entire study.

### Data Collection

Data was obtained from the personal interview with the individual farmers. A pre-tested semi-structured questionnaire was made to obtain survey data. 180 individual farmers were individually interviewed. During the interview, all the information's were asked in the details. Farmers' participatory method was used among farmers for discussion and ranking some parameters to obtain qualitative data. The flocks, feeding and watering methods and the designed for the poultry housing, the feed store and egg store room, affiliated environment etc. were personally observed by the researchers and finally qualitative data was obtained

### Garrett's Ranking Technique for the Study of Problems

The examination of constraints faced by layer raising farmers in the production and marketing of eggs is one of the important aspects of research from policy point of view and hence this was specified as fifth objective of the study. Garrett's ranking technique was used to analyze the constraints. The sample farmers were asked to rank the given constraints in production and marketing of eggs. Ranks given by the farmers were converted to the percent position by using the following formula which was again converted to scores by referring to table given by Garrett and Woodworth.

$$\text{Percent Position} = \frac{100 (R_{ij} - 0.50)}{N_j} \times 100$$

Where,

$R_{ij}$  = Rank given for  $i^{\text{th}}$  item by  $j^{\text{th}}$  individual

$N_j$  = Number of items ranked by  $j^{\text{th}}$  individual

### Data Management and Analysis

Data collected in this study were entered, cleaned, and coded using MS-Excel and they are converted into Text

MS-DOS. Multiple regression analysis was done to study the socio-economic impact of poultry farming. To study the effect of different constraints on poultry farming parameters, data were analyzed by Least Square procedure (Harvey, 1990) statistical software package. Statistically significant means were compared using DMRT computer software package. Data on flock composition and performance were analyzed using the General Linear Model (GLM) procedure of Analysis of Variance (ANOVA) and t-test.

## Results and Discussion

### Socio-Economic Characterization of Poultry Farmers

Characterization of the poultry farmer's socio-economic value was analyzed that included their age, education, size of the farm, family members and access to veterinary services. We categorized the age as less than 30years, 30 to 50 years and above 50years. Similarly, we categorized the level of education as primary, intermediate and higher education (graduation). We classify the veterinary services as none, moderate and easily accessible to farmers. The experienced in poultry farming was classified as less than 5 years, between 5-10 years and above 10 years. Finally, we classified the family size as less than 2; between 2 to 5 and above 5 in number.

We found the significant difference in farmers' age and experience ( $P < 0.05$ ) as 12.21 % of the respondent are less than 30 years of age, 52.23% fell within the age range of 31-50 years, 35.57% fall within age 50 above. About 28.1% of the respondent had less than 5 years of experience, 25.0% had 6-10 years of experience, 18.0% had 11-15 years of experience and 28.33% had more than 15 years of experience in poultry egg production. Highly significant difference was found among the farm size and farmers' level of education ( $P < 0.01$ ) as 55% of the farmers were rearing less than 3000 laying birds, 30% farmers were rearing 3000-10000 birds and 15% were rearing above 10000 birds. Majority of the respondents were educated with 77.78% having tertiary education. 13.88% had intermediate and 8.33 have primary education. Analysis revealed that there was no significant difference in the level of accessing veterinary services, size of the family and male-female ratio (Table 1).

### Production Characteristics Egg Laying Chickens

We analyzed the various production characteristics of the laying birds and found that chick's mortality till 8 week of the chicken was highly significant ( $P < 0.01$ ) to different study area. The size of the farm, days for peak laying, total egg production per hen per cycle was found significant to the different study area ( $P < 0.05$ ). The characteristics like age at first lay, Peak hen day production was found higher in Kaski but not different significantly (Table 2).

**Table 1:** Multiple regression analysis showing the socio-economic factors influencing poultry egg production among farmers

Variables	Coefficients	Std. Errors	t-value	P-value
Age	0.876	0.03	2.431	0.041 <sup>b</sup>
Level of Education	56.221	11.50	0.549	0.001 <sup>a</sup>
Experienced	41.119	2.12	1.343	0.012 <sup>b</sup>
Access to veterinary service	19.771	9.09	1.33	0.111
Size of the farm	0.19	0.002	3.412	0.001 <sup>a</sup>
Family members	0.021	0.001	8.212	0.104
Family (Male: Female) ratio	1.1	1.22	0.919	1.091

<sup>a/b</sup> significant at 90% level<sup>a b c</sup> significant at 95% level**Table 2:** Productive performance of egg laying chicken

Parameters	Study area			Overall mean	P-value
	Chitwan	Kathmandu	Kaski		
Average size of the farm	4544±11.34	1820±15.65	1209±22.31	2693±19.06	0.02 <sup>b</sup>
Chick's mortality till 8 <sup>th</sup> week (%)	14.03±1.22	10.41±1.56	8.41±1.63	11.21±1.12	0.002 <sup>a</sup>
Age at first lay (day)	122±1.31	126±1.44	127±2.33	126.3±2.98	1.53
Peak hen day production (%)	92.08±1.11	94.33±1.34	96.02±1.54	95.33±1.36	0.51
Days for peak egg laying	36±3.22	15±3.33	22±3.43	26.23±3.67	0.33
Total egg production/hen/crop cycle	222±14.44	210±23.33	209±19.88	316.1±15.55	0.43

<sup>a/b</sup> significant at 90% level<sup>a b c</sup> significant at 95% level

### Housing and Feeding Management

The housing and feeding management was significantly ( $P < 0.01$ ) different in the study area. Few modern poultry had automatic feeding management system while majority of the farm had semi-automatic system of feeding and very few had manual feeding scheme to the birds (Table 3). Regarding the water intake, all the birds were provided 24 hours water and libtum. 83% of the farmhouse were constructed with bricks and cement and good ceiling ( $P < 0.05$ ). Few house constructed with wooden materials or bamboo materials. The poultry shed and the farmer living house was in the same location in 60% samples. Around 62.3% farmers used rice husk and wood dust as litter materials while rest housed were caged system ( $P = 0.51$ ). All the shed were open housed. Proper housing for poultry provides better environmental impact and provides adequate ventilation to the birds and overall comfort to the laying birds (Yakubu 2010).

### Marketing

Most of the marketing chain in the poultry sector was observed as informal practice. Both eggs as well as chicken were sold to the final consumer via middle trader or broker. The practice of organized middle trader was found in all the study area. Some 22% of live sales were made between farmer and consumer, and 78% from farmer to trader. Middle man usually collected the birds from the farm and supplied it to another sub-middle man prior to actual consumer. So there existed 4 stage trading chain for selling chicken. However the marketing of the egg was found a bit

organized as compared to the chicken selling. The egg association (from each study area) has fixed the ceiling price and bottom price for the farmers and traders. We found almost similar farm-gate price rate of the egg within individual study area however comparing to one study area to another, the price was significantly different ( $P < 0.05$ ). The price of the egg in Kathmandu valley was highest and price in Chitwan was the lowest (Table 4). The major cities in the study area were terminal markets where birds collected from study area centers were sold. Birds were transported by trucks with crates tied on top with bags and sacks of grains frequently exposed to accidents and deaths.

### Chicken Mortality and Its Analysis

We found majority of the egg lying chicken mortality in the study area at before the age of 8 week ( $P < 0.01$ ). This finding was similar to the previous report of Dessie and Ogle (2001), who indicated 40-60% of chicks' mortality in the first 8 weeks of life mainly as a result of disease and predation. We found the Newcastle Disease (ND) and Chronic Respiratory Disease (CRD) were the major disease prevalent in the study area. ND was responsible for majority of death (Table 4) however, very little death was observed in CRD. Indeed, CRD was the major cause for decrease egg production ( $P < 0.05$ ). The second reason for the chicken mortality was piling due to attack attempt of predators. During the dry season, the problem of predators was twofold. However, some predators like wild cats are problem during wet season. Snakes and dogs were also been identified as contributor of poultry losses.

**Table 3:** Housing and feeding analysis

Variables	coefficient	Standard error	t-value	P value
Birds Feeding system (automatic vs manual)	1.21	0.11	1.11	0.002 <sup>a</sup>
Housing System (cemented vs wooden)	3.33	1.22	2.32	0.03 <sup>b</sup>
Litter materials used	5.98	1.24	0.43	0.51
Farm and owner housing	11.34	4.42	2.32	0.33

<sup>a/b</sup> significant at 90% level<sup>a/b/c</sup> significant at 95% level**Table 4:** Egg price, egg production and disease impact analysis

Parameters	Study area			Overall mean	P-value
	Chitwan	Kathmandu	Kaski		
Egg price (farm gate price)	10.02±1.34	14.44±0.65	13.01±1.31	12.04±1.06	0.02 <sup>b</sup>
Disease (ND+CRD)*	71.66±0.34	43.33±0.84	31.66±1.31	48.18±1.11	0.04 <sup>b</sup>
Egg loss by ND	3.44±1.31	2.56±0.45	3.13±0.33	2.93±1.98	1.53
Egg loss by CRD	11.08±1.11	9.33±1.34	6.02±0.54	7.33±0.22	0.03 <sup>b</sup>

<sup>a/b</sup> significant at 90% level<sup>a/b/c</sup> significant at 95% level

\*prevalence study was performed by asking the persistence of outbreak of disease if every month as sub clinical form/milder form

### Knowledge of Medication and Vaccination

Farmers were asked to disclose the methods of treating various disease and vaccination schedule. Major focus was given for ND and CRD vaccination as these two diseases were most prevalent in the study area. No significant difference was observed between the farmers and within different study area about the methods of treating ND and CRD (P=0.91). Their responses were that they had a treatment regime specific for ND according to the management guide of the breeding company. Use of common antibiotics was based on the farmer's individual judgment and analysis of the disease and flock condition rather than consulting with veterinary doctors. We found the excessive use of antibiotics in treatment of disease through feed and water, however, the treatment regime was still found debatable among the individuals.

Farmers were also asked to express their knowledge about poultry vaccines. Most of the respondents had experienced their birds to vaccine against ND at different age of the birds, 4% respondent used ND vaccine only twice where rest of the respondent used ND vaccine once in every two months. 40% respondents stated that they had never been trained in poultry production and health management, indicating that poultry did not receive strong veterinary service or extension support in the study areas.

The farmers mentioned the disease outbreak could be because of the vehicle (transporting feed) or vehicle transporting (egg) as traders use same vehicle to run farm to farm. Also they revealed, the veterinary practitioner (veterinary doctor or para-veterinarian) could be another reason for transmitting disease from one farm to another farm. We found the majority of the poultry farm had different flock size with different age and different breed (P<0.05). The variation in flock size and health status among flock within the same farm could be another reason for the continuous persistent of disease.

### Conclusions

The output of this research showed that poultry business is one of the major agricultural practices in Nepal, however it has major constraints that lower the optimum productivity of the egg and cause higher mortality in the birds. Technical knowledge of the housing system, disease control and husbandry in general is lacking in poultry farming farmers. Government and concerned agencies need to take active part for the extension service to strengthen the health of chicken. Also it is recommended that well based and organised marketing channel is essential for selling of poultry products. Farmers are advised to consult veterinary doctors for the health issue of the birds and advised further to avoid the excessive use of antibiotics. Since ND and CRD were prevalent in all the study area as major health issue, an in-depth analysis of these two diseases should be carried out in future to explore the cause of morbidity and mortality. This would considerably reduce the losses and maximize the returns to the farmers.

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