



# Assessment of Management Practices and Egg Production Performance of Sasso and Bovans Brown Exotic Chicken Breeds in Sidama Zone and Halaba Special Woreda, SNNPR, Ethiopia

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## Abstract:

This study was conducted in Sidama Region and Halaba Special district to assess management practices and productivity performance of Bovans brown and Sasso chicken breeds. Two districts namely Aleta Wondo and Aleta Chuko from Sidama Zone and Halaba Special District were selected depending on exotic chicken distribution. Households were selected using systematic random sampling techniques. Primary data was collected using questionnaire survey. Data was analysed using SPSS (Version 20). The result indicated that majority of respondents (52.2%) keep chicken for egg consumption. About 56.1% of respondents keep chicken in backyard production system. About 63.9% of respondents rear chicken within similar house with people. Majority of respondents (82.2%) provide supplementary feed whereas rest of respondents leave chicken on only scavenging for their feed. From supplements to chicken maize accounts major share than other feed ingredients. About half of respondents provide free access watering for chicken from which 55.0% of water source is tap water. About 34.4% of respondents do not cull chicken for any reason, however rest of respondents cull old aged, poor productive and diseased chicken. About 50.0% of respondents never vaccinate chicken for any kind of disease. About 50.0% of respondents vaccinate chicken for Newcastle disease. Bovans brown chicken breed is faster for first mating and first egg lay than Sasso breed in study districts. Bovans brown chicken produce higher number of eggs per hen per year than Sasso breed. Egg producing performance is ranked as first trait that makes Bovans brown preferable than Sasso. However, large body size and weight for meat production is ranked as first preferable trait for Sasso breed. In the study districts disease, feed shortage and predators are main factors challenging chicken production. Therefore, improved housing system, feeding and watering system, scheduled vaccination program needed to be promoted in the study areas. Attention needed to distribute chicken breed that better perform in specific area.

*Keywords: Bovans brown, Halaba, Management practices, Productivity, Sasso, Sidama*

## INTRODUCTION

Ethiopia owned huge number of poultry population. However, productivity of this sector was hindered by different factors like diseases, predators, lack of proper health care, feed shortage and poor marketing system (Bayesa, 2021). Poultry production system of the country is mainly characterized by backyard production system with minimal inputs and indigenous chicken breeds (Boere *et al.*, 2015, Dawit *et al.* 2018).

With the aim of improving poultry productivity, different breeds of exotic chickens have been disseminated through higher learning institutions, research organizations, the Ministry of Agriculture and Non-Governmental Organizations to rural farmers and urban-based small-scale

poultry producers (Solomon, 2008). Also there has been a substantial effort to introduce improved hybrid layer particularly SASO, Bovans Brown (BB), New Hampshire, white leghorns and dual-purpose hybrid Potchefstroom Koekoek (PK) breeds to smallholder farmers under backyard management in the country. However, there is lack of recorded data on the performance of chicken and all aspects of management, lack of regular chicken health program and market information especially for Bovans Brown and Sasso. Consequently, there is a need to define the present performance of those exotic breeds. As a result, systematic study is required to assess production performances and determine survivability status or rate of improved poultry chicken under village production system in the region. Therefore, this study was designed to fill the gap with the following objectives.

### Objectives

- To assess management practices and productivity performances of Sasso and Bovans Brown chicken in different production systems in the study area.
- To determine the farmers' preferences for breeds and their products.

### METHODOLOGY

The study was conducted at Sidama Zone and Halaba special woreda in the SNNPR. Selection of study households have been done through selecting two different woreda from Sidama Zone depending on their ecology and in each woreda, three Peasant Associations (PAs) which have been participating in improved poultry extension package at least in the last one and more years were selected purposively based on the extent and intensity of improved chicken distribution. The list of households, which adopted improved chickens from each PAs, was used as sampling frame. The total of three woreda and nine kebeles from one selected zone and special woreda were selected. In each kebele, 20 (twenty) households, total of 180 households were selected using systematic random sampling. Finally, questionnaire survey started after it has been pre-tested before the actual data collection. In addition to questionnaire data collection, general inspection regarding breeds and their management practices was carried out. Cross-sectional survey has been carried out for each household to collect information focusing on status of keeping improved chickens, use of extension packages and its constraints from member(s) of the households directly responsible for management and care of chickens.

**Table 1: Household selection design for data collection**

NO	Name of Study zones (special woreda)	Number of selected Woreda in each zone	Number of kebeles in each woreda	Number of households in each kebele	Total number of households in each zone/woreda
1	Sidama	2	3	20	$20 \times 3 \times 2 = 120$
2	Halaba special woreda	1	3	20	$20 \times 3 \times 1 = 60$
Total households					180

Moreover, the productive performances in terms of number of eggs produced/hen/year, pullet age at first laying, and matured body weight of chickens from farmers' assumption and husbandry practices are also the core points that are considered in the process. Average number of eggs was taken from farmers' estimation of eggs laid/hen/month. Furthermore, the management practices have been assessed through observation of the incorporation of recommended scientific husbandry packages applied for each household. Provision of housing, additional feed,

agricultural extension system used, marketing, vaccination practices and use of modern medication have been assessed through questionnaire survey.

### Data Management and Analysis

The data has been entered using Microsoft excel spread sheet and analyzed using SPSS (Version, 20). Descriptive statistics was employed for describing management practices in each district. Differences in productive performances and marketing preferences are compared using means generated from one-way ANOVA.

## RESULTS AND DISCUSSIONS

### Demographic Characteristics of Respondents

Demographic characteristics of the respondents in the study area are presented in Table 2. Result of the current study shows that majority of respondents were male (76.1% in average). This might be happened in all districts due to that female are mainly engaged in indoor activities than males. Due to this reason the probability of male to be exposed for survey is higher than that of women. Ratio of male to female is higher than the report of Legesse and Kefyalew (2022), they reported 55% male and 45% female in their study. However, higher ratio of male to female (86.45% male and 12.55% female) was reported by Demissu (2020). The attributed variations might happen due to the availability of respondents during survey period. About half of respondents (48.9% in average) are categorized under age category of 31-45. This is in line with results Ermias (2015) reported 42.1 years average age of the respondents. Following this age category about 38.3% of respondents categorized under age group of 15-30. Only 12.8% of respondents are under the age of above 45 years. In line with this result the report of Legesse and Kefyalew (2022) and Meseret (2010) shows that higher proportion of respondents in their study categorized under age group between 31-45 followed by age group between 15-30 and the least number of respondents are under age group above 45 years old.

**Table 2: Socio-economic characteristics of the respondents in the study areas**

Variables		Districts			Overall	Chi-square
		A/wondo	A/Chuko	Halaba		
Sex of respondents (%)	Male	83.3	90.0	55.0	76.1	22.79**
	Female	16.7	10.0	45.0	23.9	
Age group of respondents	15-30	41.7	43.3	30.0	38.3	6.372 <sup>NS</sup>
	31-45	40.0	46.7	60.0	48.9	
	Above 45	18.3	10.0	10.0	12.8	
Education	Illiterate	8.3	1.7	0.0	3.3	62.416**
	Read and write	0.0	3.3	26.7	10.0	
	Elementary	13.3	21.7	45.0	26.7	
	High school	40.0	45.0	21.7	35.6	
	College and above	38.3	28.3	6.7	24.4	
Average family size (Mean±SD)		4.72±1.668	4.22±1.391	5.07±1.716	4.67±1.627	P=0.15

SD= Standard deviation, NS= non-significant; \*\* significance

Regarding educational status of respondents, higher proportion of respondents (35.6%) are categorized under high school education level and lowest proportion (3.3%) is illiterate (never attended any level of formal education). The average family size of respondents in current study is 4.67 without significant difference between study districts. Ermias (2015) reported higher value of average family number than current study. Attributed difference might be due to difference of location, because population density and family size may vary from area to area.

### Breeds and Purpose of Production

Breed of interest and the purpose of keeping them are presented in Table 3. This study does not conclude all types of breeds available in the study area, rather it touches only Bovans brown and Sasso chicken breeds. The result of present survey shows that Bovans Brown breed holds higher part than Sasso in Aleta Wondo and Aleta Chuko. However, mostly distributed breed in Halaba is Sasso, it comprises about 95.0%. This large difference might be depending on different factors. Among factors distribution of different companies across regions plays major role on kind of breeds to be distributed to the regions. Bovans Brown and Sasso breeds are mainly distributed ones in South Eastern Ethiopia (Abiyu, 2020).

Result shows that main purpose of keeping these breeds is for egg consumption in Aleta Wondo and Aleta Chuko districts. Respondents holds only few numbers of these breeds due to reason that their production goal is not market oriented rather it is subsistence production. In contrary to this study the result of study by Demissu (2020) shows that about 90.85% of respondents keep chicken mainly to sale poultry and their products. In Halaba district about 46.7% of respondents keep chicken for sale and about 31.7% keep poultry mainly for egg consumption.

**Table 3: Breeds adopted in the study areas**

Parameters		Districts			Overall (N=180)	Chi-square
		A/Wondo (N=60)	A/Chuko N (=60)	Halaba (N=60)		
Breed (%)	Bovans Brown	68.3	61.7	5.0	45.0	58.721**
	Sasso	31.7	38.3	95.0	55.0	
Purpose of keeping chicken	Egg consumption	65.0	60.0	31.7	52.2	19.226**
	Meat consumption	13.3	15.0	16.7	15.0	
	Product sale	18.3	25.0	46.7	30.0	
	Live birds' sale	3.3	0.0	5.0	2.8	

Values in the table are presented in percentile; \*\*= significantly different; n=sample size

### Management and Housing Condition

Poultry management system and housing condition of respondents are presented in Table 4. Result of present finding shows that majority of respondents (56.1%) keep chicken in backyard production system. From respondents 63.9% keep chicken within similar house with people, this means some of respondents make separate partition for chicken inside the similar house with people. Demissu (2020) reported that about 73.52% of respondents keep chicken within family house, and in this similar study only 7.44% of respondents made separate house for chicken. In the current study, only 25.6% of respondents have separate house constructed to keep chicken.

In line with present study Fissaha (2010) reported that 22.1% of respondents in Bure district use separate house entirely constructed for chicken. In his similar study very few number of respondents (only 3.4%) have separate house constructed for chicken. These and other similar studies witnessed that poultry production system of the country is highly backward. This system is not recommended in number of ways. Especially, exotic breed chicken needs safe condition for their survival and better productivity.

**Table 4: Housing condition of the birds at the study areas**

	Districts			Overall	Chi-square
	A/Wondo	A/Chuko	Halaba		

Management	Backyard	60.0	48.3	60.0	56.1	2.211 <sup>NS</sup>
	Semi-intensive	40.0	51.7	40.0	43.9	
Housing	Same house with people	61.7	75.0	55.0	63.9	19.458*
	Night shelter only	3.3	10.0	1.7	5.0	
	Their own separate house	28.3 <sup>a</sup>	8.3 <sup>b</sup>	40.0 <sup>a</sup>	25.6	
	Same house with other animals	6.7	6.7	3.3	5.6	

Values in the table are percentile values; NS=non-significant; \*\*=significantly different; values within similar row with different superscript letters are significantly different.

### Feeding and Watering of Chicken

Feeding and watering practices of respondents in the study districts are presented in Table 5. Result of present study revealed that majority of respondents (82.2%) in the study districts fed their chicken scavenging with supplementation. There is no significant difference between study districts on feeding system of chicken. This finding is in line with the results of Hailu et al, (2019), who reported that 79.6% of respondents provide supplement in addition to scavenging for the feed. Respondents responded that maize, wheat, wheat bran and house leftovers are supplemented to the chickens as their availability. Abiyu *et al*, (2020) reported that wheat, maize, sorghum and house leftovers are types of supplementary feed for chicken in South Western Ethiopia.

Regarding watering practices about half (50%) of respondents provide free access water to chicken whereas some of them (25%) provide once a day and the remaining 25% provide twice a day for their chickens. The result of Etalem (2019) is in concordance with the finding of present study. She reported that 53.8% of respondents offer free access water to their chicken. In contrary to present study Fisseha (2010) reported that all of the respondents during his study provide free access water to chicken. On the other side 66.8% of respondents provide water to chicken only once a day (Legesse and Kefyalew 2022). These differences might be observed due seasonal variation and availability of water in the study areas.

**Table 5: Feeding and watering practices of chicken**

Parameters		Districts			Overall	Chi-square
		A/Wondo	A/Chuko	Halaba		
Feeding system	Scavenging only	15.0	20.0	18.3	17.3	0.532 <sup>NS</sup>
	Scavenging with supplement	85.0	80.0	81.7	82.2	
supplement type	Maize and wheat	46.7	41.7	53.3	47.2	7.762 <sup>NS</sup>
	Wheat bran	21.7	33.3	18.3	24.4	
	House leftovers	18.3	6.7	11.7	12.2	
Watering	Free access	46.7	58.3	45.0	50.0	6.733 <sup>NS</sup>
	Morning only	21.7	18.3	35.0	25.0	
	Morning and afternoon	31.7	23.3	20.0	25.0	
Water source	Hole water	27.6 <sup>a</sup>	15.0 <sup>b</sup>	8.3 <sup>b</sup>	16.7	56.617 <sup>**</sup>
	River	46.7 <sup>a</sup>	38.3 <sup>a</sup>	0.0 <sup>b</sup>	28.3	
	Tap water	26.7 <sup>a</sup>	46.7 <sup>a</sup>	91.7 <sup>b</sup>	55.0	

Values in the table are percentiles; values within similar row with different superscript letters are statistically different; NS= non-significant; \*\*=significant difference

### Culling Practices and Health Control

Culling practices and health related practices of respondents are presented in Table 6. Result of the present study witnessed that about 34.4% of respondents do not have any practices of culling

chicken. Rest of the respondents culls old aged, poor or nonproductive and diseased chicken. There is significant difference on culling of chicken based on different reasons. Ermias (2015) reported that chicken producers cull chicken for old age, space problem, low egg production, disease problem, for extra money need and feed shortage. Meseret (2010) mentioned different reason for which chicken producers cull chicken from their flock. Reasons may vary from time to time and from area to area depending on the problem encountered the production.

In the study areas about 50% of respondents do not give any kind of vaccination to chicken, whereas about half (50%) of respondents vaccinate chicken for Newcastle disease.

**Table 6: Culling practices and health control practices of respondents**

Parameters		Districts			Overall	Chi-square
		A/Wondo	A/Chuko	Halaba		
Culling practices	Do not cull chicken	36.7	43.3	23.3	34.4	24.577**
	For poor productivity	10.0 <sup>a</sup>	28.3 <sup>b</sup>	26.7 <sup>ab</sup>	21.7	
	For old age	28.3 <sup>ab</sup>	21.7 <sup>b</sup>	43.3 <sup>a</sup>	31.1	
	For sickness	25.0 <sup>a</sup>	6.7 <sup>b</sup>	6.7 <sup>b</sup>	12.8	
Annual vaccination	None	60.0 <sup>a</sup>	36.7 <sup>b</sup>	53.3 <sup>ab</sup>	50.0	6.933*
	For NCD	40.0 <sup>a</sup>	63.3 <sup>b</sup>	46.7 <sup>ab</sup>	50.0	
Anti ecto-parasite	Yes	0.0	1.7	0.0	0.6	2.011 <sup>NS</sup>
	No	100.0	98.3	100.0	99.4	
Deworming	Yes	0.0	1.7	0.0	0.6	2.011 <sup>NS</sup>
	No	100.0	98.3	100.0	99.4	

NCD= Newcastle disease; NS= Non significant; \*\*= statistically significant; values within similar row with different superscript letters are statistically different.

### Productivity of Chicken in the Study Area

Reproductive performance of chickens in the study districts is presented in Table 7. First mating age of two different breeds shows significant difference that, first mating age (in month) of Bovans brown was 4.23 and that of Sasso breed was 4.94.

Age of the first egg lay for bovans brown breed was 24.31 and that of Sasso was calculated as 25.93. This show that there is significant difference on age of first egg lay (in weeks). Bovans brown start to lay eggs earlier that Sasso. In the study by Aberra *et al*, (2019) recorded earlier period of first egg lay, 155 days for Sasso and 157 days for Bovans Brown chicken breeds. Difference might be attributed due to management differences. Considering egg laying potential Bovans brown lays 198.61 eggs per hen per year, whereas sasso breed lays 132.53 eggs per hen per year. In accordance with present study Aberra *et al*, (2019) reported 133 average egg per hen per year for Sasso breed, however lower egg production potential (117 eggs per hen per year) was recorded for Bovans Brown chicken breed. Bovans Brown is better performing breed for egg production than Sasso, but the result of Aberra's study given reverse of it. Reason for this variation might be due that the environment or any other factor hindered production performance of Bovans brown chicken breed in Boricha district. The result of Ermias (2015) witnessed that Bovans Brown preferred as first breed among by respondents than other breeds compared with it.

**Table 7: productive performance of Bovans Brown and Sasso in study districts**

Parameters	Breed		F-value	P-value
	Bovans Brown (Mean±SD)	Sasso (Mean±SD)		

First age of mating (in month)	4.23±.86	4.94±.805	32.787	0.000
Age of first egg lay (in weeks)	24.31±3.55	25.93±378	8.664	0.004
Number of eggs per hen per year	198.61±67.59	132.53±35.96	69.005	0.000

### Trait Preferences of Bovans Brown and Sasso Chicken in the Study Districts

Respondent's preferences of Bovans brown and Sasso chicken breeds for different traits are presented in Table 8. Result of present study shows that egg production potential was ranked first for Bovans brown chicken breed whereas large body size and weight for meat was ranked first preferred trait for Sasso breed in the study districts.

**Table 8: Trait preference of exotic chickens by farmers**

Traits of importance	Breeds			
	Bovans Brown		Sasso	
	PI	Rank	PI	Rank
Produce many eggs	0.45	1 <sup>st</sup>	0.176	3 <sup>rd</sup>
Has good physical appearance	0.15	3 <sup>rd</sup>	0.302	2 <sup>nd</sup>
Large body size and weight for meat	0.24	2 <sup>nd</sup>	0.474	1 <sup>st</sup>
Produce eggs with thicker shells	0.048	5 <sup>th</sup>	0.048	4 <sup>th</sup>
They are feed efficient	0.11	4 <sup>th</sup>	-	-

### Major Constraints of Poultry Production

Major constraints of chicken production in the study districts are presented in Table 9. Poultry production in the study area was hindered with different factors. Respondents replied that, disease was ranked as first constraint at Aleta chuko and Halaba special woreda and as second challenging factor in Aleta wondo woreda. Similarly, Fisseha M, *et al.* (2010) described that disease is major challenging and most economically important factor for village chicken production system.

Feed shortage both in quality and quantity is also one of the challenging factors in village chicken production. Respondents ranked feed shortage as first, second and fourth challenging factor in Aleta wondo, Aleta chuko and Halaba special woreda respectively. Predation was ranked as third challenging factor in Aleta wondo, Aleta chuko and Halaba special woreda. Fisseha M, *et al* (2010) identified predation as economically important constraint in Bure and Dale woredas. Halima (2007) also reported that predation is one of the major constraints in village chicken production in northwest Ethiopia. In line with present study, Abiyu *et al*, (2020) reported that disease, feed shortage and predators are main challenging factors of chicken production in Bench Maji, Kaffa and Sheka Zones of South Western Ethiopia.

Other production constraints in the study areas are thieves and lack of knowledge. Lack of knowledge was ranked as second economically important constraint in Halaba special woreda and fourth challenging factor in Aleta wondo and Aleta chuko woreda. Other constraints identified in the study areas during the interview are lack of time due to other farm activities, improper veterinary service and lack of credits and capital to expand their business on poultry production.

**Table 9: Major constraints of poultry production in the study districts**

Constraints	Districts					
	A/Wondo		A/Chuko		Halaba	
	PI	Rank	PI	Rank	PI	Rank
Disease	0.247	2 <sup>nd</sup>	0.278	1 <sup>st</sup>	0.289	1 <sup>st</sup>

Feed shortage	0.296	1 <sup>st</sup>	0.26	2 <sup>nd</sup>	0.158	4 <sup>th</sup>
Predators	0.24	3 <sup>rd</sup>	0.225	3 <sup>rd</sup>	0.229	3 <sup>rd</sup>
Thieves	0.05	5 <sup>th</sup>	0.117	5 <sup>th</sup>	0.07	5 <sup>th</sup>
Lack of knowledge	0.16	4 <sup>th</sup>	0.118	4 <sup>th</sup>	0.253	2 <sup>nd</sup>

### CONCLUSION

Exotic chicken breeds are adopting under small scale farmers in few numbers. Most of farmers manage their chickens in backyard system with seasonal supplementation. Sasso and Bovans brown breeds chicken have been distributed in the region. But Sasso breed is late in maturity and first egg lay and poor in egg production. In the study areas most of the farmers keep chickens at similar house with people. But it is not recommended to keep chicken in similar house with people and other livestock because there might be disease transmission between chicken and human as well as other livestock. Disease is major economically important constraint for village chicken production system. Therefore, it needs scheduled vaccination to overcome this problem. Predation and thief are other main problems in village chicken production system. This problem can be solved by making suitable house that protect chickens from adverse weather, predators and thieves.

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