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**Original article**

## Rural poultry marketing systems and associated marketing constraints in two agro-ecological zones of central Tigray, Northern Ethiopia

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### ABSTRACT

A study on rural poultry marketing was conducted in lowland and midland agro-ecological zones of central Tigray, in northern Ethiopia with the objective of characterization of rural poultry marketing system under rural household management. A total of 160 rural households, 80 from each district, were randomly selected and 50% of them were female headed households. Data were collected using semi structured questionnaire and group discussion with key informants and traders. Twenty seven chicken and egg traders and 60 consumers were also randomly selected and interviewed to collect market information. All age group of chickens except chicks (< 2 months) were sold at market but cocks and cockerels take the largest proportion. The total number of live birds and eggs sold per households per year was significantly greater ( $P < 0.0001$ ) in midland than in lowland. Chicken and egg selling was also significantly greater ( $P < 0.01$ ) in female headed households than in male headed households. Chickens with red plumage color were dominant in the market covers 56.2% of the total chickens. Average numbers of birds and eggs sold per household per year were 4.3 and 48.75 in lowland and 6.2 and 81.25 in midland, respectively. Mean price of matured and grower chickens was 49.96 birr and 35.3 birr in lowland and 51.3 birr and 39.7 birr in midland, respectively, and average price of eggs was 1.3 birr in lowland and 1.4 birr in midland agro-ecology. Average price of chickens and eggs in lowland areas was significantly

( $P < 0.0001$ ) lower than average price in midland agro-ecological zone of the study area. There was also a significant difference ( $P < 0.0001$ ) in price of chicken products between ordinary market days and festival market days. Price of double comb cocks was significantly greater ( $P < 0.0001$ ) than price of single comb cocks. Chicken and egg traders collect chickens and eggs from producers at farm gets, road sides and different local or urban markets. In turn 87.8% of the collected chickens and 74.9% of the collected eggs were sold to direct consumers. Lack of extension service for indigenous ecotypes, lack of appropriate market place and seasonality of market prices in both agro-ecologies were the main constraints of rural poultry marketing in the study area. Therefore, separate market place and appropriate poultry extension and credit packages should be designed to improve rural poultry marketing in both agro-ecologies.

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## 1. Introduction

Backyard poultry production in Ethiopia contributes 98.5 and 99.2% of the national egg and poultry meat production, respectively (AACMC, 1984). The term backyard chicken production designates rearing of chickens on small scale (10-50 birds) for family use and up to some extent for generation of cash income (Farooq *et al.*, 2004) and chicken kept on small farms under extensive management system considerably contributed to the cash income of the rural families in most of the third world countries (Farooq and Mian, 2001). Village poultry in extremely poor areas of the country play important economic role in the livelihoods of the rural households and is an appropriate system to supply the fast-growing human population with high quality protein (Tadelle *et al.*, 2003) however, Poultry marketing structure has not well studied in Ethiopia. The smallholder farmers do have little knowledge on how the market works and why price fluctuates and have virtually no information on market conditions. The market outlets or channels available to producers are diverse at all markets, although their importance differs across markets. The highest consumption of chickens has associated only with holy days and festivals resulted in demand and supply imbalance (Tadelle and peter, 2003). In such circumstances, prices fall dramatically during fast days due to the high supply compare to demand. Ultimately, affect the smallholder producers. The marketing aspects of the smallholder poultry production often marginalized by policy-makers and development workers. Traditional chicken and egg collectors, who collect eggs and birds from the villages, can facilitate the marketing of small holders however, such marketing structure are over looked, or criticized, as it is not sustainable. These indicate that there is a need to undertake research on rural poultry marketing in the area. The objective of this study was to explore rural poultry marketing systems and to identify associated marketing constraints in the lowland and midland agro-ecological zones of central Tigray.

## 2. Materials and methods

The research was conducted in mid and lowland agro-ecological zone of central Tigray namely Adwa, located between  $14^{\circ} 19' 25''$  North latitude &  $39^{\circ} 4' 27''$  East longitude and Mereblek, located between  $14^{\circ} 32' 11''$  North latitude &  $39^{\circ} 1' 49''$  East longitude with average elevation of Adwa 1907 and Merebleke 1350 meter above sea level. Human population of Adwa and Merebleke are 106,390 and 118,328 respectively (CSA, 2007). The study area receives annual rainfall ranging from 400mm to 650mm. The production system of the study area is mixed farming, comprised of crop and livestock production. The districts have a number of market sheds that could be an advantage or disadvantage for the household poultry producer in one way or the other. Therefore, it was crucial to conduct a study on characterization of poultry marketing system and identification of potential constraints and opportunities in the area. A sample of 160 farmers, 80 from each Wereda, 40 male and 40 female headed households were selected randomly using lottery method from those households reared at least one chicken in

the year. In addition a total of 27 chicken and egg traders and 60 consumers were randomly interviewed to collect information on marketing system and its constraints. Data were collected from individual households using pre-tested formal semi structured questionnaire. Marketing chain and channels, plumage color, shank color, comb type and total number of chickens by sex and age groups versus their price were collected from different markets (Rama, Adi-abun, Gendebta and Adwa market) in two weeks interval. Besides, open discussion with intermediaries, buyers, and sellers was conducted. Secondary data from concerned institutions was also collected and incorporated with the data obtained from the survey. Statistical analysis of the primary data were made using JMP5 (SAS, 2002). Descriptive statistics such as mean, range and percentile were used. Chi-square test was employed for ordinal and nominal data such as chicken marketing, mode of transportation, supply and demand and ANOVA test was employed to investigate the effects of agro-ecology and market distance on chicken and egg price in different market days.

### 3. Results

#### 3.1. Poultry market characteristics

Saturday was the only fixed market day in all market sheds of the study area. But when any religious and cultural festivals lied between Wednesday and Saturday marketing would be takes place one day before the festival (eve) especially in Adwa market. Rama market was the only local market in lowland areas and Adi-abun, Yiha and Gendebta were used as local markets in midland agro-ecology whereas Adwa was the only urban market in the study area. In both agro-ecology there was no separate market place for chicken and egg marketing. For example in lowland agro-ecology of the study area the place was commonly used for charcoal, fire wood and poultry marketing. Similarly in midland ago-ecology poultry marketing was takes place in common area with vegetables, cereals and other market commodities. Poultry producers, consumers (residents and soldiers), traders, and owners of restaurants were some of the major actors involved in the system for selling and purchasing of poultry products. Usually marketing was takes place at normal market place but it was also practiced at farm get (at home), road sides and customer's home like restaurants, hotels and pastries.

#### 3.2. Chicken marketing

Although there was no any regulation regarding to poultry marketing, women and children were the major members of the household involved in marketing of live birds and eggs. Time and objective of selling of live birds is shown in Table 1. According to the interviewed chicken owners selling of live birds were practiced when there was an instant need of money in the household (50% and 47.5%), at time of cultural and religious festivals so as to earn good price (25% and 31.2%), during onset of disease outbreak (16.2% and 8.75%) and at time of cropping season (8.75% and 12.5%) of the households in lowland and midland agro-ecology, respectively.

All age group of chickens except chicks (< 2 months) were sold at market but cocks and cockerels take the large proportion of the total number. Supply and demand of chickens in different market days is displayed in Table 1. High supply and demand of chickens was recorded during the time of religious festivals like New Year, Finding of the cross (*Meskel*), Ethiopian x-mass and Ethiopian Easters than any other market days. Normally price of chickens was fixed by negotiation after long bargaining process. Source of information about chicken price was not similar between male headed households and female headed households. About 58.8% of the male headed households have got information from other farmers referring the price of last week market day whereas 62.5% of the female headed households have got information by visiting the market. This shows that women were more frequently involved in poultry marketing than the other family members of the household. Only 1.9% of the chicken owners were experienced chicken death during the time of transportation to market. Average numbers of chickens sold per household in the past 12 months were 5.3 and total number of live birds sold per households per year was significantly greater ( $P < 0.0001$ ) in midland (6.2) than in lowland (4.3) of the study area. This might be attributed to urban market access and production purpose of the farmers in the area. Chicken selling was also greater ( $P < 0.01$ ) in female headed households than male headed households. This might be attributed to the difference in alternative income source of the households. Females usually had limited source of income so they tried to maximize their income from sale of chickens and eggs. Concerning the fate of unsold chickens, first the owners tried to sale the chicken at any price (53.8%), if not 25.6% of the owners return to home and isolate the chicken for

three days and the rest 20.6% of the households return and treat the chicken traditionally with herbal medication like *Shinfae* and holy water.

### 3.3. Egg marketing

The study revealed that 15% of the households in lowland and 53.8% of the households in midland agro-ecology used eggs for selling as first purpose. Almost all of the interviewed farmers in lowland and midland agro-ecology were involved in egg marketing at least once a year. This shows that selling of eggs for income generation was important function of chicken eggs in the study area mainly in midland agro-ecology. Average number of eggs sold in the past 12 months per household was 65.

Like that of chickens total number of eggs sold per household per year was significantly greater ( $P < 0.0001$ ) in midland agro-ecology (81.3) than in lowland agro-ecology (48.8). This might be also related to market access and egg production purpose of the farmers in the study area. Egg selling was also greater ( $P < 0.01$ ) in female headed households than male headed households. The reason could be attributed to the difference in income source between male and female headed households. There was no large price fluctuation or difference in egg marketing but the price was always fixed by negotiation between the seller and buyer. Buyers usually check the quality of the egg by setting the egg over the eye towards the direction of the sun so as to observe whether it is light transparent or not. Normally light transparent eggs are considered as viable eggs or eggs not expired (Table 1).

**Table 1**

Marketing of chicken and eggs in male and female headed households in lowland and midland agro-ecological zones of central Tigray

Marketing	Lowland		Midland		$\chi^2$ value	P-value
	MHH <sup>1</sup> (%)	FHH <sup>2</sup> (%)	MHH <sup>1</sup> (%)	FHH <sup>2</sup> (%)		
Chickens sold in the past 12 months	3.6	5.1	5.7	6.7	27.42	<0.0001
Eggs sold in the past 12 months	38.3	59.3	68.8	93.8	33.74	<0.0001
<b>Reason for selling of chickens and eggs</b>						
When need of money	45	55	37.5	57.5	11.03	0.2736
At time of festivals	27.5	22.5	35	27.5		
At time of disease outbreak	15	17.5	7.5	10		
When season of cropping	12.5	5	20	5		
<b>Source of market information</b>						
Other farmers	62.5	32.5	55	42.5	8.61	0.0349
Market visit	37.5	67.5	45	57.5		
<b>Death of chicken during transportation to market</b>						
yes	2.5	5	0	0	4.57	0.2062
no	97.5	95	100	100		
<b>Fate of unsold chickens</b>						
Sale at any price	57.5	47.5	50	60	2.77	0.8372
Return and isolate three days	20	27.5	30	25		
Return and treat traditionally	22.5	25	20	15		

<sup>1</sup>Male Headed Household.

<sup>2</sup>Female Headed Households.

### 3.4. Market channels of poultry products

Producers in lowland agro-ecological zone of the study area sold their products at local market (76.3%) and the rest 23.7% of the households sold their products at home (Table 2). About 82.5% of the households in midland agro-ecology however, sold at urban market, 15% at local market and 2.5% of the households sold at home. There was no any formal marketing agreement between the producers and buyers in the study area. They simply sold to any buyer (86.2% in lowland and 100% in midland) but about 13.8% of the farmers in lowland sold their products to regular buyers (customers) such as soldiers (11.3%) and retailers like hotels and kiosks (2.5%). No middle men

(chicken and egg collectors) were recorded in lowland agro-ecology. This might be the reason for the development of customer base marketing between some producers and buyers in that area.

Chicken transportation system of the farmers in both agro-ecological zones of the study area was on foot caring the chicken usually embracing by hand (67.5%) for one or two birds but for more than two birds farmers used a stick to carry the chickens hanging upside down (32.5%) on their shoulder. In addition when traders collect chickens from adjacent districts they used car as means of transportation hanging the chickens upside down on the upper part both sides of the car (*Porto Magalia*). Such inhuman method of transportation may create high stress on the chickens and increase mortality rate of the chickens during transportation. For egg transportation, 70.6% of the farmers used straw or grain placing in any container to protect the eggs from breakage, 15% used any container without any bedding material. Middlemen (egg collectors) collect the egg and fill in a cartoon to transport from market to market. Marketing of live birds and eggs follows the same channel.

**Table 2**

Type of market where farmers sold their products and mode of transportation of chickens and eggs to the market

Marketing	Lowland		Midland		$\chi^2$ value	P-value
	MHH <sup>1</sup> (%)	FHH <sup>2</sup> (%)	MHH <sup>1</sup> (%)	FHH <sup>2</sup> (%)		
<b>Type of market farmers sold their products</b>						
Local market	77.5	75	20	10	147.62	<0.0001
Urban market	0	0	80	85		
At farm get or home	22.5	25	0	5		
<b>Market customer</b>						
Soldiers	15	7.5	0	0	17.21	0.0085
Hotel/kiosks	2.5	2.5	0	0		
No customer (sold to any buyer)	82.5	90	100	100		
<b>Mode of transportation of chicken</b>						
Embracing by hand	67.5	70	60	77.5	2.94	0.4013
Hanging upside down	32.5	30	40	22.5		
<b>Mode of transportation of eggs</b>						
Eggs with straw	40	45	67.5	65	34.00	<0.0001
Eggs within grain	27.5	7.5	12.5	17.5		
Using any container	7.5	20	20	12.5		
No transport (sold at home)	25	27.5	0	5		

<sup>1</sup> Male Headed Household

<sup>2</sup> Female Headed Households

### 3.5. Demand and supply of chickens and eggs

Demand and supply of poultry products were higher at time of cultural and religious festivals than any other ordinary market days. In such condition demand was higher than supply. The unequal proportion of demand and supply leads to raise chicken and egg price in the market and there was a significant difference ( $P < 0.0001$ ) in price of chicken products between ordinary market days and festival market days. Market type and distance also have an influence on price of chicken products. Farmers in lowland and mid land agro-ecological zones of the study area traveled  $6.9 \pm 0.29$  km and  $5.5 \pm 0.29$  km to reach local market and  $43.9 \pm 0.47$  km and  $10.2 \pm 0.46$  km to reach urban market respectively. Because the only local market in lowland agro-ecology of the study area is Rama market and it is unthinkable to travel over 43 km to reach urban market, chicken producers found in the area were having poor access to local and urban markets as compared to those farmers found in mid-altitude of the study area. Average price of chickens and eggs in lowland areas was significantly ( $P < 0.0001$ ) lower than average price in midland agro-ecological zone of the study area. Average number of chickens supplied per one market day in lowland agro-ecology (in Rama market) was 272 in festival market days, 212.5 in ordinary market days and 117.7 in fasting market days whereas 417, 268 and 195.3 were average numbers of chickens supplied in festival market days, ordinary market days and fasting market days respectively in midland agro-ecology. Cockerels covered 42.3%, cocks 34.2%, pullets 14% and hens 9.5% of the total chickens supplied at market in both agro-ecologies. In average

about 94.8% of the total supplied chickens were sold to market level collectors, retailers and direct consumers in one market day (Fig. 1).

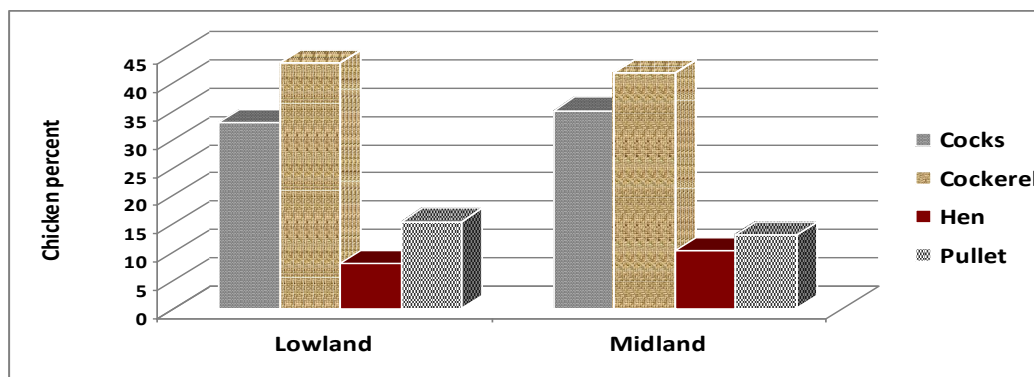


Fig. 1. Chickens supplied to market by age and sex group in lowland and midland agroecological zones of central Tigray.

The market level collectors always bought large amount of chickens mainly cocks to sell them later to hotels, restaurants and direct consumers with in the week. The remaining unsold chickens were characterized as very old cocks, old hens and very yang males, chickens with some defects and rejected or not preferred plumage colors. Average chicken price in festival market days, fasting market days and ordinary market days was 47.2, 42.5 and 41.24 birr respectively (Table 3). Likewise average price of matured and grower chickens was 49.96 and 35.3 birr in lowland and 51.31 and 39.7 birr in midland agro-ecology respectively. Unlike chicken price there was no big fluctuation of price in egg marketing. Average price of eggs were  $1.3 \pm 0.01$  and  $1.4 \pm 0.01$  birr in lowland and midland agro-ecology respectively ranged from 0.75 to 1.75 birr. Egg price was greater ( $P < 0.0001$ ) in midland than in lowland agro-ecology of the study area.

Table 3

Price of chickens and eggs in lowland and midland agroecology

Marketing	Lowland (Mean $\pm$ SE)	Midland (Mean $\pm$ SE)	P value
<b>Average distance (k.m.)</b>			
Local market	6.9 $\pm$ 0.29 <sup>a</sup>	5.5 $\pm$ 0.29 <sup>b</sup>	0.0012
Urban market	43.9 $\pm$ 0.46 <sup>a</sup>	10.2 $\pm$ 0.46 <sup>b</sup>	<0.0001
Average price* in festival days	44.7 $\pm$ 0.3 <sup>b</sup>	49.3 $\pm$ 0.28 <sup>a</sup>	<0.0001
Average price in ordinary days	39.24 $\pm$ 0.44 <sup>b</sup>	43.14 $\pm$ 0.43 <sup>a</sup>	<0.0001
Average price in fasting days	39.75 $\pm$ 0.67 <sup>b</sup>	44.83 $\pm$ 0.62 <sup>a</sup>	<0.0001
Average price of matured chickens	49.96 $\pm$ 0.31 <sup>b</sup>	51.31 $\pm$ 0.3 <sup>a</sup>	0.0018
Average price of growers	35.3 $\pm$ 0.33 <sup>b</sup>	39.7 $\pm$ 0.32 <sup>a</sup>	<0.0001
Average price of eggs	1.3 $\pm$ 0.01 <sup>b</sup>	1.4 $\pm$ 0.01 <sup>a</sup>	<0.0001

-Least sq. means with different superscript within a row are significantly different, ( $P < 0.05$ ).

\* Price in Eth. Birr, in the year 2011/2012 18 Eth. Birr was equivalent to 1 USD

### 3.6. Plumage color and comb type of chickens in market

Chicken weight, plumage color and comb type were price determinant factors in chicken marketing in both agro-ecologies. Buyers first attracted to their favorite feather color and take a hand weighs, bargaining and fix the price based on the estimated weight of the chicken. In addition age and shank color of the chicken was considered as selection criteria to buy the chicken. Birds with smooth and yellow shank color were preferred to white scaly and green shank color. Shank color is also used to estimate the age of the chickens. Experienced buyers, especially traders, estimate the age by looking at the roughness of the legs of the birds and spur length of the cocks. During chicken marketing 16.7% of male and 35% of female interviewed consumers looked at plumage color of the chickens, 6.65% of male and 18.35% of female consumers looked at comb type and 8.35% of male and 10% of

female consumers looked at shank color and smoothness of the shank and the rest 68.3% of male and 36.65% of female interviewed consumers considered all factors (Fig. 2).

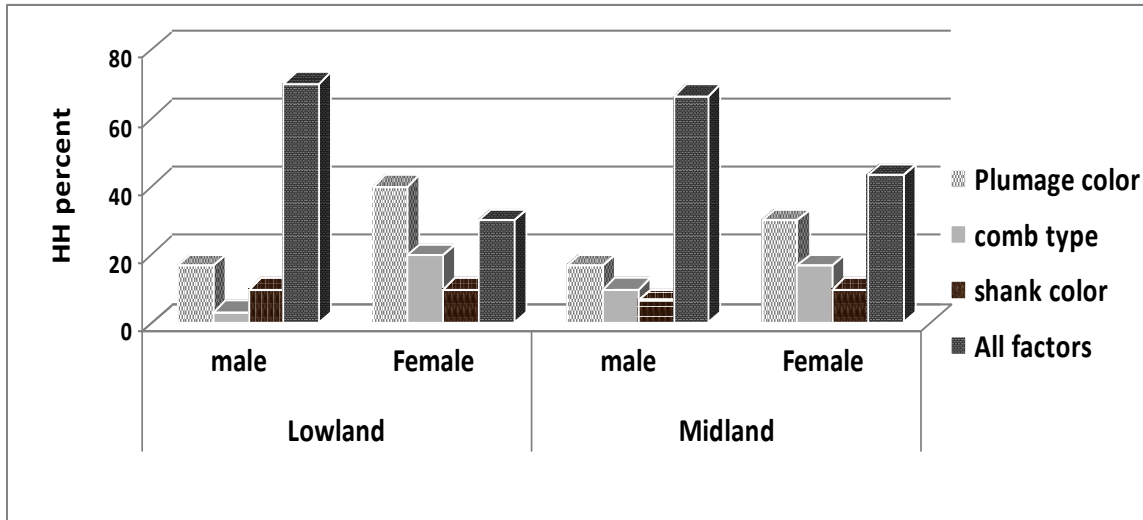


Fig. 2. Factors considered by buyers during purchasing of chickens at market.

Different plumage colors were recorded at market in both agro-ecology. The result of the study revealed that chickens with red plumage color were dominant in the market covers 56.2% of the total chickens followed by grayish (*segemo*) 19.6% and mixed color (*chehcek*) 10.5%. Concerning comb type, double comb cocks (locally called *Dimdm*) covered 69.3% in lowland and 65.5% in midland agro-ecology and cocks with single comb (locally called *Salla*) covered 30.7% and 34.4% in lowland and midland agro-ecological zones, respectively. Average price of double comb type and single comb type cocks were 53±0.35 and 49.3±0.49 birr in lowland and 53.7±0.32 and 51.9±0.45 birr in midland agro-ecology respectively (Table 4). Price of double comb cocks was significantly greater (P<0.0001) than price of single comb cocks. This is attributed to the interest and preference of the consumers to wards double comb cocks but there was no scientific explanation given to the difference in price between double and single comb cocks.

Table 4

Price of cocks with double and single comb types in different market days.

Different market days	Lowland (Mean±SE)		Midland (Mean±SE)		P value
	Double comb	Single comb	Double comb	Single comb	
New year	55.9±0.33 <sup>ab</sup> (49 - 61)	53.3±0.5 <sup>c</sup> (49 - 59)	56.7±0.33 <sup>a</sup> (50 - 62)	54.9±0.47 <sup>b</sup> (53 - 59)	<0.0001
Meskel	56.4±0.42 <sup>c</sup> (49 - 60)	52.6±0.54 <sup>d</sup> (48 - 58)	59.5±0.4 <sup>a</sup> (55 - 63)	58±0.5 <sup>b</sup> (55 - 62)	<0.0001
Any market day	49.1±0.5 <sup>a</sup> (42 - 57)	44.1±0.67 <sup>c</sup> (40 - 53)	48±0.41 <sup>a</sup> (40 - 58)	46±0.55 <sup>b</sup> (40 - 53)	<0.0001
Muslim festival day	53.2±1.3 <sup>a</sup> (43 - 60)	46.7±1.6 <sup>b</sup> (37 - 57)	56.6±1.2 <sup>a</sup> (45 - 72)	54.6±1.7 <sup>a</sup> (40 - 63)	<0.0001
Market in pre x-mas fasting	49.6±0.59 <sup>a</sup> (45 - 55)	48.4±0.86 <sup>ab</sup> (45 - 53)	49.4±0.58 <sup>ab</sup> (40 - 58)	47.4±0.86 <sup>b</sup> (43 - 55)	0.1465
X-mas	54.8±0.51 <sup>b</sup> (50-60)	52.7±0.77 <sup>c</sup> (50-55)	56.4±0.46 <sup>a</sup> (67-50)	54.9±0.65 <sup>ab</sup> (50-58)	0.0007
Average	53±0.35 <sup>a</sup>	49.3±0.49 <sup>c</sup>	53.6±0.32 <sup>a</sup>	51.9±0.45 <sup>b</sup>	<0.0001

-Least sq. means with different superscript within a row are significantly different, (P<0.05).

-Numbers in bracket are range.



### 3.7. Monthly price variation of chickens and eggs

According to the interviewed farmers, prices of chickens varied from season to season and even from month to month in the year, generally low in rainy season and high in dry season. The average price of matured chickens was  $49.96 \pm 0.31$  birr in lowland ranged from 37 - 60 birr and  $51.31 \pm 0.3$  birr in midland agro-ecology range from 40 - 63 birr, and average price of grower chickens was  $35.3 \pm 0.33$  birr ranged from 22 - 40 in lowland and  $39.7 \pm 0.32$  birr range 25 - 45 birr in midland agro-ecology. Monthly price variation of chickens from August 2011 to March 2012 is displayed in Fig. 3.

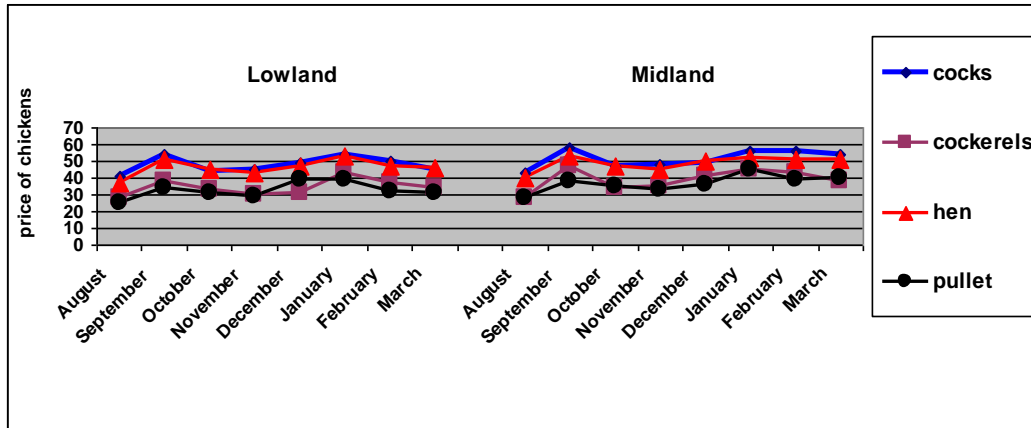


Fig. 3. Price of chickens in the months from August 2011 to March 2012 in lowland and midland agroecological zones of central Tigray.

Socio-cultural and religious festivals were the main deriving factors of price variation. Price of chicken products was high mainly in time of cultural and religious festivals and non-fasting months like Ethiopian New Year and *Meskel* in September, Ethiopian X-mass and other socio-cultural festivals like wedding in January. In addition farmers had always better economically in these months so consumption could be greater than selling of chickens. The major egg price determinant factors in addition to socio-cultural festivals were type and size of the eggs. The bigger the size of the egg the higher the price was. But regardless of the size, price of exotic type of eggs was not as high as the local type of eggs particularly in low altitude of the study area. Price variation of eggs in the months from August 2011 to March 2012 is shown in figure 4.

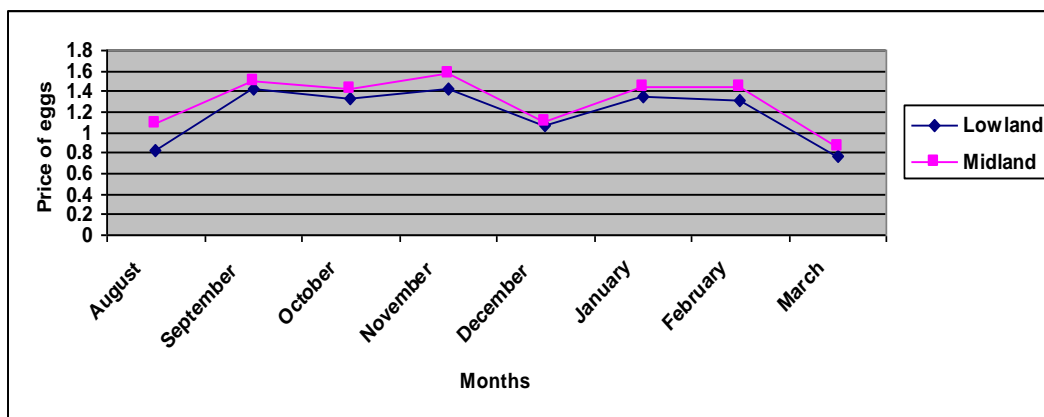


Fig. 4. Price variation of eggs in the month August 2011 to March 2012 in lowland and midland agroecological zones.

### 3.8. Chicken and egg traders (middle men)

Chicken and egg traders collect chickens and eggs from producers at farm gets, road sides and different local or urban markets. Most chicken & egg traders used the activity as part time work (66.7%) to get additional income.



Some of the traders were involved in either chicken (40.8%) or egg (33.3%) marketing and others involved in both egg & chicken marketing (25.9%). According to these traders 87.8% of the collected chickens were sold to direct consumers, 11.4% to restaurants and or hotels and sometimes they transport to other urban markets (0.8%) if they have got better information about price of chickens. In the same way about 74.9% of the collected eggs were sold to direct consumers and 25.1% to hotels and or café's. Average chicken purchasing capacity of the traders were 7 chickens per any market day (ranged 2-15) and 18 chickens per festivals market day (ranged 4-45) but average chicken selling capacity were 6 chickens per any market day (ranged 1-10) and 16 chickens per festivals market day (ranged 4-40). Most of the interviewed traders were males (77.8%) and the rest 22.2% were females with 3 years average chicken and egg trading experience (ranged from 1-8 years). Concerning education level 44.5% of the traders have completed elementary school and 40.7% completed secondary school while the rest 14.8% of the traders were uneducated persons. About 66.7% of the traders found between the ranges of 18-35 years old, 25.9% found between 36-50 years old and 7.4% found above 50 years old. This indicates that most of the traders are youngsters with at least elementary school completed. There for it is easy to trained them and make cooperative so as to avoid unnecessary competition between the traders and as the same time to improve poultry marketing system in the area.

#### 4. Discussion

From the result of the study producers sell their chickens when there is a need for money and during cultural and religious festivals. In line with this Dessie and Ogle (2001) reported that farmers sold live birds and eggs, particularly during holidays and festivals, at onset of disease outbreaks and when they needed to meet a cash requirement for some small household expenditure. In this case women were more frequently involve in poultry marketing. Similarly Fisseha *et al.* (2010) reported that women and children were the major members of the household involved in marketing of live birds.

Poultry producers in midland areas have better access to urban markets. Access to markets, which greatly influences chicken and egg marketing system of the study area, was mainly determined by topography of the area, infrastructure and distance to the market. With limited market access chicken price was mostly low and production purpose of the farmers had focused on consumption and hatching for replacement in lowland agro-ecological zones of the study area. This might have its own influence on the total number of chickens reared per households and on the overall production system of the farmers in the area. In line with this report households in villages closer to the regional capital Mekelle had a better market access, kept larger flocks and got higher prices than those in the more remote villages (Aklilu *et al.*, 2007).

Producers use different mechanisms like carry on shoulder and by car to transport their chickens and eggs. Similar mode of chicken and egg transportation was reported by (Fisseha *et al.*, 2010).

Chicken price in festival market days, fasting market days and ordinary market days was varied and the average price of chickens and eggs in midland was higher than in lowland. This could be attributed to market access and high demand of poultry products in midland agro-ecology. The current price of this finding is higher than the reported prices 24.7 birr for matured male and 15.3 birr for matured female (Tadelle *et al.*, 2003)

Even though size was the main determinant factor of price in egg marketing, consumers preferred to purchase local egg to exotic breed eggs. In line with this Fisseha *et al.* (2010), reported that most consumers preferred to buy local eggs from producers as they were considered to be tasty and the dark colored yolk was commonly favored. Abdelqader (2007) in Jordan also revealed that eggs of local chickens fetched higher prices than commercial eggs of exotic breeds.

The dominant plumage colour at market was red. Similarly in other parts of the country as reported by Fisseha *et al.* (2010) red & white colours were most preferred and covered more than half of the chicken population in Bure district. The significant difference between the price of Double and single comb cocks was attributed to the interest of the consumers. In line with this Kibret (2008) reported that non-single (Pea and Rose) comb *Nech* and *Key* cocks and cockerels had higher prices (as much as 5 Birr higher) than the single combs of the same color. Fisseha *et al.* (2010) also reported that double (rose) comb was more privileged than single comb types in terms of preference, market price and demand.

Farmers sold their chickens mainly in the beginning of rainy season to minimize chicken lose due to disease outbreaks and or to protect their crop seedlings from damage. In such situation price of chickens decreased significantly as the result of higher supply than demand. In line with this Dessie and Ogle (2001) reported that, live

birds were sold at the onset of local disease outbreaks to prevent anticipated financial losses and in such circumstances, the price fell dramatically owing to the high supply of birds relative to demand. Farmers also need to keep more chickens in the dry season than in rainy season. Ultimately the demand and supply of chickens might be affected by these factors and contributed to price variation of poultry products in both agro-ecologies. Similarly Hallima *et al.* (2007) reported that, price of live chickens in Northwest of Ethiopia was affected by seasonal demand (holidays and fasting seasons) and Kibret (2008) also reported that, the main reasons for the seasonal price variation were socio-religious factors. Seasonal effect on chicken price was also reported by Abdelqader *et al.* (2007) in Jordan and he stated that during the summer season local chickens had higher prices than during the winter.

## 5. Conclusion

In both agro-ecology there was no separate market place for chicken and egg marketing. Women and children were the major members of the household involved in marketing of live birds and eggs. Price of chickens was highly influenced by cultural and religious festivals, plumage color and comb type. Chickens with red plumage color were dominant in the market and attract premium price. Market type and distance also have an influence on chicken and egg price. Hence women and children are the main actors of poultry marketing, provision of training on concepts of marketing, supply and demand is imperative to improve rural poultry marketing system.

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