



# Constraints of Small-Scale Commercial Poultry Farms Analyzed by Garrett's Ranking Technique in and around Debre Markos, Amhara Region, Ethiopia

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## ABSTRACT

This study was carried out to assess constraints of small scale commercial poultry farms in and around Debre Markos, Amhara region, Ethiopia. Cross sectional study was involved on the assessment of socio demographic characteristics, flock size and constraints faced by employing structured questionnaire for personal interviews. The socio demographic and flock size data were analyzed by  $\chi^2$  and one way analysis of variance, respectively. The constraints faced were ranked by the respondents and the factors were analyzed by Garrett's ranking technique. The result showed that sex, age, marital status, religion, occupation, family size, experience years, educational level had statistically significant effect ( $p < 0.05$ ) on the operation of small scale poultry farms. The mean flock size was 844.3 chicks. Flock size was influenced ( $P < 0.05$ ) by sex of birds rather than breed. The flock size of female chicks were significantly ( $P < 0.05$ ) higher than male chicks. Among the constraints; high cost of feed, unavailability of feed and feed ingredients, unavailability of land, lack of market linkage and promotion, high cost of birds for starting business, lack of finance, lack of extension service and lack of training were listed as 1-10 ranks sequentially. Therefore, for successful poultry production and further expansion in the study area; there is a need to improve market linkage and promotion, provide training on poultry husbandry practice, provision of land and fulfilling the financial needs through facilitating credit services are among the imperatives for improving the current status of small scale commercial poultry production

**Key words:** Constraints, Flock size, Personal interview, Questionnaire

## INTRODUCTION

Food security and poverty reduction are priority policy issues in the Ethiopian government development plan due to the fact that about 29% of the population lives below the national poverty line (IFAD, 2012). Poor human nutrition has continued due to lack of sufficient energy and protein in the food or due to insufficient availability of food (Abedullah et al., 2007). Shortages of protein availability are a well-known problem in Africa (Haftu, 2016). To fulfil the protein requirements of the population, animal sources play a significant role. Among the animal protein sources, poultry meat and eggs are important sources of edible animal protein (FAO, 2010). Thus, if food self-sufficiency is to be achieved and to combat malnutrition in developing countries particularly in Ethiopia, there is a need to give due attention to poultry production (Melkamu, 2013). Because poultry is needed not only to fulfill the protein requirements but it also plays a pivotal role in poverty reduction due to its enormous potential to bring about rapid economic growth, particularly benefiting the weaker sections of the society. Further, it requires low capital investment and assures quick returns (Rajendran and Samarendu, 2003).

The total poultry population in Ethiopia is estimated to be about 50.38 million and the estimated poultry populations in the Amhara Region and East Gojjam Zone is 14.6 million and 1.15 million, respectively (CSA, 2013). The prevailing poultry production systems in the mentioned areas include backyard, small-scale, and large-scale commercial production systems.

Commercial poultry production in Ethiopia is characterized by a large number of small scale farms, and a few medium to large scale poultry farms (Nebiyu et al., 2016). There are several emerging small-scale commercial poultry farms in the country in general and in Debre Markos in particular. These emerging farms have vital contribution to

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improve the livelihood, food security and poverty reduction as well as providing a handsome return in semi-urban and urban areas in the tropics (Pica-Ciamarra and Otte, 2010; Emebet, 2015). Also in Ethiopia, it plays a great role as a prime supplier of eggs and meat both in rural and urban area (Haftu, 2016). However, the contribution of poultry in both systems to the Ethiopian economy is only 2-3% due to different constraints (Dana, 1999). The information pertaining to constraints of small-scale poultry farms in and around Debre-Markos was generally scanty. Therefore, this study was carried out to assess the major constraints which hinder the sustainability of small scale poultry farms in the areas studied.

## MATERIAL AND METHODS

### The Study Area

The study was conducted in and around Debre-Markos, Ethiopia. Debre-Markos is located at 300 km from Addis Ababa in Northwest of the country and 265 km Southeast of Bahir Dar, capital of Amhara Region. The altitude ranges from 500-4154 meter above sea level. The annual rainfall ranges from 900-1800 mm and a minimum and maximum temperature of the area is 7.5°C and 25°C, respectively.

### Ethical Approval

Before conducting this survey type research, Debre Markos University ethical approval committee critically assessed and approved the document to undertake this research on small scale commercial farms

### Study population

All small-scale poultry farm owners who personally funded and were organized by small and micro enterprise offices in and around Debre Markos were considered as the study population.

### Research design

A cross-sectional study was carried out to assess the constraints of small-scale commercial poultry farms. A checklist of constraints was developed to guide the ranking process and farm heads or leaders were asked to rank them according to their priority.

### Data collection and analysis

Data were collected by the use of pretested structured questionnaire through personal interview method from heads (owner of the farm) and leaders of the farm (organized in small and micro enterprise offices) to generate information on constraints faced in small-scale commercial poultry farms. The farm heads or leaders were asked to rank the factors that were hindering poultry production. These factors were analysed by Garrett's ranking technique within six steps to interpret the result

Step one: the ranking given by producers for each factor was analysed

Step two: Thus assigned ranks by the individual producers was counted into percent position value by using the formula.

$$\text{Percentage position} = \frac{100(\text{Rij} - 0.50)}{N_j}$$

Where

Rij - Rank given for the  $i^{\text{th}}$  factor by the  $j^{\text{th}}$  individual

$N_j$  - Number of factor ranked by the  $j^{\text{th}}$  individual.

Step three: For each percent position scores were obtained with reference to Garrett's Ranking Conversion Table and each percent position value were converted into scores by reference to Garrett's Table (Garrett and Woodworth, 1969)

Step four: The summation of these scores for each factor were worked out for the number of respondents who gave ranking for each factor

Step five: Mean scores were calculated by dividing the total score by the number of respondents

Step six: These mean scores for all the factors were arranged in descending order and the most influencing factors were identified through the ranks assigned.

## RESULTS

### Socio demographic characteristics

The socio demographic characteristics of small scale poultry farmers are presented in table 1. Sex had a significant effect ( $P < 0.05$ ) on the operation of small scale poultry farms. About 83.7% of the farms were run by males and 16.7%

were by females. Age had a significant difference ( $P < 0.05$ ) in running of small scale poultry farms. Among the poultry farmers, 85.7% of the age profile ranged 15-30 years. There was no any significant ( $P > 0.05$ ) difference between married and unmarried in small scale poultry production. The unmarried poultry producers were 55.1% and the married were 44.9%. Religion had a significant ( $P < 0.05$ ) effect in poultry operation. Almost 98% of the farms were run by Orthodox Christianity believers and the rest was Muslim. The educational level were highly significant effect ( $P < 0.05$ ) in running poultry farming. Almost one third (36.7%) of small scale farming was run by first degree poultry producers. Nearly more than half (57.1%) of the producers had not any experience and the rest 42.9% of the producers run their farms with experiences. About 57.1% of the producers were new and 40.8% had 1-3 years of experience. Family size had a significant effect ( $P < 0.05$ ) in small scale poultry production. Almost 79.6% of the producers had 1-3 family sizes. Just about 79.6% of the poultry producers were engaged fully in poultry production and the rest 20.4% of the producers were a secondary occupation in and around Debre Markos small scale commercial poultry farms.

**Table 1.** Socio demographic characteristics of small scale poultry farms in and around Debre Markos, Amhara Region, Ethiopia from September 2015 to May 2016

Variables		N=49	%	$\chi^2$	P-Value
Sex	M	41	83.7	10.694	< 0.001*
	F	8	16.3		
Age	<15	1	2.0	97.204	< 0.001*
	15-30	42	85.7		
	31-45	5	10.2		
	46-60	1	2.0		
Marital Status	Married	22	44.9	0.510	0.475
	Unmarried	27	55.1		
Religion	Orthodox	48	98	45.082	< 0.001*
	Muslim	1	2		
	Others	0	0		
Ethnic Group	Amhara	49	100	1.000	< 0.001*
	others	0	0		
Occupation	Poultry prod	39	79.6	17.163	<0.001*
	others	10	20.4		
Family size	1-3	39	79.6	49.143	<0.001*
	4-6	9	18.4		
	7-9	1	2.0		
Presence of experiences	Yes	21	42.9	1.000	0.317
	No	28	57.1		
Experience years	New	28	57.1	23.551	<0.001*
	1-3	20	40.8		
	4-6	1	2.0		
Educational level	5-8 grade	4	8.2	10.694	0.030*
	9-10 grade	8	16.3		
	11-12 grade	9	18.4		
	Diploma	10	20.4		
	Degree	18	36.7		

Note: \*Shows a significant effect at  $P < 0.05$ .

### Flock size of chicks in small scale poultry farms in and around Debre Markos

The flock size and breeds of chicks in small scale poultry farms in and around Debre Markos is presented in table 2. The mean flock size per farm was 844.3, however the flock size was significantly ( $P < 0.05$ ) influenced by the sex of birds. Female chicks were higher ( $P < 0.05$ ) than male chicks. The flock was composed of four breeds of chicks like Bovans brown (egg type), Bovans white (egg type), Koekoek (dual), Sasso T44 (dual). The flock size did not become statistically ( $P > 0.05$ ) affected by breed. However, 71.4% of the producers had kept Bovans brown.

### Constraints

The constraints faced to hinder the sustainability of small scale poultry farms are presented by their rank in table 3.

**Table 2.** Flock size and breeds of chicks in small scale poultry farms in and around Debre Markos, Amhara Region, Ethiopia from September 2015 to May 2016

Variables	N (%)	Mean (SEM)
Flock size	49(100)	844.3(98.257)
Sex	Female chicks	774.7(98.257) <sup>a</sup>
	Male chick	261.7(104.890) <sup>b</sup>
Breed	Bovans brown (egg type)	982.0(121.952) <sup>a</sup>
	Bovans white (egg type)	1105.0(605.000) <sup>a</sup>
	Koekoek (dual)	354.4(82.481) <sup>a</sup>
	Sasso T44 (dual)	503.3(115.518) <sup>a</sup>

Note: N (%) describes number or percent of producers; SEM-standard error of mean, means with the different letter of superscript in the same column did differ significantly (P<0.05)

**Table 3.** Rank of constraints faced in small scale poultry farms in and around Debre Markos, Amhara Region, Ethiopia, from September 2015 to May 2016

Constraints	Total score	Mean Score	Garrett's rank
High cost of feed	3080	62.86	1
Unavailability of feed and feed ingredients	2867	58.51	2
Unavailability of land/space	2579	52.63	3
Lack of market linkage and promotion	2326	47.47	4
High cost of birds	2177	44.43	5
Lack of finance	1974	40.29	6
Lack of extension service	1746	35.63	7
Lack of training	1734	35.39	8
Poor credit facilities	1725	35.20	9
High cost of medicaments	1477	30.14	10
Unavailability of improved birds near the farm	1339	27.33	11
Electric disturbance	1301	26.55	12
Lack of technical know-how in handling poultry	1291	26.35	13
Mortality of day-old/young chicks	1282	26.16	14
Losses due to environmental change	1277	26.06	15
High initial investment	1227	25.04	16
Cannibalism	1084	22.12	17
Lack of veterinary care	1063	21.69	18
Inability to diagnose sick birds	1005	20.51	19
High rate of interest on loans	956	19.51	20
Unavailability of desired breed	897	18.31	21
Lack of equipment	798	16.29	22
unavailability of waste disposal	779	15.90	23
Difficulty for water	634	12.94	24
Labour problem	552	11.27	25
Disease outbreak	542	11.06	26
Loss of birds due to predators	538	10.98	27
High rate of morbidity of birds	496	10.12	28
Inability to pay constant attention	395	8.06	29

## DISCUSSION

In spite of the contribution of the poultry industry to the economy, the subsector is faced by challenges to hinder further growth. Among the constraints faced in and around Debre Markos small scale commercial poultry farms, high cost of feed stood at the forefront and unavailability of feed and feed ingredients near to the town was the second rank. This was in line with the report of Tadelle et al. (2003) who noted that poultry feed and nutrition is one of the most critical constraints to poultry production under both the rural small holder and large-scale systems in Ethiopia. The rank confirmed the report of Demeke (1996) who reported that the availability, quality and cost of feed are the major constraints to poultry production in Ethiopia which is not self-sufficient in cereal grains that form the bulk of concentrate feeds for poultry. The report coincides with the report of Nebiyu et al. (2016) who noted that the price of feed was the

most noticeable constraint in Addis Ababa small scale intensive poultry farming. The result also agreed with the report of Aromolaran et al. (2013) who found that in small scale commercial poultry farms, 55.8% of the respondents lack of quality ingredient for feed formulation to be a major constraint while 51.7% believed that the high cost of feed for their layering birds was a major constraint encountered which prevented them from increasing their layers production. The result coincides with the report of Rajendran and Samarendu (2003) who noted that high cost of feed was the leading factor to hinder production in India.

Unavailability of land/space/ was the third factor among the constraints in small scale poultry farms in and around Debre Markos. Almost more than 71.4% of poultry producers keep their chicken within their own dwelling houses and 4.1% in hired houses. This is due to lack of capital to request land from the government and unable to establish their own farms/poultry house/. However, Nebiyu et al. (2016) explained that the unavailability of land was the second constraint in Addis Ababa small scale poultry production. The result also coincides with the report of Mengistu (2008) who noted that shortage of space was one of the major constraints among the others in smallholder broiler producers in and around Debre zeit, Ethiopia. Aromolaran et al. (2013) reported that 25% of the respondents replied that unavailability of land/space was the major constraint, and the other 57.5% and 17.5% of the respondents thought that unavailability of land was a minor and not as constraint, respectively in Nigeria.

Lack of market linkage and promotion was the fourth rank among the constraints in the study area. Most of the poultry producers replied that the involvement of the government to link the market and give promotion service is still limited. Due to this reason, they are unable to sell birds on their selling age and lead to expose for extra outlay. The result is in line with Jaafar and Gabdo (2010) who confirmed that inadequate market/market linkage is the major constraint in small scale poultry enterprise in Nigeria. Small-scale poultry farmers also encountered problems in marketing produce (Okantah et al., 2003). Lack of market for birds was the leading constraint compared with lack of market for eggs in India (Nath et al., 2012). A different result was reported by Nebiyu et al. (2016) who noted that market difficulties during selling was the eighth rank in Addis Ababa small scale poultry farming.

The purchasing price of day old chicks was very high and it had the fifth rank. The egg type day old chick was purchased around 25.50 Ethiopian Birr. According to the producers thought due to their expensiveness, unable to maximize the number of birds during production time. The result coincides with the report of Aromolaran et al. (2013), 54.2% poultry producers noted that purchasing a healthy day old chicks was the major constraint. The result also confirmed by Nath et al. (2012) who reported that high cost of day old chicks were the second constraint among the economic constraints.

The lack of finance was the sixth rank constraint in small scale poultry farms in and around Debre Markos, because almost half of the poultry producers were beginners in poultry production and they are not economically efficient. A similar result was reported by Micheal (2008) who noted that shortage of capital was one of the leading constraints among others in and around Debrezeit stallholder broiler producers, Ethiopia. The result was in agreement with the report of Okoli et al. (2005) who noted that to run small scale commercial poultry production, high cost of production inputs and lack of adequate finance were major constraint to the business in Nigeria. Another similar result was reported by Ghasura et al. (2013) who noted that lack of finance was the seventh leading constraint in Gujarat, India. Also Bishop et al. (2009) reported that in intensive small scale poultry production, lack of finance was the major constraint in Delta State Nigeria.

The agricultural extension service is one of the institutional support services that have a central role to play in the transformation process from backyard poultry production system to small scale intensive poultry production system. The service contributes to the development of the skill and knowledge of farmers to adopt new and improved technologies. Lack of extension service was the seventh leading constraint in the study area. Jaafar and Gabdo (2010) reported that among the six major constraints in small scale poultry production enterprises, lack of extension service was the leading constraint (100%). Lack of training was the eighth constraint in the study area; however inadequate training was the 11<sup>th</sup> constraint in Addis Ababa small scale intensive poultry farming (Nebiyu et al., 2016). Poor credit facilities were the 9<sup>th</sup> constraint in and around Debre Markos small scale commercial poultry farms. The result was confirmed by the report of Ghasura et al. (2013) who noted that the poor credit facilities were ranked as the 8<sup>th</sup> factor in India small scale poultry farm entrepreneurs. The result coincides with the report of Nebiyu et al. (2016) who reported that the lack of access to credit was the 10<sup>th</sup> factor in Addis Ababa small scale intensive poultry farming. High cost of medicaments was the 10<sup>th</sup> constraint in and around Debre Markos small scale poultry farm producers. Vaccines were given by the town agriculture office came from the national veterinary institute at Bishofitu, Ethiopia and other medicaments were purchased from the town veterinary pharmacy and these medicaments are costly. The result was in agreement with the report of Nath et al. (2012) who noted that high cost of medicine was also the major constraint in India small scale poultry production. The result was also confirmed by Ghasura et al. (2013) who stated that the high price of medicine was the fifth major constraint in Gujarat poultry farm entrepreneurs, India.

The other constraints ranked by Garret's ranking technique in small scale commercial poultry farm in and around Debre Markos were ranked from rank 11-29. According to their sequence, these were unavailability of improved birds near the farm, electric disturbance, lack of technical know-how in handling poultry, mortality of day-old/young chicks, losses due to environmental change, high initial investment, cannibalism, lack of veterinary care, inability to diagnose sick birds, high rate of interest on loans, unavailability of desired breed, lack of equipment, unavailability of waste disposal, difficulties accessing water, labor problem, disease outbreak, loss of birds due to predators, high rate of morbidity of birds, inability to pay constant attention. Nearly similar result was reported by Ghasura et al. (2013) who noted that the constraints in Gujarat poultry farm entrepreneurs beyond rank 10 were non-availability of improved birds in time, inability to pay constant attention, lack of supports from family members, high charge of electricity and non-availability of laborers for poultry enterprise.

## CONCLUSION

There were 49 small scale commercial poultry farms in and around Debre Markos. Among them 75.5 % of the farms were established by their own initiation privately and 24.5% of the farms were established by youths organized by small and micro enterprise office. However the poultry production didn't achieve its full potential due to a number of constraints. Among the constraints high cost of feed, unavailability of feed and feed ingredients, unavailability of land/space, lack of market linkage and promotion, high cost of birds, lack of finance, lack of extension service, lack of training, poor credit facilities and high cost of medicaments were the leading major constraints that hindered to run successful poultry production through their production time. Therefore, the intervention of the government is very crucial to alleviate the constraints faced for efficient and successful poultry production, and for further expansion.

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### Competing interests

The authors declare that they have no competing interests.

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