

Introduction and Demonstration of Commercial Broilers (Cobb-500) in and around Hawassa Town

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Abstract

This study was conducted at Hawassa zuria district with the aim of demonstrate full fledge poultry packages in and around urban areas to enhance meat production by introduction and demonstration of Commercial broilers (cobb-500) chicken breed. Totally 500 a day old chickens of Coob 500 broilers breed were purchase from Alema poultry multiplication and dissemination farm and 50 DOC's disseminated to each of the selected farmers with 50 kg of starter feed. Brooding was done using electrical brooder. The average weight old day old chicks was 41.1 g. The average weight of birds at end of 1st, 2nd, 3rd, 4th, 5th, 6th and 7th weeks were 116.1, 209.4, 268.5, 546.7, 832.7, 981.3, 1233.6 respectively. The average final weight was 1264.7g (ranged 1106.4g–1264.7g). The average daily feed intake/bird and cumulative feed intake/bird during the entire period was 79.84g and 3887.6.9 g, respectively. The cumulative average feed conversion ratio (FCR) was 3.6. The total cumulative mortality was 5.6%. The result of the study signify that broilers producers requires high attention for all management issue particularly for feed, If they could not purchase and use commercial feed. Otherwise; it will not be an easy task to bring broilers in to marketable weight within seven weeks of growing period.

Keywords: Broiler; Coob 500; Small holder; Day old chicken; Producers; Hawassa

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Background and Justification

Animal production in general and chickens in particular play important socioeconomic roles many poor rural households in developing countries [1]. In sub Saharan Africa, 85% of all households keep chicken under free range system, with women owning 70% of it; providing cheap/affordable animal protein in the form of meat and eggs as well as being a reliable source of cash income [2]. Besides the sector significantly constitutes to human livelihood and food security of poor households and can be considered an initiative enterprise owing to its low cost [3].

In spite of their great importance to the lives of most rural people, the contribution of village chicken is not proportion to the huge number. According to Singh (1990), low productivity of local breeds; prevalence of diseases; less availability and poor quality of feeds; limited research and poor extension service; and lack of organized marketing and processing facilities are some of the most important constraints affecting the village chicken production system.

Distribution of a day-old and 3 months old improved chicken breeds, mainly RIR & WLH, has been some of the livestock extension packages implemented by the ministry of agriculture. The package is being implemented in many ways like; 5 pullets & 1 cockerel, 1 cock only, 15 pullets & 2 cocks and 50 day-old chicks. Despite such a large number of improved breeds distribution into the village system, the majority of the chicken population is still comprised of the local stock managed under the traditional production system. The contribution of improved chicken in the current production system is less than two percent [4].

A recent study on adoption of poultry breeds in the highlands of Ethiopia indicated that adoption has been limited by a set of factors such as, lack of strong extension follow up and complimentary inputs, diseases, unavailability of credit services and market problems. Besides, the numbers of breeds and birds included in the package were few [5]. This results to a huge gap between demand and supply of poultry products. According to Alemu and Tadelle [6], the per capita egg and chicken meat consumption was estimated to be 57 eggs and 2.85 kg

respectively. But in the current time it is less than one egg and a kilogram of chicken meat, which is very much less than a global average (153 eggs) [7].

A recent study by Nigussie et al. [8], witnessed that the significance of enhancing institutional links and the need to transform the traditional piece meal approach of poultry technology transfer into promotion of carefully selected and packaged technologies. Therefore, to tackle the ever existing problem, different approaches of improved poultry technology packages dissemination should be followed on the basis of certain socio-economic and physical environments.

Objective

- To introduce and demonstrate meat type commercial chicken in urban/peri-urban area of Hawassa town.
- To demonstrate full-fledged poultry packages in and around urban areas.
- To enhance meat production in urban areas.

Materials and Methods

Description of study area, selection of participants and husbandry practices

The study was conducted at Hawassa Zuria woreda located Sidama Regional State of Ethiopia. Geographically it is located between 7.50 - 7.80 N latitude and between 38.180_ 38.250 E longitudes. The elevation area is ranges from 1680m to 2100m above sea level (a.s.l).

After intensive discussion with agricultural experts of the town, 10 participants/farmers with higher willingness were selected. Then, after selected farmers and respective development agents were given an intensive training regarding management and health care of broilers coob-500. Participants were prepared shelters, cleaned and disinfected using formaldehyde solution before two weeks earlier to arrival of day-old chicks. Deep litter housing system was used so that the floors of houses were bedded with 10 cm deep teff straw. Brooding of chicks was done by using 125 watt infra-red lamps and 24 hour light system to increase feed intake and other necessary equipment's like brooders, brooder guards and litter was prepared by farmers. Whereas equipment's like feeders and drinkers were supplied by the research centres. Chicken houses were equipped with well cleaned and disinfected feeders and drinkers.

Chicken distribution and management

500(five hundred) day-old broiler(Coob-500) chicken breed purchased from Alema poultry multiplication and dissemination farm and 50(fifty) DOC's were disseminated to each of the farmer's with 50 kg commercial starter feed to feed only for the first 15 days, then locally prepared feed were allowed. Chickens were vaccinated for Mareks, NCD and Gumboro. At arrival to town, day-old chickens were given a solution of sugars in order to replace energy losses due to transportation of long journey. Feeding, watering and health care of chickens managed according to the guide of the breed.

Data collection

The following data were collected from the trial: weight of day old chicks (g), weekly and cumulative mortality percentages (as occurred due to either disease, predator, mechanical or others), weekly and total body weight gain/bird (g), final weight of chicks (g), daily feed intake, weekly feed intake, cumulative feed intake during entire period, feed conversion efficiency, farmers perception of breed and partial cost benefit analysis.

Data management and analysis

The qualitative and quantitative data-sets were analyzed using appropriate statistical analysis software (SPSS, 20). More specifically descriptive statistics and General Linear Model (GLM) were used for this study. The following linear model was used during analysis of quantitative data:

Model statement regarding the effect of age on mortality:

$$Y_{ij} = \mu + m_i + \epsilon_{ij};$$

Where:-

Y_{ij} - is the chicken performance parameter estimate for bird j in age i ,

μ - is the overall mean

m_i - is the fixed effect of age in weeks ($i=7$; week1, week 2, week 3, week 4, week 5, week 6, week 7) and

ϵ_{ij} - is the residual error

Results and Discussion

Mortality and survivability of birds

As shown in the **Table 1** below, the total number of birds died from all participants in the entire period of study was 26. Due to the hardy nature of the breed there was no mortality during transportation and distribution. The maximum numbers of birds that means 2.2% died at 1st week whereas minimum death 0% was recorded at 5th weeks. The average cumulative mortality percentage of birds recorded in this trial was 5.6%. This was higher than the result (1.7%) and (3.9%) that was presented by [9] and in contrast 7.8% of mortality was presented by [10] on the same breed. Mortality level up to 5% was expected in big poultry farms and accepted as normal. But in case of this study 5.6% of mortality rate were recorded due to disease and predator. Majority of the chickens were died by mechanical damage and suffocation in the first week of study period. This was caused by poor housing system with uncontrolled environment and less follow up. This infers that broiler farmers should implement good and proper management practices, as these will ensure the optimum performance of broilers by reducing mortality that might occur due to poor management practices.

Growth performance

Live body weight and average weekly weight gain of Cobb 500 commercial broiler under Hawassa zuria district condition were presented at **Tables 2 and 3**, respectively. The mean live body weight steadily increased until 3rd week, and fast live weight was

Table 1: mortality of birds and cumulative mortality recorded in each week of study conducted at Hawassa zuria district.

HH Code	No of Doc's given	Mortality at 1st week	Mortality at 2nd week	Mortality at 3rd week	Mortality at 4th week	Mortality at 5th week	Mortality at 6th week	Mortality at 7th week	Total birds died at entire period
1	50	2	0	0	1	0	0	0	3
2	50	3	0	0	0	0	0	0	3
3	50	0	0	0	6	0	0	0	6
4	50	2	0	0	0	0	0	1	3
5	50	0	0	4	0	0	1	0	5
6	50	2	0	0	0	0	0	0	2
7	50	0	3	0	0	0	0	0	3
8	50	0	0	0	4	0	0	0	4
9	50	2	0	0	0	0	0	2	4
10	50	0	0	4	0	0	1	0	5
Mean±sd	1.1±1.2a	0.3±0.95c	0.8±1.7b	0.1±2.1a	0.0±0	0.2±0.42	0.3±0.67c		2.8±1.23
Mortality rate	2.20%	0.60%	1.60%	0.20%	0%	0.40%	0.60%		5.60%

HH: House holder, DOC's: day old chicken of broiler Coob 500, No: number

Table 2: Average body weight of birds during entire period.

HH code	Wt of DOC	Av. wt of 1st week	Av. wt of 2nd week	Av. wt of 3rd week	Av. wt of 4th week	Av. wt of 5th week	Av. wt of 6th week	Av. wt of 7th week
1	41.5	108.9	211.06	282.6	534.4	841.23	975.04	1262.7
2	41	126.8	210.1	286.5	538.9	868.1	1014.7	1252.2
3	41.6	107.6	209.9	267.4	557.6	834.6	921.9	1258.2
4	41.2	108.9	212.4	287.6	547.3	842.71	986.1	1260.8
5	40.8	121.8	211.2	243.1	563.2	829.9	994.2	1213.3
6	41.4	126.6	210.8	275.7	538.6	868.5	1019	1247.6
7	40.3	110.4	201.3	283.9	547.2	801.5	1000.9	1223.7
8	41.7	110.4	209.3	245.9	532.3	801.4	1001.7	1106.2
9	40.9	119.6	212.4	240.1	538.7	809.2	993.4	1246
10	41	120.8	205.9	271.8	568.9	830.1	906.8	1265
Mean±sd	41.1±27	116.1±29.2	209.4±49.5	268.5±74.1	546.7±68.2	832.7±25.3	981.3±589	1233.6±184.3

Table 3: Average weight gain of broilers at end of each week (g) recorded in a broiler demonstration trial conducted at Hawassa zuria district.

Farmers Code	Av. Wt gain at 1st week	Av. Wt gain at 2nd week	Av. wt gain at 3rd week	Av. wt gain at 4th week	Av. wt gain at 5th week	Av. wt gain at 6th week	Av. wt gain at 7th week	Total weight gain
1	67.4	102.16	71.54	251.8	306.83	133.81	287.66	1221.2
2	85.8	83.3	76.4	252.4	329.2	146.6	237.5	1211.2
3	66	102.3	57.5	290.2	277	87.3	336.3	1216.6
4	67.7	103.5	75.2	259.7	295.41	143.39	274.7	1219.6
5	81	89.4	31.9	320.1	266.7	164.3	219.1	1172.5
6	85.2	84.2	64.9	262.9	329.9	150.5	228.6	1206.2
7	70.1	90.9	82.6	263.3	254.3	199.4	222.8	1183.4
8	68.7	98.9	36.6	286.4	269.1	200.3	104.5	1064.5
9	78.7	92.8	27.7	298.6	270.5	184.2	252.6	1205.1
10	79.8	85.1	65.9	297.1	261.2	76.7	358.2	1224
Mean ±SD	75±7.8	93.3±7.9	59.04±20	278.2±23	286.±28	148.6±42	252.1±70.4	1192.4±48

recorded 4th,5th&6th weeks of study; whereas the average daily weight gain steadily increased up 2nd week and declined at 3rd again started to decline at 6th week. The average weight day old chicks (DOC) at arrival was 41.1g (ranged 40.3 g – 41.5 g). The average final weight of chicks was 1233.6g, similar finding was presented by [9] in contras higher final body weight 2094.3g and 3760g was recorded by Dessie [11]. The final weight of broilers obtained in this trial was lower than the genetic potential of the breed when managed intensively which was 2592 g. However,

the result obtained in this trial was very promising under small holder level, which fulfills the weight requirement of our end users (1 kg - 1.5 kg carcass weight). The average weight gain of birds at end of each week is presented in **Table 3**. The minimum and maximum total weights gain of birds at end of the trial was 1064.5 g and 1221.2 g, respectively. The highest weight gain was recorded at the end of the trial period, mainly at 5th week. The weight gain recorded in some participants at the final week was below the expected due to feed shortage.

Feed intake of Broilers during entire period

The average daily feed intake of birds is presented in **Table 4**. Accordingly; the average daily feed intake of birds during the entire period was 79.8 g. The average cumulative weekly feed intake is presented in **Table 5**. The total average cumulative feed intake of each bird was 3887.6g. The daily, weekly and cumulative feed intake of birds recorded in this trial was lower than the genetic potential of the breed. This might be due to several factors including; the feed quality, the climatic condition and general management of birds.

Feed Conversion Ratio (FCR)

The cumulative FCR recorded in this trial was 3.6 (**Table 6**). This means that birds consumed 3.6 kg of commercial feed to produce 1kg of meat. It was higher than the genetic potential of the breed, which was 1.74. This relatively higher FCR (low efficiency) could be related to the feed quality, feed consumption, environmental stress, type of chicken management, feed wastage and water quality and consumption rate of birds. According to the results; significantly lower FCR (high feed conversion efficiency) was recorded at the 3rd week. The lower efficiency (higher FCR) was recorded at the first week of production period.

Partial budget analysis

In **Table 7** above, day old chicks of broiler coob-500 were purchased from Alema farm and after disseminated to farmers all labor afforded by chicken producers and the cost was not considered in the analysis. Finished broilers were sold in live weight (per head) after 47 days of growing period. The result in the partial budget analysis indicates that smallholder broiler production was profitable with a net benefit of 17 ETB /head

Perception of farmer's

Farmers were pleased by the breed and decided to improve poultry production system (**Table 8**). According to the producers the breed has paramount merit than any other chicken breeds they know before. Some of the merits mentioned by the participants were; very fast growth, good final body weight, able to rear many cycles per year and rear as side activity.

Constraints of broiler production as mentioned by producers

Recent study shows that feed shortage, disease and predator were economically important challenges in the study area (**Table 9**). Similarly Fisseha et al. [12] reported that disease was major economically important challenge for village chicken production system. Predation is one of the major economically important

Table 4: Average daily feed intake of birds (g).

HH NO	Daily feed intake at 1st week	Daily feed intake at 2nd week	Daily feed intake at 3rd week	Daily feed intake at 4th week	Daily feed intake at 5th week	Daily feed intake at 6th week	Daily feed intake at 7th week	Daily feed intake at entire period
1	18	33	59	91	102	121.5	124.5	78.42857
2	19	32.5	62	92.7	101	120	120.4	78.22857
3	17	34	60	96	108	125	120.2	80.02857
4	18	35.5	63	95.5	105	113.5	129	79.92857
5	17	35	68	90	108	126	129	81.85714
6	20	33.2	66	92	102.5	114	120	78.24286
7	21	34	67	94	114	102.7	133	80.81429
8	19	36.1	68	93	106	114.5	121.5	79.72857
9	19	32.7	60	95	110	113	124.1	79.11429
10	21	64	64	97	100.5	106.3	116.3	81.3
Mean±SD 18.9±1.5 34±9.5 63.7±3.4 93.62±2.2 112.1±3.7 123.5±2.1 132.1±1.4 79.84±2.3								

Table 5: Average weekly feed intake of birds (g).

HH No	Cumm feed intake at 1st week	Cumm feed intake at 2nd week	Cumm feed intake at 3rd week	Cumm feed intake at 4th week	Cumm feed intake at 5th week	Cumm feed intake at 6th week	Cumm feed intake at 7th week	Cumm feed intake at entire period
1	126	231	413	637	714	850.5	871.5	3843
2	133	227.5	434	648.9	707	840	842.8	3833.2
3	119	238	420	672	756	875	841.4	3921.4
4	126	248.5	441	668.5	735	794.5	903	3916.5
5	119	245	476	630	756	882	903	4011
6	140	232.4	462	644	717.5	798	840	3833.9
7	147	238	469	658	798	718.9	931	3959.9
8	133	252.7	476	651	742	801.5	850.5	3906.7
9	133	228.9	420	665	770	791	868.7	3876.6
10	147	238	448	679	703.5	744.1	814.1	3773.7
Mean±SD 132.3±10.1 238±8.4 445.9±24.03 655.34±15.9 739.9±30.6 809.5±53.1 924.7±36.1 3887.59±69.7								

Table 6: Average weekly FCR and cumulative FCR.

HH N ^o	Average FCR 1st week	Average FCR 2nd week	Average FCR 3rd week	Average FCR 4th week	Average FCR 5th week	Average FCR 6th week	Average FCR 7th week	Cumulative FCR
1	1.8	2.3	5.8	2.5	2.3	6.4	3	3.4
2	1.6	2.7	5.7	2.6	2.1	5.7	3.5	3.4
3	1.8	2.3	7.3	2.3	2.7	10	2.5	4.1
4	1.8	2.4	5.9	2.6	2.5	5.5	3.3	3.4
5	1.5	2.7	6.6	2	2.8	5.4	4.1	3.6
6	1.6	2.8	7.1	2.4	2.2	5.3	3.7	3.6
7	2.1	2.6	5.7	2.5	3.1	3.6	4.2	3.4
8	1.9	2.6	5.5	2.3	2.8	4	8.1	3.9
9	1.7	2.5	5.4	2.2	2.8	4.3	3.4	3.2
10	1.8	2.8	6.8	2.3	2.7	9.7	2.3	4.1
Mean±SD 1.7±0.17 2.5±0.19 6.1±0.7 2.3±0.19 2.6±0.3 5.9±2.2 3.8±1.6 3.6±0.31								

Table 7: Partial Budget analysis of Broiler.

S.No	Description	Amount of Birr in ETB
1	Feed cost	26250
2	Electricity cost	600
3	Litter /straw cost	700
4	Day old chicken price per head	6300
5	Vaccination and medication cost	600
6	Feed and chicken transport cost	6000
7	Total variable cost	40450
8	Total cost per head of chicken	77
9	Average selling price per chick	94
10	Total selling price	49350
Net profit per chick		17

Table 8: Farmers perception of birds at the study area.

Characters	Number of respondents	Response (%)
High product(high final body weight)	10	100
Fast growth	10	100
Ability to do many cycle per year	10	100
Done as side activity	10	100

Table 9: Constraints of broilers production at the study area.

S.No	Constraints	Respondents percentages	percentage	Rank
1	Feed shortages	5	50%	1 st
2	Disease	2	20%	2 nd
3	Predators	1	10%	3 rd
4	Lack of Day old chicks	2	20%	4 th

challenges at northwest Ethiopia. Also Salo et al. [13] reported that disease, feed shortage, predators and poor housing condition are constraints of chicken production in Lemo District, Hadiya Zone.

Conclusion

Cobb 500 commercial broiler showed good performance on survival, live weight gain and withstand environment under small scale production. The higher mortality rate was recorded in the first week of age infers that broiler growers need strict follow up at this stage and it's also important to implement good and proper management practices to reduce the overall mortality

rate. The result of the trial showed that boiler producers should give a due attention for the preparation of good quality feed the producer could not purchase and use commercial feed to bring broilers in to marketable weight within seven weeks of growing period. Finally, the study indicated that broiler production is worthwhile given that appropriate management was followed as per the breed's management guideline.

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