ON-STATION AND ON-FARM COMPARATIVE PERFORMANCE EVALUATION OF HAY BOX CHICK BROODER AT DILLA UNIVERSITY AND AMARO WOREDA, SNNPRS OF ETHIOPIA

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ABSTRACT

The aim of this study was to evaluate suitability of hay box brooder in terms Body weight gain and mortality rate of Lohman chicks distributed under improved and farmer management production systems. The study was conducted in two peasant association of Amaro Woreda namely Jijola and Kereda as an On-Farm site and Dilla University as an On-station site of evaluation. Both Experimental site were found in Southern Nation Nationalities and Peoples Regional State of Ethiopia. About 8 households from each peasant association and a total of 16 households were selected to participate in the on farm trials. About 840 randomly selected and weighed day old chicks were divided into batches of 10, 30, 50, and 70 and transferred to each of 20 brooders. The hay-box brooder of 10, 30,50 and 70 chick capacity and each replicate 5 times and total of 20 hay-boxes were used. Mortality and cause of mortality, growth rate (body weight gain), and Dilla University site feed intake was used as evaluation parameters of the hay-box brooder distributed. All data collected were analyzed by using Statistical Analysis System (SAS, 2002) and statistical package for social science (SPSS) version 16.0 for windows. About 51.49% of chick mortality were occurred in 70 chick capacity hay box brooder which is significantly ($P>0.05$) higher than 50, 30 and 10 Chick capacity box. About 59.39% chick mortality was occurred at Kereda (On-Farm) while significantly lower (30.23%) occurred at Dilla University (On-Station). Statistically no significant ($p<0.05$) difference observed across the four different hay box size. About 64.38±4.72 body weight gain was attained at Dilla University site, which is significantly ($P>0.05$) higher than that of Jijola (34.32±1.75) and Kereda (32.39±1.53). The collected data clearly showed that there was no statistically significance ($P<0.05$) difference in feed intake between the different box size. Based on the result of this study the researtures recommend that Adoption and scale-up of hay box brooder, improved chickens, small scale layers housing, feeds, vaccination and training package would have a remarkable benefit to the extension and development programs in the study area.

Key words: Hay-Box brooder, chicken, lohman, Mortality, Body weight gain

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1. INTRODUCTION

Chicken were among the most adaptable domesticated animals and more people are directly involved in chicken production throughout the world than in any other single agricultural enterprise (Bishop, 1995). The impact of village chicken in the national economy of developing countries and its role in improving the nutritional status, income, food security and livelihood of many smallholders is significant owing to its low cost of production (FAO, 1997; Gondwe, 2004; Abdelqader, 2007; Abubakar *et al*., 2007).

Ethiopia is one of the few African countries with a significantly large population of chicken, estimated at 50.37 million (CSA 2013). However, the number of chicken flocks per household in most Ethiopian rural communities is small; constituting an average of 7–10 chicken (Tadelle and Ogle, 2001) and average of 7.3/households (Matiwos, 2013). Alemu and Tadelle (1997) also reported that the local chicken in Ethiopia vary widely in body size, conformation, plumage colour, comb type and feather cover.

Poultry production is practiced predominantly by the rural small holder's farmers using local stock under scavenging management. The output from traditional production sector is low compared to their contribution to the local chicken population. According to Tadelle (2003), in Ethiopia, village chicken production systems are characterized by low input–low output levels. A range of factors such as suboptimal management, lack of supplementary feed, low genetic potential and high mortality rate are the major causes for the apparent low output level. However, village chicken production is part of a balanced farming system, plays an important role in the supply of high quality protein to the family food balance, and provides small

disposable cash income in addition to the socio-religious functions important in the rural people's lives.

The productivity of village chicken production systems in general and the free range system in particular is low (Kondombo, 2005). This is due to low egg production and high mortality rate (Nigussie *et al*. 2003). Teketel (1986) and Aberra (2000) also characterized the low productivity of local chicken due to low egg production performance, production of small sized eggs, slow growth rate, late maturity, small clutch size, an instinctive inclination to broodiness and high mortality of chicks.

In Ethiopia, a local scavenging hen on average lays about 36–40 eggs/year (Tadelle et al., 2000; FAO, 2004). The average egg weight of local hens around Arsi, Ethiopia, was reported to be 38 gm (Brannang and Persson, 1990). The average number of eggs/clutch of local hens in Burkina Faso was estimated to be 12 eggs (Kondombo, 2005), which is comparable to the range of 12–18 eggs reported by Gueye (1998), but higher than that of 10 eggs/clutch reported by Mourad *et al*. (1997) in Guinea and 9 eggs/clutch by Kuit *et al*. (1986) in Mali. Halima (2007) reported an average productivity of 9–19 eggs/clutch with 2–3 clutch periods/hen per year and an average total egg production ranged from 18–57 eggs/year per hen for local hens in North-West Ethiopia. The average number of clutches/ hen per year and the number of eggs/clutch of local chicken in Sudan were 3 and 12 eggs, respectively (Khalafalla *et al*., 2001).

Under the present Ethiopian condition the production performance of local chicken is extremely low not only because of poor egg production performance but also due to long brooding period and high chick mortality. Mortality of chicks is not associated with a single factor but it attributed to disease and predators. In Ethiopia, poultry production technology in using hay box brooder was introduced in a number of decades back. This is a transitional technology towards small scale intensive system for rural farmers, because it can be controlled and afforded by farmers keeping up to 70 chicks without special training. Provided production technologies are improved through provision of improved brooding and housing technologies. The uses of hay box chick brooder solve these problems. By the use of this technology the overall production performances of local and distributed exotic chicken improved due to the fact that decreasing

mortality rate of chicks and hens back to laying within short period of time. But the farming population of this area has no got the functions of this technology because of lack of scientific study and suitability evaluations of the technology. These being the cases the major objective of this research projects was:

- To evaluate suitability of the brooder in terms Body weight gain and mortality rate of Lohman chicks distributed under different production systems
- To promote/transfer improved technologies and scaling-up of best practices

2. MATERIALS AND METHODS

2.1. Description of the Study Area

This study was conducted in Two Agro-ecological Zone of Amaro Woreda and Dilla University of SNNPRS of Ethiopia.

Dilla University is found in Dilla town which is the administrative & trading center of the Gedeo Zone located at a distance of 359 km south of Addis Ababa & it lies at an altitude of 1800 m.a.s.1. The mean annual temperature of the area is 30.2°C, and the mean annual rainfall is 1333.1 mm. The main highway that stretches from Addis Ababa to Moyale Town (which borders the country with the northern Kenya) passes across Dilla town.

Amaro is one of the special woredas in the Southern Nations, Nationalities and Peoples Regional State (SNNPRS). The land area of this Special Woreda is estimated at 1,597.20 square kilometres, and bordered with Arbaminch Zuria woreda to the Northwest, Derashe Special Woreda to the Southwest, Konso and Burji Special woreda to the south, and Oromia National and Regional State to the East. Agro-ecollogically, Amaro Special Woreda can be divided into Dega (30%), Woina Dega (38%) and Kola (32 %). Geographically, it is found between 370 32"10': 380 East, longitude and 50 3" 55': 60 North, latitude. The elevation of the woreda varies from 501 - 3,000 metres above sea level. The rainfall varies from 801 - 1,000 millimetres while the average temperature ranges from 12 °C – 25 °C.

Administratively, the woreda is divided into 32 kebeles of which 31 are Peasant Associations. The woreda has a population of 139,743 of which 49.97 percent are males and the remaining 50.03 are females. People of the woreda are distributed and settled in the different agro-ecological zones and practice sedentary agriculture. Mixed farming is widely practiced. In the highlands the concentration of the settlement is said to be higher than the lowlands that induced migration of people to lowlands in search of productive farmland. Agriculture is the mainstay of the economy of the woreda. It is a source of employment and subsistence for about 97 percent of the total population. Enset, maize, teff, wheat, barley and beans are the main food crops growing in the woreda. Coffee is the main cash crop and is known for its aroma. As to the livestock holdings, there are 73,540 chicken, 62,550 cattle, 3,818 equine, 37,960 sheep, and 44,400 goats and 12,500 beehives in the woreda.

2.2. Selection of study site and households

On-station trial was conducted in Gedeo zone at Dilla University agricultural farm station and on-farm trials was conducted within randomly selected peasant associations from Amaro Woreda namely Jijola and Kerda. About 8 households from each peasant association and a total of 16 households were selected to participate in the on farm trials. Selection were based on some basic questions regarding farmers' interest and possibility of benefiting through involvement in the trial. The Extension Department of the Woreda and Local Development Agents were involved in this exercise. Participating farmers was given formal and informal training on benefit, bottleneck of the technology and general aspects of managing the experiment through forum and regular individual farm visits to develop skill.

2.3. Data Collection and Management of the Experimental Chicks

About 840 randomly selected and weighed day old chicks were divided into batches of 10, 30, 50, and 70 and transferred to each of 2 brooders. The hay-box brooder of 10, 30,50 and 70 chick capacity and each replicate 5 times and total of 20 hay-boxes were used. Two replication in each Agro-ecological zone namely Kereda (Highland)), Jijola (Highland) and Dilla (Kola). The two Peasant association of Amaro Woreda(Jijola and Kereda) has an on-Farm experimental site where as Dilla University Site is used as On-station Experimental site.

The distribution of the chicks were done along with hay-box brooder and commercial starters ration adequate for two weeks of feeding. Data on the rates of survival were collected throughout the study period. Total of 20 hay-boxes for the study were procured and distributed along with day-old chicks. The hay-box grouped chicks were gently pushed out of the box for several times for feeding and watering in the run, during day times and during the first week of brooding. They were closed into the boxes only at night times after the first week of brooding. All the treatment groups were fed to appetite with commercial starters ration and water is made available all the times (during day times in the run). Finally the data on performance of the chicks were obtained through frequent visits (weekly interval) for visual observation of chick's status and to collect data on flock performance. Mortality and cause of mortality, growth rate (body weight gain), and Dilla University site feed intake was used as evaluation parameters of the hay-box brooder distributed.

2.4. Statistical Analysis

All data collected were analyzed by using Statistical Analysis System (SAS, 2002) and statistical package for social science (SPSS) version 16.0 for windows. Mean difference was assessed by Duncan's multiple range test, where F-values was significant (Duncan, 1955). A General Linear Model (GLM) procedure of the Statistical Analysis System (SAS, 2002) was fitted to some parameter which were appropriate for analysis. Analysis of Variance (ANOVA) was carried out to examine variance of the data collected. For qualitative factors descriptive statistics were used. Standard error of mean (SE) was used while describing mean.

3. RESULT AND DISCUSSIONS

3.1. Rate of Chick Survival

Vaccination for Newcastle Disease (HB1 and Lassota Vaccines) and Gumbaro was provided by its timely schedule and also drug prophylaxis like Amprollium 20% powder (anti-coccidian) and Oxy-tetracycline 20 % powder (broad spectrum poultry disease) medicines were provided, Even though, mortality were occurred different age of the brooding and rearing. The survival rate of

the experimental chicks to an age of 12 weeks is shown in Table 1 and 2. There was statistically significant difference between Lohman chicks assigned to different size of hay box brooder in the three site (agro-ecologies) in mortality to an age of 12 weeks (P>0.05). The results obtained indicate that 60.65% of the overall experimental chicks distributed in all the study sites survived to an age of 12 weeks. About 19.3, 46.6, 18.2, and 15.9% of the total mortality occurred is attributed to disease, predator, miss management and hay-box suitability respectively (Graph, 2). About 54.45% of the death of all the experimental chicks occurred during the first 2 weeks of brooding. The results obtained also showed that 70 chick capacity hay box brooder was 51.49% mortality rate which was significantly (P>0.05) higher than 50, 30 and 10 chick capacity in rate of mortality to an age of 12 weeks (Table 1). The rate of survival obtained in this study was highly in contrast with Solomon (2004), who reported 5 and 7% mortality for local and White Leghorn chicks under scavenging and intensive systems, respectively. The survival rate of 1.39±0.32/30.23% recorded from the Dilla University site was significantly higher than Jijola (0.75±0.14/43.64%) and Kereda (1.02±0.18/49.69%) sites (P>0.05). The variation might be due to the fact that poor management standard, handling and sanitation. Higher mortality rate were recorded from the chick distributed to the farming households, this was because of predator attack due to poor handling and housing, which could be solved through enriching the farmers with training on overall poultry management and Hay box brooder improvement. The result recorded in the current study in On-farm evaluation is agreed with the result of Samson et al (2013) who reported about 54.85% mortality rate at the farm household condition. Although, Mc Ainsh *et al*. (2004) reported 69% mortality of chicks kept under natural brooding during the first three weeks of brooding. Rahman *et al.* (1997) reported significantly lower mortality of RIR x Fayoumi chicks as compared to cross-breeds of Lohmann Brown and RIR, Fayoumi and, White Leghorn (WHL), and RIR and WLH. The mortality rates recorded in this study also vary between age categories (Table 2). Significantly (P>0.05) higher mortality were recorded at 1st weeks (4.54±0.99) followed by 2nd and 8th weeks of brooding period while the least death was recorded at 12 week (0.00). In agreement to the result of current study Melkamu *et al* (2013) indicated that higher (63%) chick mortality during the first week brooding period.

Table 1. Rate of chick Mortality across Box Size and week (%)

Box size	DU (%)	Jijola (%)	Kereda (%)	Overall (%)
10 chick capacity	3.76^{c}	15.28^{b}	9.18^{c}	**8.25^{c}**
30 chick capacity	20.30^{b}	18.06^{b}	10.20^{c}	**16.50^{bc}**
50 chick capacity	21.80^{b}	20.83^{b}	28.57^{b}	**23.76^{b}**
70 chick capacity	54.14^{a}	45.83^{a}	52.04^{a}	**51.49^{a}**
Across week				
Week 1	42.86^{a}	33.33^{a}	28.57^{a}	**35.97^{a}**
Week 2	23.31^{b}	9.72^{bc}	5.10^{b}	**14.19^{b}**
Week 3	1.50^{c}	0.00^{c}	12.24^{b}	**4.62^{cd}**
Week 4	4.51^{c}	1.39^{c}	0.00^{b}	**2.31^{d}**
Week 5	1.50^{c}	22.22^{ab}	9.18^{b}	**8.91^{bcd}**
Week 6	1.50^{c}	8.33^{bc}	27.55^{a}	**11.55^{bc}**
Week 7	3.01^{c}	2.78^{c}	7.14^{b}	**4.29^{cd}**
Week 8	21.80^{b}	5.56^{c}	10.20^{b}	**14.19^{b}**
Week 9	0.00^{c}	9.72^{bc}	0.00^{b}	**2.31^{d}**
Week 10	0.00^{c}	2.78^{c}	0.00^{b}	**0.66^{d}**
Week 11	0.00^{c}	4.17^{c}	0.00^{b}	**0.99^{d}**
Week 12	0.00^{c}	0.00^{c}	0.00^{b}	**0.00^{d}**
Overall	**30.23^{b}**	**43.64^{ab}**	**59.39^{a}**	**39.35**

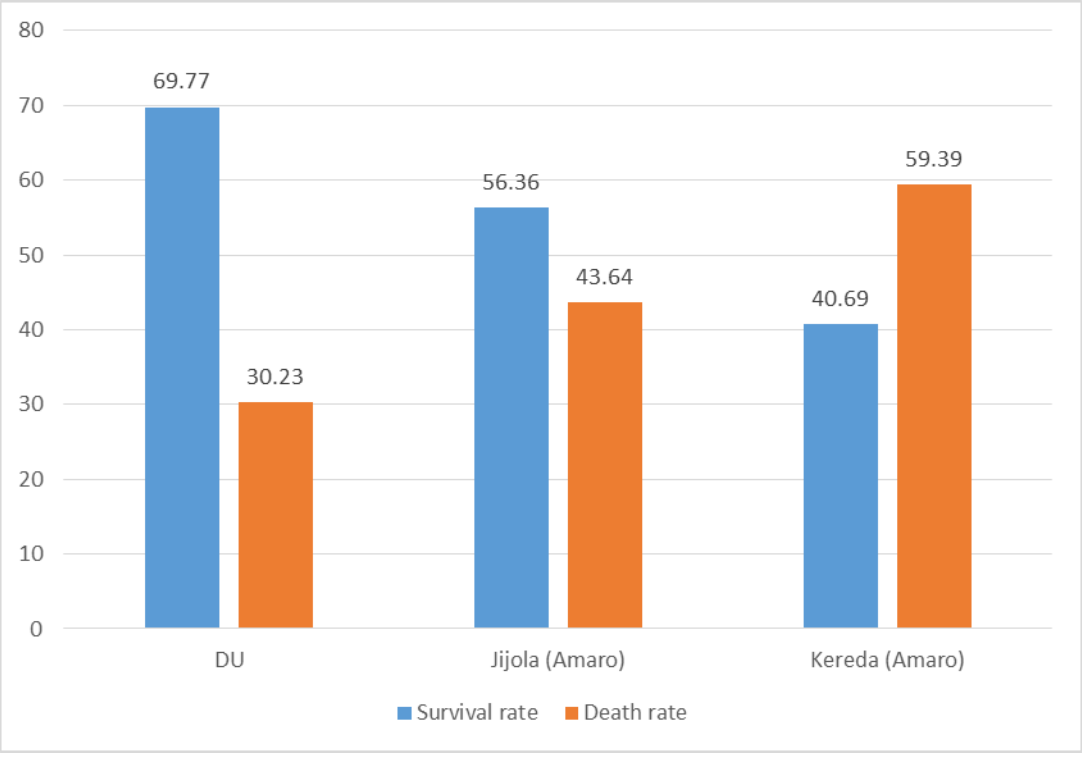

Fig 1. Chick survival rate.

3.2. Feeding management and intake

Poultry being simple stomached species, cannot synthesise most of the nutrients required for them and so the nutrients become dietary essentials chicken has to be fed adequate quantities of balanced diet for its growth, livability and to exhibit its genetic potential to the full extent. Poultry differ from other species of livestock in body temperature and digestion, Biological activity and maturity. In this study the chick were fed commercial ration (starter up to 8 week and Grower then after). The lohman breed of chicken feed intake was evaluated. The collected data clearly showed that there was no statistically significance ($P<0.05$) difference in feed intake between the different box size (Table 1). The statistical analysis honestly showed that a great feed intake significance ($P>0.05$) difference across a week's of brooding and rearing. Feed intake at week 12 (84.51±0.35) was significantly higher while week 1 and 2 intake was recorded as lower intake (Table 2 and Fig. 2). Similarly Halima (2007) reported that at the age of four weeks, the lowest (23.40 g) and highest (34.20 g) daily feed intake were recorded for RIR and local chicken lines, respectively.

Table 2. Comparison of different brooder size performance with respect to BWG, Feed intake and chick mortality rate (Mean ± S.E)

Box Size	DU	Jijola	Kereda	Overall
10 **(BWG)**	61.52±8.73	33.02±3.55	32.60±2.95	42.38±3.62
30 **(BWG)**	63.81±9.49	34.70±3.54	32.64±3.05	43.72±3.87
50 **(BWG)**	64.85±9.93	34.64±3.43	34.30±3.41	44.60±4.01
70 **(BWG)**	67.35±10.14	34.93±3.68	30.04±2.95	44.11±4.17
Overall	64.38±4.72[a]	34.32±1.75[b]	32.39±1.53[b]	43.70±1.950
10 **(FI)**	45.31±4.49			45.31±4.49
30 **(FI)**	45.38±4.45			45.38±4.45
50 **(FI)**	46.73±4.48			46.73±4.48
70 **(FI)**	48.69±4.40			48.69±4.40
Overall	**46.53±2.19**			**46.53±2.19**

NB: Abbreviation in Parentheses indicated BWG= Body Weight Gain, FI= feed intake
[abc] letters in superscript showed as significant difference vertically and horizontally in the case of overall mean.

Feed intake increment level in this study is due to the fact that as the bird grown up their maintenance and production requirements increase. The result of the current study agreed with findings of Ensminger *et al*., (1990) who reported that the amount of energy in the ration has got an effect on feed intake. Feed cost is the largest single item in poultry production & accounts up to 75% of the total production cost. So much emphasis has been placed on least-cost feed formulation and getting the lowest feed cost per unit of salable product.

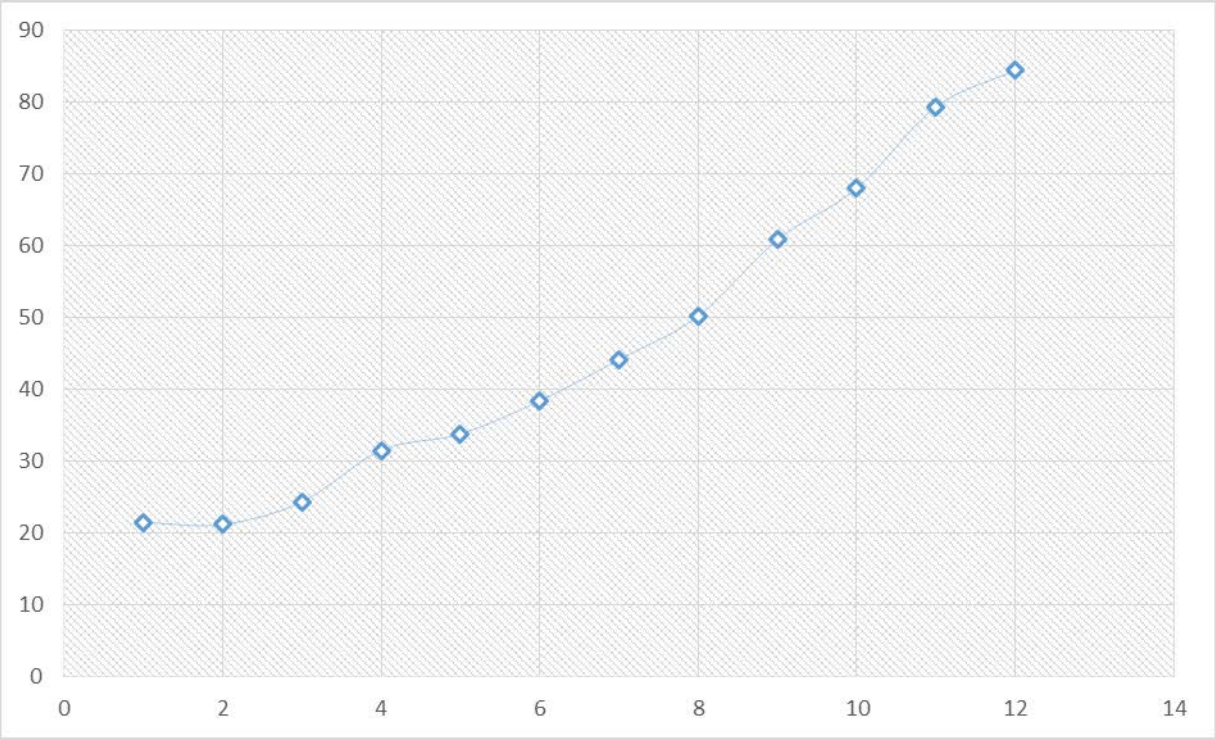

Fig. 2. Level of Feed Intake across week during the experimental period.

3.3. Body weight gain

The mean body weight gain across different Box size was showed in Table 1. Statistically no significant ($p<0.05$) difference observed across the four different hay box size. Which indicated that the size of hay box brooder has no effect on body weight gain of chicks. About 64.38±4.72 body weight gain was attained at Dilla University site, which is significantly ($P>0.05$) higher

than that of Jijola (34.32±1.75) and Kereda (32.39±1.53). The greater body weight gain at Dilla University is due to the fact that combined management system like standard feeding, watering, vaccination and close supervision. Whereas in farmer management system at Amaro woreda was poor in terms of feeding balanced ration and poor handling. The data collected from chick distributed to farmer was showed significantly (P>0.05) lower in body weight gain. Since the feed offered at household level was cereal grain (maize, wheat, food leftover and spoiled grain) and milling by-products, which is richer by its energy constituents but deficient in required Protein, vitamin and minerals. It is necessary to refine energy and nutrient requirements, disease control, genetic improvement, and housing & equipment. All those efforts led to steady improvements in growth rate, feed conversion, and livability under extensive and intensive commercial conditions. Similarly Taddele *et al*, 2003 reported that the protein and energy supplied from the Scavenging feed Resources, as determined from chemical analyses of crop contents of scavenging local hens, were on average 8.8% and 2864 kcal/kg, respectively. The protein contents fall even lower during the short rainy and dry seasons, while energy supply is more critical in the drier months (Tegene, 1995; Tadelle and Ogle, 2000). These values were below the protein requirement of free ranging local hens of the tropics, estimated at about 11g/ bird /day, and ME supply could meet the requirement of a non-laying hen only (Scott, *et al*., 1982), indicating limitations of the scavenging feed resources in terms of nutrient supply to increased productivity. The calculated results of the On-farm study is in agreement with the conclusions of Tegene (1992), who reported the feed that the local chickens consume from scavenging is critically deficient in CP, Ca and P and this would have been much more evident if amino acids had been analyzed.

Therefore, the performance of any chicken farming, measured as live weight gain or eggs, can be obtained after the demands for maintenance have been satisfied. The level and quality of production, a part from the genotype of chicken, can be controlled by the level and system of feeding. Correct nutrition is a prerequisite to utilize the high genetic performance potential of chicken. Best control on nutrition is achieved by feeding a ready mixed compound feed. The recommended feeding programme concentrates on the essential nutrients and is designed to cover the requirements for top performance in rearing and production.

Body weight gain, feed intake and mortality rate difference with Week was showed in Table 2. About 77.47±10.25 body weight gain was attained at 12 weeks which was significantly (P>0.05) higher than week 1 (7.00±0.65). The body weight record at the beginning were slightly increased from week 1 to 7 and no significant (P<0.05) observed between week 9, 10 and 11 (Table 2). In agreement to the result of this study Halima (2007) find out 8.8g/day (61.6g/week) body weight gain at 8 week of age. Conversely Lohman production guide reported about 80g body weight gain at 12 week of age which is lower than the result of current study.

Table 3. Body weight gain, feed intake and mortality rate difference with Week (Mean ± S.E)

Period	DU (440 Chicks)	Jijola (165 Chicks)	Kereda (165 Chicks)	Overall (770 Chicks)
BWG at Week 1	10.41±1.07^{f}	4.96±0.45^{h}	5.63±0.50^{h}	7.00±0.65^{i}
BWG at Week 2	17.41±1.08^{ef}	11.49±1.00^{g}	14.95±0.68^{g}	14.62±0.72^{h}
BWG at Week 3	20.44±1.52^{ef}	15.69±0.53^{f}	21.81±0.91^{f}	19.31±0.80^{g}
BWG at Week 4	21.19±2.83^{ef}	22.19±0.53^{e}	28.94±1.52^{de}	24.10±1.26^{f}
BWG at Week 5	27.38±2.30^{e}	28.04±1.54^{d}	40.38±2.20^{c}	31.93±1.68^{e}
BWG at Week 6	47.98±3.69^{d}	33.59±1.95^{c}	55.38±2.16^{a}	45.65±2.41^{d}
BWG at Week 7	74.74±3.13^{c}	44.05±0.71^{b}	52.81±1.69^{ab}	57.20±2.93^{c}
BWG at Week 8	72.16±3.53^{c}	44.80±2.21^{b}	48.63±1.90^{ab}	55.19±2.91^{c}
BWG at Week 9	110.50±8.19^{b}	52.15±1.05^{a}	27.81±1.95^{e}	63.49±7.72^{b}
BWG at Week 10	110.59±4.98^{b}	49.38±0.86^{a}	29.56±0.70^{de}	63.18±7.37^{b}
BWG at Week 11	114.23±6.47^{b}	52.31±1.52^{a}	29.25±1.19^{de}	65.26±7.78^{b}
BWG at Week 12	145.56±2.56^{a}	53.25±1.41^{a}	33.59±2.20^{d}	77.47±10.25^{a}
Overall	**64.38±4.72^{a}**	**34.32±1.75^{b}**	**32.39±1.53^{b}**	**43.70±1.95**
FI at Week 1	21.52±1.31^{j}			21.52±1.31
FI at Week 2	21.23±0.74^{j}			21.23±0.74
FI at Week 3	24.40±0.94^{i}			24.40±0.94
FI at Week 4	31.56±0.34^{h}			31.56±0.34
FI at Week 5	33.85±0.51^{h}			33.85±0.51
FI at Week 6	38.45±0.38^{g}			38.45±0.38
FI at Week 7	44.21±0.73^{f}			44.21±0.73
FI at Week 8	50.26±0.52^{e}			50.26±0.52
FI at Week 9	60.91±1.67^{d}			60.91±1.67
FI at Week 10	68.06±1.83^{c}			68.06±1.83
FI at Week 11	79.40±0.60^{b}			79.40±0.60
FI at Week 12	84.51±0.35^{a}			84.51±0.35
Overall	**46.53±2.20**			**46.53±2.20**

NB: *Where BWG= Body weight gain, FI= Feed intake and MR=Mortality rate*
^{abc} *letters in superscript showed as significant difference vertically and horizontally in the case of overall mean.*

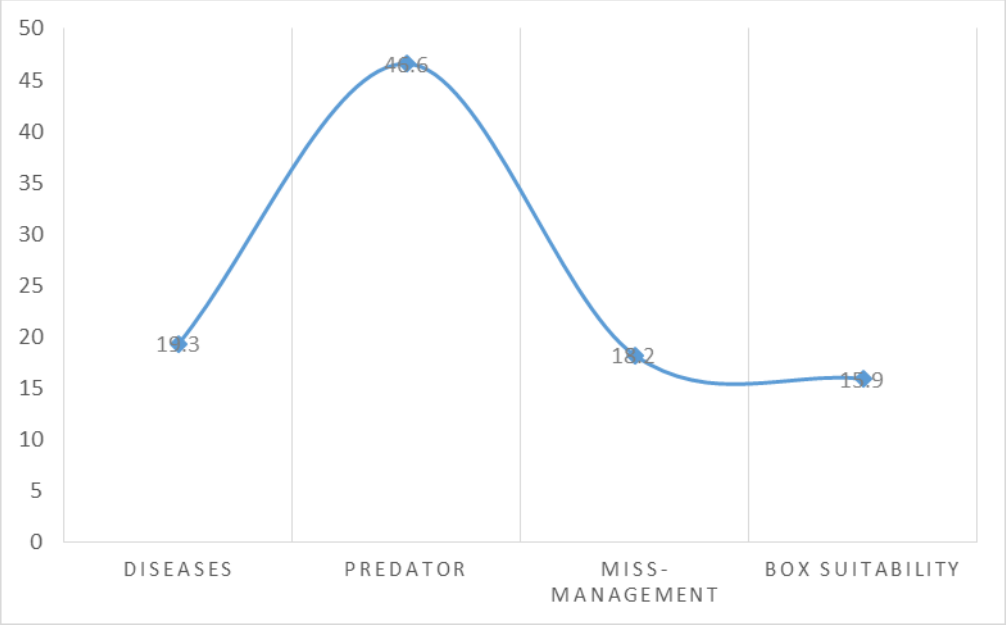

Fig 3. Reason of chick death.

4. CONCLUSION AND RECOMMENDATIONS

The result of the study indicated that significantly (P>0.05) higher chick mortality is occurred in Kereda (59.39%) followed by Jijola (43.64%) while rate of mortality at Dilla University was lower (30.23%). Although in 70 chick capacity hay box brooder significantly (P>0.05) higher chick mortality were recorded than the 50, 30 and 10 chick capacity. Based on the result this study 70 chick capacity brooder has not recommended to use in the study area. The result of the current study showed that about 35.97, 14.19, 14.19% rate of chick mortality were occurred in in week 1, 2 and 8, respectively. Significantly (P>0.05) lower chick mortality were observed at week 12. Although, higher chick mortality occurred at Kereda and Jijola were attributed to predator (46.6%), disease (19.3%), miss management (18.2%) and hay-box suitability (15.9%). Therefore, to minimize chick mortality in the Hay-box brooder, a work should have need to done on improvement of the upper box coverage, medication and vaccination, training of the farmer on management need to be done.

The result of the current study revealed that feed intake of lohman breed ranges 21.52±1.31g to 84.51±0.35g at 1 and 12 weeks of age, respectively. There were no significance (P<0.05) difference observed between the four box size in terms of body weight gain. However, significantly (P>0.05) higher body weight gain attained at on-station Dilla University (64.38±4.72g) per week whereas lower at on-farm Jijola (34.32±1.75g) and Kereda (32.39±1.53g). In order to attain normal body weight gain the farmers should have to combine the good management with recommended feeding commercial ration. The remarkable adaptive fitness in terms of survival make the Lohman breed make the best choice especially for transformation of back yard poultry production system to modern and business oriented production system. In addition, adoption and scale-up of hay box brooder, improved chickens, small scale layers housing, feeds, vaccination and training package would have a remarkable benefit to the extension and development programs in the study area.

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